A Pilot Study Tracking Physiological and Psychological Indicators of Stress

Garrett G. Chesley

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A Pilot Study Tracking Physiological and Psychological Indicators of Stress

by

Garrett G. Chesley

A Dissertation submitted in partial satisfaction of the requirements for the degree of Doctor of Philosophy in Clinical Psychology

September 2008
Each person whose signature appears below certifies that this dissertation in his opinion is adequate, in scope and quality, as a dissertation for the degree Doctor of Philosophy.

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Jason E. Owen, Professor of Psychology

Lee S. Berk, Professor of Public Health
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ABSTRACT OF THE DISSERTATION

A Pilot Study Tracking Physiological and Psychological Indicators of Stress

By

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Doctor of Philosophy, Graduate Program in Clinical Psychology
Loma Linda University, September 2008
Dr David A. Vermeersch, Chairperson

Aims: It is the aim of this research to investigate the degree to which psychological and physiological distress levels coincide for those receiving psychological treatment. Another aim of this research is to investigate the effects of feedback to therapists on patient progress on a psychological and physiological outcome measure.

Methods: Adult outpatient partial hospitalization patients participating in eating disorder treatment were invited to take part in this research. In addition to demographic data, each participant was asked to fill out the Outcome Questionnaire – 45 and to deposit 4 ml of saliva into a collection tube to obtain cortisol measurements three times during the course of treatment (pretreatment, time of signal, and at posttreatment). In addition, a psychological assessment, a semi-structured clinical interview, and case notes were used to provide several case study examples.

Results: The results demonstrated mixed outcomes with several of the hypotheses being supported. Specifically, the results seem to substantiate previous research on the OQ-45, while the cortisol measurements partially confirm the stated hypotheses. In relation to pre-post differences, both the self-report psychological measure and the biological marker suggest that treatment is beneficial.
**Discussion:** These results support the mind – body and psychoneuroimmunology research that posits the inseparable connection between the mind and the body, treating the person as a complex set of interactions that occur between thoughts and emotions, the biological nature of the body, and socio-cultural factors. Implications for future research, program development, and delivery of treatment are discussed.
Introduction

Recent interest in the relationship between the brain, immune and endocrine systems, and health outcomes has witnessed a proliferation of research. An extensive body of literature exists on stress, which has traditionally been defined unidimensionally as physiological stress. More recently, social and biological scientists as well as clinical practitioners have utilized this research in an attempt to ameliorate the emotional distress, dysfunction, physical diseases, and social ills created by stress (Lazarus, 1999). Consequently, this work has focused on the implications of psychological and social factors on health and well-being (Rabin, 1999). Not surprisingly, we have witnessed a flooding of stress reduction and coping techniques aimed at preventing, eliminating, managing, or learning to live with the experience of daily stress (Lazarus, 1999). Growing out of this focus is an emphasis on interdisciplinary development of theory and research as it is evident that social, physiological, and psychological health factors are important.

A distinctive feature of this research is the use of both quantitative and qualitative methods of inquiry. The idea behind a mixed method or multitrait – multimethod approach is that it avoids the difficulties associated with basing the validity of the results of a study on a single method. In other words, the relevant correlations or results of the study may be due to their common basis in the same method of measurement rather than providing further evidence of validity (Rosenthal and Rosnow, 1991). More than one method is used to ensure that the variance is associated with the trait and not the method (Jick, 1979). This enhances our confidence that the convergence or agreement between the two methods are not a methodological remnant but a valid result (Bouchard, 1976).
The general assumption of a mixed method approach is that it provides numerous viewpoints that allow fixing on a real effect in a way that is unattainable from a single perspective (Brewer and Collins 1981).

In order to conduct research that is interdisciplinary and have the results be relevant to multiple fields of study (e.g. social, psychological, and biological scientists as well clinical practitioners) the use of a mixed method approach seems appropriate. However, there are those who argue that a mixed approach is unadvisable due to the conflicting attributes of the paradigms. That is, the different paradigms used will usually represent irreconcilable assumptions about the nature of the world and what is important to know, thereby rendering the mixed method approach neither possible nor sensible (Smith, 1983; Smith and Heshusius, 1986). Others take the opposing viewpoint, which contends that it is precisely the independence found in the mixed methods incompatibilities that render them useful. This pragmatic approach is more interested in the practical difficulties of the problem in determining what is needed to answer important scientific questions (Reichardt and Cook, 1979). A middle – ground approach seeks to reconcile these viewpoints by preserving paradigmatic integrity while asserting that our understanding of a phenomenon is improved by the convergence of data across methods (Kidder and Fine, 1987). The approach in this paper recognizes that incommensurable philosophical assumptions or paradigms are not incomparable. That is, such incompatibility between methods holds the potential for profound and compelling comparisons (Kuhn, 1997; Slife, 1999). By providing quantitative results alongside qualitative data in the form of case studies, it is expected that those cases presented will
capture the complexity of the individual and those additional variables not measured quantitatively that are associated with the patient's care and success.

The purpose of this research is to combine what we understand regarding the physiological reaction and the psychological reaction to chronic stress. It is an attempt to clarify the biological and psychological connection with respect to illness and recovery and define stress along more than one dimension. By connecting a psychological marker of distress to a physical marker of distress, it is expected that new understanding will emerge in regards to how people react to stress in real time as they move through a treatment program.

*Defining Stress*

Stress is understood in a variety of ways with a variety of connotations and definitions depending on what part of the human experience are being described. In Western philosophies, stress is often understood as a loss of control, somewhat akin to a chicken running around with its head cut off. In Eastern philosophies, stress is likely to communicate a lack of inner peace or internal turmoil and conflict. When we study stress in terms of its physiological ramifications it is described as the wear and tear on the human body. Psychologically, stress is frequently understood as occurring when a person's ability to cope is exceeded by external stressors or events that produce a state of anxiety (Lazarus, 1999). As far as we know, the concept of "stress" was first used in the 14th century to describe the hardships, adversities, or afflictions suffered by people in a nontechnical sense (Lumsden, 1981).

Each of these definitions of stress is arguably the "right" one. It is important that we clearly define a working definition of stress that characterizes what we mean by this
term. The study of psychoneuroimmunology (PNI) describes situations in which there are physiological differences in the way the body reacts to what may be loosely defined as good or bad stress (Seaward, 2005). In an attempt to combine the PNI data with a holistic approach to stress, the following definition of stress is suggested: Stress is the inability to cope with a perceived (real or imagined) threat to one’s mental, physical, emotional, and spiritual well-being, which results in a series of responses and adaptations (Seaward, 2005). Since this definition seeks to incorporate the multiple dimensions of a person’s experience, placing equal emphasis on perceptions as well as physiological reactions to stress, it is a useful and more accurate description of what happens to us when we feel “stressed.”

In order to understand more explicitly what is meant by stress a brief discussion of the different types of stress is needed. Hans Seyle (1974) made a distinction between two types of stress: eustress and distress. Eustress is defined as constructive, striving, motivating, or inspiring and is associated with positive emotions that are protective of good health. In contrast, distress is defined as destructive and debilitating, associated with negative emotions like anger and aggression, and is considered damaging to health. Although these types of stress are rather vague, when considered within our working definition of stress offered earlier, the relevance of perception becomes unavoidable. A person creates or constructs their reality from theories and concepts about the world that reflect their beliefs, values, and biases. Since groups of people differ in their perceptions of reality, there is little, if any, clear consensus. These differences are therefore important to understand how people interpret their worlds and how these interpretations affect the meaning we attribute to stressful situations (Lakey and Cohen, 2000; Kelley, 1969). In
other words, what is distressful to one person may not be to another. Furthermore, what was distressful to a person may not be later on or the next time a similar situation arises. Therefore, defining what is or is not distressful is ultimately identified by how a person constructs or interprets the situation along the multiple dimensions (e.g. physical, emotional, spiritual, etc) affecting him or her. The terms distress and stress will be used interchangeably as distinct from what is eustressful.

What a person perceives as distressful is broken down into two types of stress that are related to how the body reacts. Depending on the situation with which a person is faced he or she may be experiencing acute or chronic stress. Acute stress is commonly defined as intense and disappearing quickly. It serves an important function in our ability to survive “the moment” as it mobilizes energy that is delivered to where it is most needed, pain is dulled, and costly anabolism is delayed until a more favorable time (Sapolsky, 2002; Seaward, 2005). The body is essentially preparing to survive the stressor and readying itself to return to homeostasis. It is an ideal response for short-term physical stress. In contrast, chronic stress is less intense and remains for extended periods (e.g. hours, days, weeks, or even months). Under chronic stress conditions a person is perpetually aroused for danger and it is this type of distress that accounts for an increased susceptibility to diseases (Seaward, 2005). When the stress response is activated for too long or too frequently and for nonphysiological reasons (i.e. psychological and social stressors), a greater risk of contracting disease appears (Sapolsky, 2002). Having defined stress holistically and identified the difference between chronic and acute stress, a brief overview of the physiological responses to stress is needed.
The Stress Response

Walter Cannon, a Harvard physiologist, was the first to describe the physiological reactions to stress with the term fight-or-flight. He noticed the body preparing to react to stress in one of two ways: either to attack and defend oneself or to escape the dangerous situation. When the body reacts with the fight-or-flight sequence it takes only seconds. This type of stress and physiological reactions are understood as acute. Emotions are significant indicators of how a person might react to distressful situations. It is important to note that anger and aggression are associated with the “fight” portion of the acute fight-or-flight response and that fear is related to the “flight” portion of the stress response.

The consequence of emotions and a person’s idiosyncratic construction of the event itself and the events leading up to the threatening situation represent an indispensable component in the holistic view of stress and health. The effects of stressful life events are reduced or amplified by the perceived availability of resources on hand to manage the stressful events (Lazarus, 1966; Lazarus and Folkman, 1984; Moos and Billings, 1982). Therefore, stressful life events are less harmful to an individual who perceives a high degree of resources available for coping with the stressful event. Such a perception leads the person to interpret these events less negatively (Cohen and Hoberman, 1983; Cohen and McKay, 1984). It follows that how a person interprets a situation is very important in understanding the perceived stressfulness of the event and its consequences for health in that those appraisals that are more negative will lead to greater emotional distress (Lazarus, 1966; Lazarus and Folkman, 1984).
The physiological systems affected by the stress response are briefly reviewed using a simplistic overview of the stages through which an organism moves during the stress response. During stage one, the brain via one or more of the five senses detects the stimuli. In stage two, an evaluation of the stimuli is performed and judged to be either a threat or not. If not a threat, the stress response terminates. If judged a threat the brain activates the nervous and endocrine systems to prepare quickly for defense or escape. During stage three, the body stays activated and aroused until it is determined that the threat has passed. Stage four is a return to physiological calmness where the body is in homeostasis (Seaward, 2005).

As the stress response moves through these stages nearly all of the physiological systems of the person are affected. For example, an increase in a person’s heart rate, blood pressure, and perspiration is experienced. Ventilation, serum glucose levels, fatty acids mobilization, and blood coagulation are increased while the vasodilation of arteries occurs. A decrease in gastric movement and abdominal blood flow also take place. All of this is meant to prepare us for surviving a perceived physical threat. However, the stress response is inadequate in dealing with nonphysical threats in situations like being late for an important meeting, receiving a parking ticket, a sudden death in the family, unemployment, or preparing for a final exam to give just a few examples. Furthermore, the stress response is induced not only with physical and nonphysical threatening situations, but also with imagined threats to which the body reacts with the same degree of intensity (Sapolsky 2002; Seaward, 2005). Whether it is the imagined monster in the closest, the unsupported idea that the boss is “out to get you”, the feeling of being followed late at night on a dark street, or maintaining a dissatisfying relationship, a whole
milieu of physical and nonphysical threats exist that are both real and imagined that pose a risk to a person’s health.

Review of the Nervous System

The nervous system is divided into two parts: the central nervous system (CNS) and the peripheral nervous system (PNS). The CNS is comprised of the spinal cord and brain. The PNS is divided into two networks: the somatic and autonomic nervous system (ANS). The ANS is divided into two branches: the sympathetic nervous system and the parasympathetic nervous system. Since the CNS holds the brain and spinal cord it is the location of the different functions of the brain including the vegetative processes (e.g. heartbeat, respiration, vasomotor activity), limbic system (e.g. pain and pleasure, emotions, appetite), and neocortical functioning (e.g. organization, creativity, logic, memory). The PNS is comprised of the neural pathways of the extremities. The somatic pathways are responsible for transmitting sensory information between the senses and higher brain centers through efferent and afferent pathways. The ANS is automatic because it functions outside of conscious awareness and regulates visceral activities of vital organs (e.g. circulation, digestion, respiration, temperature regulation). Although it is convenient to conceptualize the ANS as functioning outside of conscious thought, recent research suggests that both systems of the PNS (voluntary somatic system and the ANS) are influenced by higher mental processes (Seaward, 2005) and that the ANS and CNS function in close collaboration (Rabin, 1999; Sapolsky, 2002). The nervous system functions in a complex and integrative manner.

The important systems for our focus on the stress response are the component parts of the ANS: the sympathetic and parasympathetic nervous systems. The
sympathetic nervous system releases substances that are responsible for the fight-or-flight response. Specifically, a pair of catecholamines called epinephrine (adrenaline) and norepinephrine (noradrenaline) begins a cascade of events in several organ tissues that prepare the body for the fight-or-flight response. For example, these substances cause an increase in heart rate and myocardial contraction, dilation of pupils, vasoconstriction of arteries to muscles not involved while vasodilating arteries to working muscles, release of glucose for rapid energy expenditure and many other functions. Epinephrine and norepinephrine have a rapid release and effect on targeted organ tissues. Due to the speedy effect of the sympathetic nervous system, it is classified as an immediate response to stress (Rabin, 1999; Seaward, 2005; Sapolsky, 2002).

In contrast, the parasympathetic nervous system is associated with energy conservation and relaxation. During this time acetylcholine (ACh) is released, which is a neurological agent that decreases metabolic activity. Whereas the sympathetic nervous system is concerned with energy expenditure, the parasympathetic nervous system allows for cell regeneration and for the body to return to homeostasis. Consequently, the parasympathetic nervous system is largely responsible for a decrease in heart rate, ventilation, muscle tension, and other functions (Rabin, 1999; Seaward, 2005; Sapolsky, 2002). Just as the sympathetic nervous system represents the "fight-or-flight" bodily response, the parasympathetic nervous system is often thought of as the "rest-and-digest" bodily response.

Both these systems are antagonistic to each other. Both are "turned on" at the same time, however only one system is able to dominate visceral activity at any given moment. In this way, they are mutually exclusive; the sympathetic nervous system
dominating during times of stress and the parasympathetic system controlling the body’s movement toward homeostasis (Rhoades and Tanner, 2002; Seaward, 2005). The implication being that we cannot physically be aroused and relaxed at the same time.

*Neuroendocrine Pathways and Immunosuppression*

The endocrine system regulates metabolic activity associated with endurance rather than speed. It is comprised of four components: glands, hormones, circulation, and target organs. Endocrine glands are located in various parts of the body that produce and secrete chemical substances called hormones that facilitate changes (increase or decrease) in cellular metabolism. Hormones secreted by the glands travel to target organs (e.g. heart, skeletal muscle, arteries) through the blood stream.

The endocrine processes associated with the stress response are explained by the function of those glands most intimately involved. The pituitary gland is responsible for creating several essential hormones involved in the stress response. It is directly influenced by the hypothalamus, which appears to "order" this sequence of hormonal events. The thyroid gland is responsible for increasing the metabolic rate. The adrenal gland is located on the top of each kidney and plays an important role in the stress response. It consists of two parts: the adrenal cortex (exterior of adrenal gland) and the adrenal medulla (inside of the adrenal gland), each manufacturing distinct hormones and therefore having different affects on the body. The adrenal medulla secretes catecholamines (epinephrine and norepinephrine) that function similarly to those catecholamines secreted by the nerve endings of the sympathetic nervous system (i.e. acute fight-or-flight stress response). The adrenal cortex produces hormones of a different class called corticosteroids, of which there are two types: glucocorticoids and
mineralocorticoids. Mineralocorticoids (i.e. aldosterone) function to maintain electrolyte balance (potassium and sodium) and plasma volume, which are essential for healthy circulation. The primary glucocorticoid is cortisol, which is involved in a number of important functions associated with chronic stress and immunosuppression. The mechanisms and affects on the immune system of these processes and hormones will be discussed next.

*The Vasopressin Axis.* A biochemical pathway is often referred to as an axis. In this section we discuss the vasopressin axis. Vasopressin is synonymous with the antidiuretic hormone (ADH), which is synthesized in the hypothalamus and released through the pituitary gland. Vasopressin or ADH regulates fluid loss through the urinary tract (e.g. water reabsorption or decreased perspiration) that has a prominent consequence on blood pressure by regulating the amount of water in the blood (called blood volume). The increasing or decreasing of blood volume has a prominent consequence on stroke volume (the amount of blood pumped through the left ventricle of the heart). Under chronic conditions, the result is a perpetual state of elevated blood pressure. Vasopressin, aldosterone, epinephrine, and norepinephrine have the common purpose of elevating blood pressure to ensure adequate oxygenated blood for active muscles. This mixture of stress hormones under chronic conditions makes it difficult for the body to return to physiological homeostasis and people literally die from the complications of prolonged exposure to stress hormones as such conditions lead to hypertension and cardiovascular heart disease.
The HPA Axis. The hypothalamus – pituitary – adrenal axis (HPA axis) begins with the release of corticotrophin releasing hormone (CRH) from the anterior hypothalamus. CRH stimulates the release of Adrenocorticotropic hormone (ACTH) from the pituitary gland. ACTH reaches the adrenal cortex through the bloodstream, which triggers the release of a set of corticosteroids (cortisol and aldosterone). Cortisol is the primary stress hormone that is responsible for the process that breaks down fatty acids to be used as energy by the body. Its effects are considered prolonged since they last for minutes to hours and under chronic stress where high levels of cortisol are found the integrity of the immune system is compromised.

The body utilizes several pathways or axes to ensure that the organism is ready for action to survive the perceived threat. The message of potential harm or loss is extremely important and consequently, the message is sent using several mechanisms with differing durations. The sympathetic nervous system (fight-or-flight response) uses epinephrine and norepinephrine that is secreted through nerve endings that represent an immediate (2-3 seconds) response to stress. The adrenal medulla, which also uses epinephrine and norepinephrine that travels through the blood stream, characterizes an intermediate effect (20-30 seconds) on our sense of stress. In contrast to these mechanisms of stress response, the HPA and vasopressin axes and neuronendocrine pathways use a set of hormones (e.g. ACTH and cortisol) that is consistent with a prolonged response (minutes, hours, days, or weeks) to stress that is characterized as chronic.

Immunosuppressant effects of Cortisol in the HPA Axis. As the body reacts to stress by utilizing the HPA axis it increases the amount of glucocorticoids and,
consequently cortisol. Cortisol is linked with the suppression of the immune system. More specifically, with the depletion of white blood cells that represent an important component of the immune system and its ability to ward off disease and illness (Seaward, 2005). However, some researchers suggest that it is not this simple. The immune system is extremely complex as it defends the body against infectious challenges (Dunn, 1989).

The basic cell types involved in the immune system are lymphocytes and monocytes. T cells and B cells are two types of lymphocytes. B cells are responsible for producing antibodies that bind to and mark a pathogen or infectious agent rendering it immobile and targeting it for destruction. T cells, of which there are several types (e.g. T helpers, T suppressor cells, and cytotoxic killer cells), are ultimately responsible for the destruction of infectious agents in the body. When an infectious agent or pathogen breaches the outer defenses of the body it is recognized by a type of monocyte called a macrophage. A T helper cell recognizes the agent as foreign and dangerous since it is presented by a macrophage. This triggers a proliferation of T cells and B cells that crescendo into the destruction of the foreign particle.

To increase the organism’s chances of survival and ability to fight against foreign attacks, the immune cells are scattered throughout the circulation of the body. As a result, the body produces chemicals to communicate between the immune cells in order to coordinate an attack. For instance, when a macrophage first recognizes a pathogen it releases interleukin-1 (IL-1), which triggers the T helper cell to release interleukin-2 (IL-2) that encourages T cell proliferation. This brief and simplistic overview of the immune system demonstrates the complexity of interactions involved and the multiple points
where interruptions may occur with the hormones and chemicals involved in the stress response.

Immunosuppression occurs during chronic stress. Chronic stress is manufactured through the HPA axis with the use of cortisol, a glucocorticoid. Since the HPA axis involves parts of the brain, it follows that the brain is able to influence the immune system (Ader et al., 1991; Rabin, 1999; Seaward, 2005). Cortisol is able to do this by inhibiting or disrupting the network of immune signaling described previously. This results in the inhibition of the release of cytokines, hindering the proliferation of T cells and B cells by disrupting the release of IL-1, blocking the development of lymphocytes, and can even destroy lymphocytes (Sapolsky, 2002).

When the body first reacts to stress, it is an adaptive reaction where the body prepares itself for survival both during and after the threat of harm or loss. Initially the body responds with a mixture of stress hormones (immediate and intermediate hormones – i.e. epinephrine and norepinephrine) and an enhancement of immune function immediately follows the onset of a stressor. When cortisol begins to take effect some 30 minutes later the immune system is suppressed through various mechanisms, but is not suppressed below baseline (Munck, Guyre, and Holbrook, 1984; Sapolsky et al., 2000). The immune suppression responsible for reaching levels far below a person’s baseline is associated with massive and prolonged stressors. In other words, the initial suppression of the immune system by cortisol is adaptive in that it aids the body in returning to a state of homeostasis. However, chronic stress, which is defined holistically to include not only physiological, but also other dimensions like psychological stressors, and the perpetual
build up of stress hormones, like cortisol, in the body result in immune suppression that contributes to the increased susceptibility to disease and illness.

_Psychotherapy Outcome Research_

Congruent with our working holistic definition of stress indicating that it is the inability to cope with a perceived threat to one’s mental, physical, emotional, and spiritual well-being and our understanding of the connection between mind and body as being two aspects of one person, it is essential to conduct research that seeks to integrate what we understand concerning the body with our knowledge regarding the mind. The stress response provides a valid indicator of chronic stress situations with the hormone cortisol, which supplies a type of “body” marker. Understanding that stress and emotions are interdependent and that isolating and researching one at the expense of the other necessarily limits our understanding of how people react and the struggle experienced to adapt. Psychotherapy outcome research has a history of tracking the degree of psychological distress experienced by those receiving treatment. One such program developed by Lambert et al (Lambert, Whipple, Smart, Vermeersch, Nielsen, and Hawkins, 2001; Lambert, Whipple, Vermeersch, Smart, Hawkins, Nielsen, and Goates, 2002) tracks the psychological distress level of patients on a session-by-session basis allowing for the development of a “mind” marker with which to compare and contrast the “body” marker of cortisol. Provided is a review of psychotherapy outcome research with a focus on Lambert and colleagues feedback system.

Psychotherapy research has consistently reported a well-documented trend of patient deterioration. The rate, prevalence, and magnitude of deterioration are difficult to determine. However, Lambert and Bergin (1994) suggest that deterioration rates vary
between 5% and 15%, which is consistent with other meta-analytic reviews. It is noteworthy that the rate of deterioration among patients cuts across patient populations, theoretical orientation, and a variety of treatment modalities, including group and family therapies (Mohr, 1995; Shapiro and Shapiro, 1982; Smith, Glass, and Miller, 1980).

Moreover, a deterioration rate of 5% was found in untreated groups (Lambert, DeJulio, and Stein, 1978), which suggests that a small percentage of patients entering treatment will either receive no gain from treatment or worsen compared to if they had not begun treatment at all. This underscores the importance to discover the factors that lead to poor treatment outcomes and early termination from psychotherapy. Once these factors are known and understood, then clinicians are able to address these factors to minimize their affect and improve treatment outcome for those predicted to have a poor treatment response.

For at least twenty-two years, researchers and clinicians have wanted research that directly speaks to clinical practice. Barlow, Hayes, and Nelson (1984) provide an example of this sentiment when they wrote:

The successful experiences of practitioners must be observed, verified, and accumulated through empirical practice and accountability. The theoretical and research developments in applied research centers that hold out so much promise for dealing with the variety of severe behavioral and emotional problems must be tested in ways that will influence and be relevant to practitioners. Attention must be paid to the absolute amount of improvement or the size of effect, with an emphasis on changes within the individual in his or her own particular environment. Without the development of a cumulative body of knowledge on the effects of various interventions in the human services, we are doomed to a series of never-ending fads and promises. Traditional scientific methodology alone is not appropriate to answer the major questions relevant to applied settings. An alternative scientific and empirical approach is needed. (pp. 36-37)
A schism exists between research findings and clinical application that is manifest in clinicians’ skepticism concerning the relevance and applicability of psychotherapy process and outcome research. This skepticism, although at times warranted, persists in the abundance of clinical trials and effectiveness studies that provide evidence that psychotherapies of various types are effective for a variety of psychological disorders (Lambert, and Bergin, 1994; Lipsey and Wilson, 1993; Smith, Glass, and Miller, 1980; Wampold et al., 1997). Simultaneously, managed care organizations began placing limitations on types and lengths of treatments and questions about the quality and effectiveness of these treatments on patients undergoing psychological services were raised. This resulted in a push for outcome research that has spawned a worldwide phenomenon. Although the drive for outcome research is understood to have occurred independent of any specific payment system (Andrews, 1995), it underscores the essential issues of the rising costs of healthcare with finite and limited resources and the need to demonstrate effective and efficient services.

Out of this political – social environment, a new research methodology emerged in 1996 by Howard, Moras, Brill, Martinovich, and Lutz to evaluate psychotherapy treatments for individual patients. It is a patient-focused methodology, meaning that it monitors patient progress over the course of psychotherapy and feeds back this information to the therapist, supervisor, or case-manager in an attempt to improve the patient’s treatment outcome.

Patient-focused research is a sort of synthesis between two broader forms of outcome research, namely efficacy research or clinical trials and effectiveness research (Lambert, 2001). The first type, efficacy research or clinical trials, uses the methodology
of random assignment of patients into an experimental and control group to test specific therapies. Due to this methods' use of random sample selection, highly controlled conditions under which the intervention is administered and delivered (usually through treatment manuals), and therapist competency and adherence to the treatment regimen, this type of research is described as having a high degree of experimental control. Standardized measures are used as pre and post tests and the results are discussed in terms of average, or mean, response differences in treatment outcome between the control and experimental groups. Efficacy research seeks to identify differences between treatment outcomes of specific therapies in order to identify which specific treatments, on average, work.

Efficacy research comprises an important segment of findings in psychotherapy research. However, it does not always provide much important information to the practicing clinician. Because of the sample homogeneity and the rigorous experimental controls required in efficacy research, what it gains in internal validity, it loses in external validity. Opponents of efficacy research have described this method as a contextless method used to study context-rich participants and interventions (Neisser, 1991); while those in favor of efficacy research claim it to be the core method for identifying empirically supported treatments (Kendall, 1998).

One possible answer to the lack of generalizability of efficacy research is the second methodology called effectiveness research. Effectiveness research attempts to reflect more accurately patient encounters experienced by clinicians in daily routine practice. This requires effectiveness research be conducted in “real world” settings utilizing heterogeneous samples, which often necessitate quasi-experimental designs and
non-random assignment into comparison groups. This means that the comparison groups may differ on one or more variables in addition to the independent variable of interest, allowing for several possible interpretations of the data due to the lack of experimental control. Because of its reliance on comparison groups, the results are explained as average group differences that allow for conclusions at the group level, but lose interpretability at the individual level. In other words, what effectiveness research gains in external validity, it loses in internal validity. Therefore, effectiveness research and efficacy research may be understood as complimentary since one compensates for the weakness of the other.

Although important in providing more "naturalistic" research findings to clinicians, effectiveness research has some additional weaknesses. Besides those weaknesses associated with a quasi-experimental design mentioned above (lack of internal validity), effectiveness research often utilize post hoc surveys that require numerous replications to test alternative interpretations of the data. Furthermore, effectiveness research does not escape the limitation inherent in efficacy research in its restriction of examining average group responses to an intervention without concern for the individual patients.

Effectiveness research only partially reduces the schism between research results and the practicing clinician. It fails to adequately respond to the questions and concerns of therapists in everyday practice. For example, is this patient benefiting from treatment, should I change the treatment plan, or is it time to end therapy? Represented in these questions are issues that have been the focus of debate in scientific and professional journals, like *American Psychologist* (VandenBos, 1996), the *Journal of Consulting and
Clinical Psychology (Kendall and Chambless, 1998), and Clinical Psychology: Science and Practice (Barlow, 1999).

Patient-focused research centers on individual patient outcome instead of the outcome for a group of patients. In this way, it stands in contrast to efficacy and effectiveness research and presents as a viable alternative method for studying psychotherapy outcome. This research methodology is specifically designed to concentrate on those questions most important to clinicians. That is, it seeks to answer the question “Is this treatment working for this patient?” by focusing on an individual patient’s response to ongoing treatment. This allows the therapist to monitor patient progress and modify treatment accordingly in order to respond to the patient’s specific needs at that time. Patient-focused research represents a “bottom-up” approach to quality assurance and builds on the results from past research related to “empirically validated psychotherapies” (Lambert, 2001).

Much interest has been growing in this area of research, as manifest by a special section of Clinical Psychology: Science and Practice (Kazdin, 1996), that encourages the assessment of individual patient outcomes in routine clinical practice. The advantages of “data-based” management of clinical practice for improving quality of care, the use of repeated assessment of patient status, and employing cut-off scores to determine a clinically significant change have been discussed (Lambert and Brown, 1996).

As a result of this growing interest in patient-focused research, a plethora of quality assurance research programs have emerged in the United States (Lambert, 2001; Lambert, Hanson, and Finch, 2001; Lueger, Howard, Martinovich, Lutz, Anderson, and Grissom 2001), Germany (Kordy, Hannöver, and Richard, 2001), and the United
Kingdom (Barkham, Margison, Leach, Lucock, Mellor-Clark, Evans, Benson, Connell, Audin, and McGrath, 2001). Each has sought to measure ongoing patient response to treatment and feed back this information to clinicians in an attempt to improve the effects of psychotherapy. Such research represents an effort to bridge the gap between efficacy and effectiveness research with clinical practice (Lambert, 2001).

Measuring Outcome in Psychotherapy Quality Management

This research utilizes one of these systems developed by Lambert and colleagues, which tracks patient progress on a session-by-session basis and feeds back this information to clinicians in order to assist them in treatment planning. The use of patient-focused research in the context of a psychotherapy quality management system requires efficient outcome measurement rather than the more comprehensive assessment batteries applied in efficacy studies. In contrast to efficacy studies, which often require hours of assessment from multiple research perspectives of change with a small number of homogeneous patients, patient-focused research uses a single, brief measure that can be given on a session-by-session basis to a heterogeneous group of patients (Howard et al., 1996).

Given the demand for efficient outcome assessment, a brief, self-report measure designed for repeated administration throughout the course of treatment and at termination was needed. After several reviews of the literature (e.g. Lambert, 1983), the Outcome Questionnaire-45 (OQ-45; Lambert et al., 2004) was implemented for use in the psychotherapy quality management system under consideration. It is a brief (45-items), self-report measure designed for repeated administration throughout the course of treatment and is conceptualized to assess four domains of patient functioning: symptoms
of psychological disturbance, focusing on anxiety and depression; interpersonal problems, social role functioning, and quality of life. Consistent with this conceptualization of outcome, the OQ-45 provides a Total Score, based on all 45 items, as well as Symptom Distress, Interpersonal Relations, and Social Role subscale scores. Higher scores on the OQ-45 are indicative of greater levels of psychological disturbance.

Research has indicated that the OQ-45 is a psychometrically sound instrument, with excellent internal consistency (Cronbach's alpha = .93), adequate three-week test-retest reliability (r=.84), and strong concurrent validity estimates ranging from .55-.88 (all significant at p<.01) when the measure was correlated with the MMPI-2, SCL-90R, BDI, Zung Depression Scale, Taylor Manifest Anxiety Scale, State-Trait Anxiety Inventory, Inventory of Interpersonal Problems, and Social Adjustment Scale. Furthermore, the OQ-45 has been shown to be sensitive to changes in multiple patient populations over short periods of time while remaining relatively stable in untreated individuals (Vermeersch, Lambert, & Burlingame, 2000; Vermeersch et al., 2004). In short, the OQ-45 is a brief measure of psychological disturbance that is reliable, valid, and sensitive to changes patients make during psychotherapy. It is well suited for tracking patient status during and following treatment.

**Defining a Positive and Negative Outcome**

A key element in patient-focused research is defining and operationalizing the concepts of positive and negative outcome. Jacobson and Truax (1991) offered a methodology by which patient changes on an outcome measure can be classified in the following categories: recovered, improved, no change, deteriorated. They conceive of two criteria that determine the difference between a patient that has achieved an
improvement or a recovery. The first criterion is indicative of a clinically meaningful change in that the degree of change must exceed measurement error based on the reliability of the measure (e.g. the OQ-45) and is referred to as the Reliable Change Index (RCI). The second criterion requires movement from a score typical of a dysfunctional population to a score typical of a functional population (Kendall, Marrs-Garcia, Nath, and Sheldrick, 1999). To fulfill this second criterion a cutoff score is calculated that represents the point at which a person’s score is more likely to come from the dysfunctional population than a functional population. When a patient’s score crosses the cutoff score patient functioning is similar to a non-patient level of functioning at that point in time. Passing this cutoff (from dysfunctional to functional) is the second criterion posited by Jacobson and Truax (1991) as an indicator of clinically significant change.

Clinical and normative data were analyzed by Lambert and colleagues (1996) to establish a Reliable Change Index (RCI) and a cutoff score for the OQ-45. The RCI obtained on the OQ-45 was 14 points, indicating that patient changes of 14 or more points on the OQ-45 can be considered reliable (i.e., not due to measurement error). The cutoff score on the OQ-45 was calculated to be 64, indicating that scores of 64 or higher are more likely to come from a dysfunctional population than a functional population, and scores of 63 or below are more likely to come from a functional population than a dysfunctional population. Using this information, patients can be placed in the following categories based on the change observed in their OQ-45 scores:

Recovered (i.e., clinically significant change) – Patients whose score decreases by 14 or more points and passes below the cutoff score of 64.
Improved (i.e., reliably changed) – Patients whose score decreases by 14 or more points but does not pass below the cutoff score of 64

No Change – Patients whose score changes by less than 14 points in either direction

Deteriorated – Patients whose score increases by 14 or more points

Support for the validity of the OQ-45’s reliable change and cutoff score have been reported by Lunnen and Ogles (1998) and Beckstead et al. (2003). Since the primary purpose of psychotherapy quality management is to better understand and improve the gains each patient is making during the course of treatment, it is essential that a reliable and valid method exist to classify each patient’s treatment response. In addition, the ability to classify individual patient change further aids in closing the gap between more traditional methods of psychotherapy research (i.e. efficacy and effectiveness studies) and practice (Kendall, 1999).

Prediction of Treatment Failure

Any system that seeks to improve individual patient outcomes must have the ability to differentiate on a consistent basis between those patients at risk for treatment failure and those that are not. Therefore, a core element of all psychotherapy quality management systems is the prediction of treatment failure. In order to improve outcomes of patients who are responding poorly to treatment, such patients must be identified before termination from treatment, and ideally, as early as possible in the course of treatment.

A great deal of research exists that concerns itself with identifying those salient factors that best predict psychotherapy outcome. Many of these studies have focused on patient, therapist, patient-therapist interaction, and other extratherapeutic variables in
predicting outcomes. However, very few of the variables explored are consistently highly predictive of outcome. Research utilizing the OQ-45 has indicated that the best predictors of outcome are initial severity of distress (i.e., pretreatment OQ-45 total score) and change score following separate sessions early in the course of treatment. In fact, Brown & Lambert (1998) found that pretreatment OQ-45 total score and change scores from sessions 1-9 accounted for approximately 40% of the variance in final outcome, and that after taking these variables into account, all other variables combined (e.g., diagnosis, patient demographics, therapist demographics, therapist theoretical orientation, etc.) accounted for less than 1% of the variance in final outcome. In other words, in prior studies using the OQ-45, the best way to predict outcome was to know how distressed patients were prior to treatment and whether or not the changes they made early in the treatment process were positive or negative. Using these two pieces of information, as well as knowledge of the dose-response relationship and the reliability of the OQ-45, a signaling system was developed to alert clinicians to potential treatment failures. Such a system allows clinicians to modify their treatment approach in an attempt to improve the outcomes of deteriorating and nonresponding patients.

The accuracy of the signaling system has been tested and it appears to be successful at identifying patients who have negative treatment outcomes. Lambert, Whipple, Bishop, et al. (2002) examined the predictive accuracy of the system with 492 patients who were in treatment at a university counseling center. Thirty-six (7.3%) of these patients deteriorated during treatment. Twenty-nine (80.6%) of these deteriorators were identified by the signaling system prior to termination and 7 (19.4%) were missed. This level of accuracy came at the expense of misidentifying 95 (20.8%) of the 492
patients as potential treatment failures who did not in fact deteriorate. These identification rates compared favorably to those obtained by using a signaling system based purely on a statistical approach (Finch, Lambert, & Schaalje, 2001).

Once a patient takes the OQ-45, commences treatment, and completes a session of treatment, the signaling system can be used to generate feedback regarding the patient’s progress. Feedback to therapists consisted of a progress graph that included all the patient’s OQ-45 total scores from pretreatment to that point in time and a colored dot (white, green, yellow, red) that was used to convey the status of patient progress. A written message corresponding to the colored dot was also provided to all therapists. A summary of each feedback message follows:

White Feedback— “The patient is functioning in the normal range. Consider termination.”

Green Feedback— “The rate of change the patient is making is in the adequate range. No change in the treatment plan is recommended.”

Yellow Feedback— “The rate of change the patient is making is less than adequate. Recommendations: consider altering the treatment plan by intensifying treatment, shifting intervention strategies, and monitoring progress especially carefully. This patient may end up with no significant benefit from therapy.”

Red Feedback— “The patient is not making the expected level of progress. Chances are he/she may drop out of treatment prematurely or have a negative treatment outcome. Steps should be taken to carefully review this case and decide upon a new course of action such as referral for medication or intensification of treatment. The treatment plan should be reconsidered. Consideration should also
be given to presenting this patient at case conference. The patient’s readiness for change may need to be re-assessed.”

Patients completed their pretreatment OQ-45 during intake procedures and subsequent OQ-45s prior to each treatment session. Each time an OQ-45 was administered, an updated graph and colored dot were provided to the therapist. Figure 1 depicts one of the algorithms (i.e., the algorithm applied to OQ-45 scores of patients who are attending sessions 2-4) used in the signaling system to determine the status of patient progress, and Figure 2 provides an example of the feedback (i.e., graph of pretreatment and subsequent OQ-45 scores, as well as the colored dot indicating the status of the patient progress) given to therapists.

Figure 1. OQ-45 algorithm used in the signaling system
Figure 2. Example of feedback given to therapist

Feedback Studies I and II

In order to test the quality management system described above, Lambert and colleagues (Lambert, Whipple, et al., 2001; Lambert et al., 2002; Whipple et al., 2003) have conducted a series of studies to answer questions pertaining to patient progress and the issuing of feedback to therapists. Out of this endeavor were produced feedback studies one and two. The decision to collectively describe the results of these first two investigations is based on the knowledge that the questions, hypotheses, and results of study one were replicated in study two. Consequently, while there were important differences across these studies, they all shared many things in common:

1. Each was conducted in the same clinic, a university counseling center.
2. Each included consecutive cases regardless of diagnosis rather than being disorder specific.

3. Random assignment of patients to experimental and control conditions was utilized in the first and third studies, while assignment to treatment condition was done by school semester in the second study.

4. The professional staff that provided the treatment remained relatively constant across the three studies and provided a variety of theoretically guided interventions dominated by cognitive behavioral and eclectic orientations. Professional therapists represented about 50% of the clinicians participating in each study. Graduate student trainees (practicum students and predoctoral interns) represented the remainder of participating therapists and varied from study to study.

5. In each study therapists saw both experimental and control cases, thus limiting the likelihood that differences between conditions could be due to therapist effects.

6. The measure of outcome as well as rules/standards for identifying potential treatment failures remained constant

7. The length of therapy (dosage) was determined by patient and therapist rather than by research design or arbitrary insurance limits

8. Generally, patient characteristics such as gender, age, and ethnic identification were similar across studies.

The research question in both of these studies was, “Does feedback to therapists on patient progress improve outcomes and attendance in therapy?” The two simple
hypotheses tested in both of these studies were: 1) Patients whose progress is poor (as identified by the signaling system) and whose therapist receives feedback in the forms of graphs and colored dots (with corresponding feedback messages) will show better outcomes than similar patients whose therapists did not receive feedback; and 2) Patients of therapists receiving feedback will show better attendance (i.e., attendance indicative of cost-effective psychotherapy) than similar patients of therapists nor receiving feedback. Over the course of the two years during which these studies were conducted, 1,620 patients were assigned to either the experimental (feedback) or control (no feedback) condition.

For purposes of data analysis and simplicity of communication, four groups of patients, described by four different acronyms, were created. Patients that were predicted by the signaling system to have a negative outcome (i.e., patients whose therapists received a red or yellow message at any time during treatment) were categorized into two groups depending on whether their therapists were recipients of feedback. Patients predicted to have a negative outcome and whose therapists received feedback were referred to as the Not-On-Track Feedback (NOT-Fb) group, whereas patients predicted to have a negative outcome and whose therapists did not receive feedback were referred to as the Not-On Track No Feedback (NOT-NFb) group. Furthermore, patients that were predicted by the signaling system to have a positive outcome (i.e., patients whose therapists received only green and/or white messages throughout treatment) were also categorized into two groups depending on whether their therapists received feedback. Patients predicted to have a positive outcome and whose therapists received feedback were referred to as the On-Track Feedback (OT-Fb) group, whereas patients that were
predicted to have a positive outcome and whose therapists did not receive feedback were referred to as the On-Track No Feedback (OT-NFb) group.

The results for hypothesis one of these studies indicated that feedback does not enhance the outcomes of patients who are predicted to have a positive outcome as evidenced by the positive but not statistically different outcomes between the OT-Fb and OT-NFb groups. However, the outcomes of patients in the NOT-Fb group were significantly better than the outcomes of patients in the NOT-NFb group (effect sizes of .44 and .40 for studies one and two, respectively), indicating that feedback does improve outcomes of patients predicted to have a negative outcome. These results are graphically presented in Figure 3.

Figure 3. Graphic results of feedback studies I and II.
The results for hypothesis two of these studies indicate that the OT-Fb group consumed significantly fewer sessions than the OT-NFb group. Although the outcomes of the OT-Fb and OT-NFb groups were essentially identical, the relevance of the finding that the OT-Fb group utilizes significantly fewer sessions is indicated in the fact that these two groups accounted for approximately 75% of the total number of participants in the study. Therefore, feedback results in decreased session attendance (yet identical outcomes to similar patients) for patients who are having a positive response to therapy. On the other hand, the NOT-Fb group stayed in therapy longer than the NOT-NFb group. Therefore, feedback results in increased session attendance for patients who are not responding to therapy (thereby providing clinicians the opportunity to make needed alterations in treatment in an attempt to improve outcomes). From this perspective, it is reasonable to argue that in addition to improved outcomes, feedback also results in a more efficient allocation of therapeutic resources.

Despite the results of studies one and two, which clearly demonstrated the value of feedback in improving outcomes of deteriorating patients (i.e., patients in the NOT-Fb group), the vast majority of those patients still concluded treatment without having reliably (i.e., OQ-45 score decreased by 14 or more points) or clinically significantly changed (i.e., OQ-45 score decreased by 14 or more points and crossed below the cutoff score of 64). In an attempt to further enhance the effects of feedback for deteriorating patients, a clinical support tool methodology was created and integrated into the existing quality management system.
Clinical Support Tools

In an attempt to improve the quality of health care, the past 25 years has produced methodologies in medical research and practice to manage clinical interventions in a variety of areas as diverse as drug dosage, diagnosis, and preventive care. The impetus for this line of research is to assist physicians in clinical decision-making and to provide recommendations, organized in a stepwise approach, which will likely improve the quality of patient care (Hunt, Haynes, Hanna, and Smith, 1998). In an attempt to further improve the effects of feedback for deteriorating patients, Whipple, Lambert, Vermeersch, Smart, Nielsen, and Hawkins (2003) developed a clinical support tool (CST) methodology (see Figure 4) and integrated it into the existing psychotherapy quality management system in an attempt to augment the feedback provided to therapists and further improve outcomes of nonresponding and deteriorating patients. The CSTs are provided to therapists when one of their patients is predicted to have a poor outcome (i.e., when a therapist receives a red or yellow warning message, indicating that patient is not responding or deteriorating in treatment). The CSTs were proposed as an empirically based problem-solving strategy and arranged hierarchically in a decision tree designed to systematically direct therapists’ attention to certain factors known to be related to psychotherapy outcome. These factors, that may or may not be of particular concern with a specific patient, were obtained from the psychotherapy research literature.
Figure 4. Clinical support tools decision tree

The therapeutic relationship. The importance of the therapeutic relationship to outcome has been empirically demonstrated in hundreds of research articles spanning nearly 50 years. It is often acknowledged as the primary curative factor in successful
psychotherapy. Of specific interest is the correlation between outcome and early ratings of the therapeutic relationship. Numerous studies have demonstrated that patient ratings of the therapeutic relationship between the third and fifth sessions are significant and possibly the best predictors of treatment outcome (Lambert & Ogles, 2004). These data suggest that when a patient shows a negative treatment response, therapists need to be particularly alert to the patient's level of comfort and satisfaction with the therapeutic relationship (Hill, Nutt-Williams, Heaton, Thompson, & Rhoads, 1996).

In order to assess the quality of the therapeutic relationship in nonresponding or deteriorating patients, the Revised Helping Alliance Questionnaire (HAq-II) is provided to therapists as part of the CSTs. The HAq-II is a 19-item self-report instrument that taps various aspects of the alliance between patient and therapist (Luborsky et al., 1996). Internal consistency for the HAq-II has been reported to be high (.90), and test-retest has been found to be .78 from sessions 2-5 (Luborsky, 1976). Concurrent validity estimates have also been adequate, as correlations of patient self-reports on the HAq-II and the California Psychotherapy Alliance Scales (CALPAS) have ranged between .59-.71 (all significant at p<.001), depending on the session assessed. If a nonresponding or deteriorating patient indicates problems with the therapeutic relationship on the HAq-II, the therapist is then provided with suggestions of interventions that can be employed in order to improve the quality of the therapeutic relationship. These interventions include: discuss therapeutic alliance with patient, give and ask for feedback on relationship, spend more time exploring patient's experience, discuss shared experiences, reassess/agree on therapeutic tasks and goals, clarify possible misunderstandings, give more positive
feedback, use more empathic engagements, discuss therapist and therapeutic style match, and process transference.

Readiness to change. Poor treatment response may also reflect the possibility that a patient has entered psychotherapy in a less than favorable stage of readiness to change (Prochaska, DiClemente, & Norcross, 1992). By matching therapeutic techniques with a patient's readiness to change, Prochaska and Prochaska (1999) suggested that final outcomes could be improved. Similarly, Drum and Baron (1998) found that final outcome could be predicted and enhanced by assessing a patient's readiness to change and matching it with appropriate therapeutic interventions.

As part of the CSTs, therapists are provided with the 32-item Stages of Change Scale (SCS), which measures a patient's readiness for change based on the four-stage model developed by McConnaughy, Prochaska, & Velicer, 1983. Eight items, scored on a 5-point Likert scale, measure each stage: precontemplation, contemplation, action, and maintenance. Internal consistency estimates for the SCS have been reported to be adequate, with Cronbach's alpha ranging from .79-.84. If it is determined that a nonresponding or deteriorating patient's readiness for change is in question, therapists can employ a number of interventions in an attempt to enhance a patient's motivation to meaningfully engage in treatment. These interventions include: discuss readiness to change with patient, give and ask for feedback about readiness for change, adjust goals and tasks to be challenging but not too difficult, discuss consequences of changing or not changing, and discuss the processes involved with change and specific skills that help.

Social support. Patients who are predicted to have a poor outcome may not have adequate social support networks to initiate or maintain gains acquired in therapy. The
adequacy of social support is directly related to a patient's reported severity of symptoms and can mediate stressful life events and the development of psychological symptoms (Monroe, Imhoff, Wise, & Harris, 1983). This information is consistent with the fact that patients spend less than 1% of their waking hours in psychotherapy and findings that report 40% of therapy outcome variance is due to extratherapeutic factors (Lambert, 1992). Therefore, for patients with inadequate social support, therapists may need to identify the resources that they already have in their current life and attempt to activate or modify them to achieve a better treatment outcome (Bankoff & Howard, 1992).

In order to assess perceived social support in at-risk patients, therapists are provided the Multidimensional Scale of Perceived Social Support (MSPSS) as part of the CSTs. The MSPSS is a 12-item inventory designed to measure a patient's perception of social support in three important domains: family, friends, and significant others (Zimet, Dahlem, Zimet, & Farley, 1988). The MSPSS has been shown to demonstrate sound psychometric properties, with internal consistency estimates of .87, .85, .91, and .88 for the Family, Friends, and Significant Others subscales and total score, respectively. Furthermore, test-retest coefficients have ranged between .72-.85 for each of the subscales and total score (Zimet et al., 1988). The inclusion of a measure designed to assess perceived social support (rather than actual social support) reflects: 1) findings suggesting that a patient's perception of social support is more strongly associated with psychological distress (Cohen & Wills, 1985; Fiore, Coppel, Becker, & Cox, 1986; George, Blazer, Hughes, & Fowler, 1989; Sarason, Shearin, Pierce, & Sarason, 1987); 2) research indicating that perceived social support is more important than actual support received in predicting adjustment to stressful life events (Wethington & Kessler, 1986);
and 3) the fact that clinicians simply have, due to the typical structure of individual psychotherapy, far greater access to patients’ perceptions of social support than information about patients’ actual levels of social support. If the patient’s reports on the MSPSS are suggestive of poor social support, therapists can take a number of supportive actions in order to strengthen the patient’s social support networks. Such interventions include: refer to group therapy, refer to biofeedback treatment, refer to assertiveness training, role play social situations, assign related homework, assess patient’s self beliefs, bring others to sessions, encourage activities with others (e.g., family, friends, significant others), work on concerns related to trusting others, and encourage greater involvement in organizations characterized by social interaction (e.g., clubs).

**Diagnostic formulation.** As part of the CSTs, therapist are also directed to reconsider their diagnostic formulations, as diagnosis informs case conceptualization, which in turn influences treatment strategy. In other words, errant diagnostic formulations could result in inappropriate treatment strategy, which could account for a patient’s nonresponse or deterioration in psychotherapy. Therapists are therefore directed by the CSTs to consult relevant resources (e.g., Eells, 1997) and alter their treatment plan if necessary.

**Medication referral.** Finally, given empirical evidence supporting the efficacy and effectiveness of medication in treating many psychological difficulties, particularly in combination with psychotherapy (Thase & Jindal, 2004; Trivedi & Kleiber, 2001), therapists are directed by the CSTs to consider referring nonresponding or deteriorating patients for a psychiatric consultation.
Therefore, the CSTs were composed of resources intended to assist therapists in assessing the quality of the therapeutic relationship, patient readiness to change and its match to treatment strategies, the patient's social support network, accuracy of the diagnostic formulation, and the appropriateness of a referral for medication. Furthermore, the CSTs provided specific intervention strategies that could be used by therapists if problems were detected in the aforementioned domains.

*Feedback Study III*

The third investigation sought to improve the feedback system using CSTs in addition to the feedback usually provided on patient progress in an attempt to improve outcomes further for those patients predicted to have a poor response to therapy. The research question in this study was, "Does feedback to therapists on patient progress and the use of CSTs improve outcomes and attendance in therapy above and beyond that which could be obtained through feedback alone?" The two hypotheses tested were: 1) Patients whose therapists receive feedback about patient progress and use the CSTs will have better outcomes than patients in the feedback and no-feedback conditions; and 2) Patients whose therapists receive feedback about patient progress and use the CSTs will demonstrate better attendance (i.e., attendance indicative of more cost-effective psychotherapy) than patients in the feedback and no-feedback conditions.

The procedures and setting for this study were similar methodologically to the previous two studies in that it was implemented in the same counseling center using the same procedures. Nine hundred and eighty one patients were assigned randomly to either a feedback condition (experimental group) or a no-feedback condition (control group). In the feedback group, those therapists whose patient’s were predicted to have a poor
treatment outcome (i.e., the patient’s therapist received a red or yellow warning message regarding the patient’s progress at any time during the course of therapy), were provided with the CSTs as a possible intervention to improve treatment outcome. The decision as to whether or not the CSTs were utilized in working with deteriorating patients and how the results of the measures were employed (e.g., whether the therapist spoke with the patient about the results) were left to the clinical discretion of the treating therapist. Consequently, those patients and their therapists who were assigned to the CST condition were not random.

In addition to the patient groupings of the first two studies (OT-Fb, OT-NFb, NOT-Fb, NOT-NFb) a NOT-Fb+CST group was created for those patients that were not responding or deteriorating in treatment and whose therapists were receiving feedback and decided to utilize at least one of the CSTs (i.e., gave the MSPSS to a patient, gave the MSPSS and HAq-II to a patient, gave all three measures to a patient, gave the SCS to a patient and referred him/her for a psychiatric consultation, etc.).

The results of the study essentially replicated those results found in the first two studies. The OT-Fb and OT-NFb groups had, statistically speaking, basically the same outcomes. However, the NOT-Fb group had significantly better outcomes than the NOT-NFb group producing a .28 effect size. As relating to the NOT-Fb+CST group, it was found that it had significantly better outcomes than both the NOT-NFb group (d=.70) and the NOT-Fb group (d=.44). These results are presented in Figure 5. Patients in the NOT-Fb+CST, NOT-Fb, and NOT-NFb groups were also categorized as having met criteria for reliable or clinically significant change, no change, or deterioration according to criteria established by Jacobson & Truax (1991). The results (and accompanying chi square
analysis) are illustrated in Table 1, and indicate that patient deterioration rates dropped from 19.1% for the NOT-NFb group, to 13.6% for the NOT-Fb group, and finally to 8.5% for the NOT-Fb+CST group. The results support the first hypothesis of the study and indicate a clear benefit to final outcomes when regular feedback is provided to clinicians who have nonresponding and deteriorating patients. Furthermore, the third study demonstrated that outcomes are additionally improved when clinicians utilize CSTs in working with these types of patients.

![Graph](image)

*Figure 5. Graphic results of feedback study III*
Table 1

Percent of NOT-Fb+CST, NOT-Fb, and NOT-NFb Cases Meeting Criteria for Clinically Significant Change at Termination

<table>
<thead>
<tr>
<th>Outcome Classification</th>
<th>NOT-Fb+CST(^a)</th>
<th>NOT-Fb(^b)</th>
<th>NOT-NFb(^c)</th>
<th>(\chi^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deteriorated(^d)</td>
<td>5 (8.5)</td>
<td>12 (13.6)</td>
<td>25 (19.1)</td>
<td>11.782*</td>
</tr>
<tr>
<td>No Change</td>
<td>25 (42.4)</td>
<td>47 (53.4)</td>
<td>73 (55.7)</td>
<td></td>
</tr>
<tr>
<td>Reliable/or Clinically Significant Change(^e)</td>
<td>29 (49.1)</td>
<td>29 (33.0)</td>
<td>33 (25.2)</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)NOT-Fb+CST = patients who were NOT and whose therapists received feedback and used the clinical support tools

\(^b\)NOT-Fb = patients who were NOT and whose therapist was given feedback

\(^c\)NOT-NFb = patients who were NOT and whose therapist did not receive feedback

\(^d\)Worsened by at least 14 points on the OQ-45 from pre-treatment to post-treatment

\(^e\)Improved by at least 14 points on the OQ-45 or improved and passed the cut-off between dysfunctional and functional populations.

- \(\chi^2 (4, N = 278) = 11.782, p < .05\)

The second hypothesis of the study investigated session attendance patterns among the different research groups. The results were, once again, essentially a replication of the first two studies. The number of sessions consumed by patients in the NOT-Fb and NOT-Fb+CST groups were combined and resulted in significantly more sessions being consumed by this combined group than patients in the NOT-NFb group. Patients in the OT-Fb group consumed significantly fewer sessions than patients in the OT-NFb group. The results suggest that as a consequence of utilizing this feedback system a more efficient allocation of therapeutic resources is created that produces more cost-effective therapy. Additionally, the use of CSTs in combination with feedback appear to significantly prolong the amount of time a deteriorating or nonresponding patient is in therapy, as evidenced by the significantly more sessions consumed by the
NOT-Fb+CST group compared with the NOT-Fb group. Thereby allowing the therapist to reconceptualize the case and implement improved interventions that will further better outcomes for these patients.

In summary, Lambert et al’s feedback system is a well established and convincing system of tracking and improving therapy outcomes by providing feedback to therapists in real time. This allows the therapist sufficient time to reconceptualize the case and renegotiate the treatment plan in cases where the patient is predicted to deteriorate or experience no change through the course of treatment, and eventually drop out prematurely. Established within this system are a series of recovery curves that are determined by the patient’s pre-treatment distress level and around which is statistically set confidence intervals. If the patient deviates beyond the limits of the confidence intervals at any time through the course of treatment, a message is generated informing the therapist of the patient’s increased distress level and the risk of premature drop out before adequate therapeutic gain.

This research combines psychoneuroimmunology and psychotherapy outcome research for the purpose of clarifying the relationship between a physiological and psychological reaction to chronic stress. Using the system of feedback developed by Lambert and colleagues and measuring cortisol hormone levels it is hoped that new understanding regarding a person’s stress reaction will surface.

Rethinking Descartes

No mind? No matter. No matter; never mind. These eight words offer a concise synopsis of the various philosophical positions on what is traditionally named the mind-body problem. In order for the stress response to be considered holistic in the sense of
occurring across multiple dimensions of organismic functioning (i.e. physiologically, psychologically, and spiritually), the mind-body problem needs to be addressed, at least briefly. The essence of the problem is found in the difference between what we experience and know physically compared to what we experience and know mentally. The theories and philosophical arguments defining the mind-body problem span centuries. What is offered is a brief, oversimplistic review of the problem, and is in no way meant to be complete or exhaustive. Instead, it is hoped that some philosophical and historical context to this research is given.

A dualistic approach posits that a fundamental difference exists between what is physical and what is mental. The most systematic theory presented by a French philosopher Descartes in the 17th century. He speculated that the mind (or mental events) is a thing separate and entirely distinct from the body. Thus, humans have a dualistic nature comprised of two separate entities, one physical, and the other non-physical. The physical having the capability to extend into space, having shape, size, weight, and location and is in no sense conscious; the mind has a completely different nature that is non-spatial without shape, size, weight, or location. This allows the one to exist without the other permitting the existence of an immortal part (i.e. the mind or spirit) of human existence. Different types of “dualism” exist that attempt to answer or make sense of our human condition. Specifically they attempt to respond to the criticisms of our supposed dual nature. However, Descartes is singled out as an icon for philosophies purporting and committed to the dualistic nature of people.

Descartes argued that a type of interaction occurs between the two entities of mind and body so that at times the body could causally influence the mind and that at
other times the mind could casually affect the body. However, his theory does not
answer what is a mind and whether it is made of a particular kind of stuff, some sort of
immaterial matter, or a bodiless body (Robinson, 1998; Shaffer, 1968) or answer how
two separate entities “communicate” or interact. Dualistic theories demand that the
totality of what constitutes a mind cannot be connected to the physical in any way or else
we could not consider mind as being separate and distinct from the physical body.

The antithesis to Descartes dualism is a monistic approach to the mind-body
problem called materialism. This theory suggests that so-called mental events (e.g.
consciousness, the mind, spirit) are really nothing but the interaction between physical
objects. Therefore, complex human behavior like decision-making, wishing, desiring,
thinking, theorizing, loving, hating, planning, and etcetera are explainable through the
interactions of atoms, subatomic particles and antiparticles, electromagnetic forces and
energies, and other physical phenomenon (Robinson, 1998; Shaffer, 1968). In attempting
to explain what thoughts, wishes, feelings, and other mental phenomenon are, materialists
necessarily reduce these events to some material substrate, for instance, a particular
pattern of neurons firing in a particular sequence. A common argument in support of this
theory is to reduce mental events, including language used to describe or assert
something of the mental events being experienced, to bits of behavior. It is not important
what form the simple bits of behavior take, for example, “I’m bored,” “I wish that....,” or
“I just thought of an idea...” These bits of behavior are ultimately the effects of certain
inner physical conditions. For the materialist, the physical is both necessary and
sufficient to explain both mental and bodily events and phenomenon.
In summation, a dualist asserts that in reality there are two separate entities (the mind and body) that account for our experience and a monist argues that it is either one or the other (either all mind or all body), but cannot be both. It is interesting to note the insistence that we are either separate parts that are completely distinct or the idea that we are ultimately one or the other. This pattern of thought and belief may be better understood in its historical context, which will hopefully shed light on our modern stream of acceptable ideas.

The discomfort felt around mixing the mind or spirit with the body relates to the era in which these philosophies were conceived and are understood to be reactions to abuses practiced to those living in the premodern era (mainly the Middle Ages). Much of the abuses of this era were arbitrary in the sense that what was held to be “right” and “good” was decided by those in power without appeal to rational justification (Jones, 1969; Leahey, 2000). Furthermore, power in the premodern era was defined by merging the political and religious life of its leaders. In this way, spiritual-political leaders were able to invoke a divine right to govern and often justified horrible acts of tyranny by invoking this absolute or “God given” divine morality (Jones, 1969).

The modern era is largely a reaction to these abuses and sought to censure the subjective interests of powerful leaders and the justification they invoked by divine right. A strategy of neutrality, or value-freeness, emerged. This is readily apparent in the scientific method, which is built upon two systems of justification – rationalism (rigorous reasoning) and empiricism (cold, hard facts) (Slife and Williams, 1995). Science and modern developed societies value value-freeness. That is, the security from abuses and censorship from excessive power is valued and often justified through objectivity and
relativism. To be objective means to control or eliminate subjective interests or actions through rational justification. Relativism ensures that people are able to decide for themselves, as opposed to a king or someone else, what is right or good for them given their unique situation.

The reaction of the modern era to abuses of the past is understandable. If we take the example of Descartes, it may clear up how the social-political environment of the times influenced which ideas were tolerable. In 1633, Galileo was brought before the Roman Inquisition to answer to charges of heresy concerning his ideas regarding astronomy. He was placed under house arrest. During this same time Descartes left his native France for Holland motivated by fear that his ideas would likely conflict with the Catholic Church and the French monarch. The threat was real and it became necessary for leading thinkers of the time to hide or even pretend (Damasio, 2003). It is difficult to tell how much was held back or to what degree their thinking was shaped or distorted by the religious, political, and economic circumstances. However, the same year Galileo was arrested, Descartes withheld publication of his Treatise of Man as an attempt to escape the vicious attacks on his ideas concerning human nature. It was with trepidation that these people published their ideas in the climate of the 17th century. Descartes inscription on his tombstone is particularly reflective of the times in which he lived: He who hid well, lived well.

From this historical perspective, we gain a deeper understanding of the opposing positions on the problem of mind and body. Dualism kept spiritual life personal and separate from body or physical phenomenon. It kept the divine and spiritual realm in one place and kept our physical life in another where not even divinely appointed kings or
cardinals can come to investigate, destroy, or control. Materialism provided the advantage of making all things physical. In doing this, it becomes necessary to deny the spiritual; creating difficulty for a king to be divine or for a church leader to represent God. Materialism had another benefit of making all phenomena (which are ultimately physical) measurable, palpable, and subject to investigation. This produced the theoretical possibility that any claim someone asserts about himself or herself or anything else in the universe is observable and therefore testable.

It is out of this historical context that we continue the mind-body problem. Confronted on one side with dualism that preserves what we experience to be very different phenomenon, the workings of the mind and the physical matter, and the other side of materialism that represents a solution to the mysterious purely thinking stuff of mental events by the notion of reducing all that exists to some sort of physical material. One viable solution is a type of hybrid between the two perspectives called person theory (Robinson, 1998; Shaffer, 1968). Another 17th century Dutch philosopher named Spinoza wrote about similar ideas found in the more modern conceptualization of person theory (or more appropriately the re-conceptualization of his dual aspect theory). This view holds that events, whether they are characterized as mental or physical, happen to some thing, which we call a person. A person is neither purely material nor purely immaterial and is therefore subject to both physical and mental events (Shaffer, 1968). In this sense, a person is considered both a thinking thing and a thing that physically extends into space without regarding the person as two separate things. Rather, the characteristics of being both physical and mental represent or define aspects of the same underlying thing, namely a person.
An analogy of an undulating line is proposed to explain the dual aspects of a person. From one point of view at a given moment, the line appears as concave, whereas from another point of view the line appears as convex. Although these are accurate descriptions of the line, either one by itself does not completely describe it; it takes both terms (Shaffer, 1968). It is not that there are two different things; rather it is that one line exists with two aspects defined by perspective or point of view. This dual aspect or person theory becomes relevant as a frame of reference in understanding scientific research as it continues to converge and integrate findings from multiple disciplines. The approach of viewing mind and body as characteristics of one organism is well presented by Damasio (2003):

Because the mind arises in a brain that is integral to the organism, the mind is part of that well-woven apparatus. In other words, body, brain, and mind are manifestations of a single organism. Although we can dissect them under the microscope, for scientific purposes they are in effect inseparable under normal operating circumstances. (p. 195)

A recent convergence of stress, emotions, and coping behaviors provide interesting results and possibilities. The interdependence shared between the fields of stress and emotion seems obvious. That is, where there is stress there is emotion and often vice versa. However, these research fields have developed separately as if stress and emotion had no bearing on each other (Lazarus, 1999). Today there is greater emphasis on interdisciplinary approaches to research and provision of care as the importance of the psychological, physical, spiritual, and social well being of a person is widely recognized.

Psychoneuroimmunology posits that the human body experiences a series of biochemical reactions when confronted with a distressful situation. Recent research
suggests that the stress-response is situation specific, is associated with psychological perceptions, and affects the immune system in complex ways. Under chronic stress, different hormones are released into the bloodstream in different ways than in an acute situation. Those undergoing psychotherapeutic treatment typically fall into the chronic stress category. This allows us to measure the hormone cortisol, which is associated with the way the body reacts to chronic stress. By combining measurements of cortisol levels with the expected recovery curves explained in the system of feedback described above, it is expected that new understanding will emerge in regards to how people react to stress, both physiologically and psychologically, in real time as they move through a treatment program.

Although we have experienced a proliferation of research on understanding the physiological mechanisms by which stress weakens the body’s immune system and increases its susceptibility to disease, there is relatively little research on combining the physiological data on stress with the research on psychological distress as related to therapeutic outcomes for those undergoing psychological treatment. It is the aim of this research to investigate the degree to which psychological and physiological distress levels coincide for those receiving psychological treatment. Another aim of this research is to investigate the effects of feedback to therapists on patient progress on a psychological and physiological outcome measure. The first research question considers whether psychological treatment significantly affects patient cortisol levels. We hypothesize that psychological treatment will significantly reduce patient stress level (as measured by cortisol). The second research question examines change scores in stress levels both psychologically and physiologically. We hypothesize that change scores in
psychological distress as measured by the OQ-45 will coincide with the physiological change scores as measured by cortisol. The third research question investigates the affect of feedback to therapists on patient progress and its relation to distress levels. We hypothesize that the group of patients whose therapist receives feedback on patient progress and psychological distress levels will have better OQ-45 outcomes than those patients whose therapist does not receive feedback. We further predict that the group of patients whose therapist receives feedback on patient progress and psychological distress levels will have lower levels of cortisol than those patients whose therapist does not receive feedback. Lastly, several case studies are presented to lend a qualitative view or investigation to the research data. It is expected that this alternative method will provide a productive complement to the quantitative method used in analyzing the previous hypotheses and that it will offer a more complete picture of both the physiological and psychological adaptation to chronic stress experienced by these patients.
Materials and Methods

Participants

Adult patients seeking outpatient psychotherapy services through the partial hospitalization program specializing in treating eating disorders were invited to participate in the present study as part of the clinic’s intake procedures. To be included in the analysis, a patient was required to have received at least two sessions of treatment, and completed the outcome measure and saliva sample for a minimum of two sessions representing the first and any subsequent session. A total of four consenting patients met these criteria.

It was originally proposed to collect data through a local psychiatric hospital’s day-treatment program. This setting would have produced a much larger sample size (we estimated the final sample to be about 60 participants) with greater diversity in terms of gender, diagnostic categories, and treating clinicians. However, due to political factors beyond our control, all research at this facilities day-treatment program was dropped and original contractual agreements were not honored.

Measures

*Psychological distress.* The Outcome Questionnaire (OQ-45) assesses psychological dysfunction (Lambert, Hansen, Umphress, Lunnen, Okiishi, and Burlingame, 1996). The OQ-45 (Lambert, Hansen, et al., 1996) measures patient progress in therapy by repeated administration during the course of treatment and at termination and integrates Lambert’s (1983) conceptualization of patient progress that suggests three aspects of the patient’s life should be monitored: (a) subjective discomfort
(intrapsychic functioning), (b) interpersonal relationships, and (c) social role performance. Items on this instrument address commonly occurring problems across a wide variety of disorders and tap the symptoms most likely to occur (e.g., "I feel blue," "I feel lonely," "I work/study too much"). The items also measure personally and socially relevant characteristics that affect the individual's quality of life. Each item is scored on a 5-point scale from 0 (never) to 4 (almost always), yielding a range of possible scores of 0 to 180 with higher values indicating the endorsement of pathology.

Completion of the OQ-45 takes approximately 5 minutes. The OQ-45 provides a total score, based on all 45 items, as well as three subscale scores.

Lambert, Hansen, et al. (1996) reported adequate internal consistency for the OQ-45 (r = .93). The 3 week test-retest value for the OQ-45 is also satisfactory (r = .84) (Lambert, Burlingame, Umphress, Hansen, Vermeersch, Clouse, and Yanchar, 1996). Concurrent validity figures, as estimated by correlating the total score with the SCL-90-R (Derogatis, 1983), BDI (Beck, Ward, Mendelson, Mock, and Erbaugh, 1961), Zung Depression Scale (Zung, 1971), Taylor Manifest Anxiety Scale (Taylor, 1953), STAI (Spielberger, 1983; Spielberger, Gorsuch, and Lushene, 1970), Inventory of Interpersonal Problems (Horowitz, Rosenberg, Baer, Ureno, and Villesenor, 1988), and the Social Adjustment Scale (Weissman and Bothwell, 1976) were all significant at the .01 level (range of r's, .50-.85). Normative information based on data collected across the country for the OQ-45 has been reported (Lambert, Hansen, et al., 1996; Lambert, Burlingame, et al., 1996; Umphress, Lambert, Smart, Barlow, and Clouse, 1997). Furthermore, the OQ-
45 has been shown to be sensitive to change in patients over short time periods while remaining stable in untreated individuals (Vermeersch, Lambert, and Burlingame, 2000).

*Cortisol.* Salivary cortisol was assessed to prevent the stress-inducing effects of venipuncture necessary for blood sampling of serum cortisol. All participants were instructed to deposit approximately 4 mL of saliva into a collection tube. All samples of saliva cortisol were obtained at approximately 0800 hours in order to control for diurnal variations in cortisol levels and prior to completing any other measures to minimize the potential impact of activity level and related stress factors on the hormone sampling. After collection, the saliva hormone testing kits were sent to ZRT Laboratories for analysis and measurement of cortisol in the saliva samples. This conventional approach for assaying adult salivary hormone samples demonstrates strong correlations to serum hormone levels (Dabbs et al., 1991; Dabbs, 1992; Scerbo and Kolko, 1994; Soler, Vinayak, and Quadagno, 2000). Moreover, salivary cortisol levels are not altered by thyroid hormones, estrogen-containing medications, or tricyclic antidepressants (Schwarz and Dunphy, 2003).

**Design and Procedures**

In order to maximize the possibility of generalizing the results of the study to similar clinical settings, we based the study in a hospital-based outpatient setting rather than a research setting. The primary purpose of the study was to examine salivary cortisol levels with patient progress feedback to therapist as patients receive services in a routine practice.
As part of the outpatient partial hospitalization clinic’s intake procedures, adult patients were invited to participate in a research study in which there was a possibility they could receive weekly updates about their treatment progress. All patients participating in the project signed an informed consent. Prior to treatment, consenting patients were administered the computerized version of the OQ-45 (Lambert, Hansen et al., 1996), and asked to deposit approximately 4 mL of saliva into a collection tube.

After completion of the measures, patients were assigned to treatment conditions using a randomized block design, with therapists serving as the blocking variable. The purpose of this approach was to control for effects associated with therapists. Patients were randomly assigned to one of the following two treatment groups: 1) treatment as usual (no feedback provided) 2) feedback provided to therapists. Following the first session of treatment, graphs of patients’ progress and corresponding messages were generated once a week using a series of decision rules (Lambert, Whipple, Bishop et al., 2002). The decision rules were based on a patient’s intake score (initial level of disturbance), the number of treatment sessions completed, and the amount of change noted at the most recent session compared to the patient’s initial score. Each of these factors was based on a combination of expert judgments, the dose-response effect analyses, survival analysis, and hierarchical linear modeling (Lambert, Hansen et al., 2001).

To test the effects of feedback, the status of a patient’s progress was used to create an additional between-groups treatment variable. Patients that were identified at any
point during the course of treatment as failing to progress as expected (single or multiple yellow/red color coded messages) formed the Not-On-Track treatment condition, whereas patients progressing as expected throughout treatment (only white or green color coded messages) formed the On-Track treatment group. Crossing the status of the patient progress variable with the two feedback conditions created four treatment groups: On track-No feedback (OT-NFb), Not on track-No feedback (NOT-NFb); On track-Feedback (OT-Fb); and Not on track-Feedback (NOT-Fb).

To test the effects of feedback on hormonal stress levels the following design was implemented. Salivary cortisol levels were measured for all participants at pretreatment as part of the intake procedures. Levels of cortisol were again measured for all participants at posttreatment. In order to better understand how cortisol levels fluctuate with a patient’s perceived emotional distress, a salivary cortisol measurement was taken for those participants’ who, at any time during the course of treatment, received either a yellow or red message (i.e. a signal case). Consequently, those participants relegated to the “not on track” feedback and no feedback groups gave an additional saliva sample at time of signal. This allowed us to track hormonal distress levels with reported elevated psychological distress levels for those who were at risk for treatment failure, prematurely dropping out of treatment, or at risk to experience no change or deteriorate in treatment.

Analyses

We performed a preliminary analysis using independent t-test and chi-square analysis of independence to determine that there are no statistically relevant differences
between the control group and the experimental group on demographic variables (age, ethnicity, etc.).

*Analysis for hypothesis one.* Pearson correlation coefficient \((r)\) was used to evaluate the degree of relationship between the number of therapy sessions (i.e. dosage of treatment) and cortisol levels (i.e. chronic stress level). A paired samples T-test was used on the pretreatment cortisol level and the posttreatment cortisol level to investigate whether there are significant differences between how chronic stress levels change before treatment and after treatment.

*Analysis for hypothesis two.* Paired samples T-tests were used to investigate whether there are significant differences in change scores between cortisol and OQ-45 scores. Several change scores were produced. Specifically, a paired samples T-test was conducted to examine the change scores between pretreatment OQ-45 scores and cortisol levels and time of signal OQ-45 scores and cortisol levels in the NOT group. Another paired samples T-test was conducted to examine the change scores between time of signal OQ-45 scores and cortisol levels and posttreatment OQ-45 scores and cortisol levels in the NOT group. A paired samples T-test was conducted to examine the change scores between pretreatment OQ-45 scores and cortisol levels and posttreatment OQ-45 scores and cortisol levels in the NOT group. One last paired samples T-test was conducted to examine the change scores between pretreatment OQ-45 scores and cortisol levels and posttreatment OQ-45 scores and cortisol levels in the OT group.

*Analysis for hypothesis three.* One-Way ANOVA was used to investigate whether there are significant differences in how patients responded to treatment as a
function of their status in the control (treatment as usual) or experimental (feedback provided to clinician) group. Specifically, a One-Way ANOVA was conducted to compare the difference between the posttreatment OQ-45 scores in the control group versus the feedback group. Another One-Way ANOVA was conducted to compare the difference between the posttreatment cortisol levels in the control group versus the feedback group.
Results

Descriptive Statistics

Prior to analysis, the variables being used in this study were examined through a variety of techniques to assure accuracy of data entry, missing values, and fit between their distributions and the assumptions of correlational analysis. The means and standard deviations of the OQ-45 and cortisol results for pretreatment, signal, and posttreatment are presented in Table 2.

Table 2

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pretreatment</th>
<th>Signal</th>
<th>Posttreatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$, $SD$</td>
<td>$M$, $SD$</td>
<td>$M$, $SD$</td>
</tr>
<tr>
<td>OQ-45</td>
<td>97.8, 16.3</td>
<td>115.5, 20.5</td>
<td>78.0, 37.2</td>
</tr>
<tr>
<td>Cortisol</td>
<td>6.5, 2.1</td>
<td>5.0, 0.85</td>
<td>3.1, 2.2</td>
</tr>
</tbody>
</table>

The mean age of the participants included in the final sample was 23.3 ($SD = 2.87$). As a small sample from an eating disorders clinic, all participants were female. Additionally, 1 (25%) was Caucasian, 1 (25%) was Hispanic/Latino, 1 (25%) was Asian American, and 1 (25%) was multi-racial. There was 1 (25%) married and 3 (75%) single participants. By virtue of the setting, all participants received an eating disorder diagnosis of one type or another. The most common secondary diagnoses on Axis I were depressed mood (75%) and anxiety (25%). All of the patients had previously received
psychotherapy services, and 50% of the participants had taken psychotropic medications when they entered treatment. See Table 3 for a summary of demographic statistics.

Table 3

Descriptive Statistics on Demographic Variables

<table>
<thead>
<tr>
<th>Demographic variable</th>
<th>Feedback group</th>
<th>No feedback group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percent (M, SD)</td>
<td>Percent (M, SD)</td>
<td>Percent (M, SD)</td>
</tr>
<tr>
<td>Age</td>
<td>(25.0, 2.82)</td>
<td>(21.5, 2.12)</td>
<td>(23.3, 2.87)</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>50%</td>
<td>100%</td>
<td>75%</td>
</tr>
<tr>
<td>Married</td>
<td>50%</td>
<td>0%</td>
<td>25%</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>0%</td>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>50%</td>
<td>0%</td>
<td>25%</td>
</tr>
<tr>
<td>Asian</td>
<td>0%</td>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td>Multi-racial</td>
<td>50%</td>
<td>0%</td>
<td>25%</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School/GED</td>
<td>50%</td>
<td>0%</td>
<td>25%</td>
</tr>
<tr>
<td>Some College</td>
<td>0%</td>
<td>100%</td>
<td>50%</td>
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<tr>
<td>4-year Degree</td>
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<td>0%</td>
<td>25%</td>
</tr>
<tr>
<td>Religion</td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>100%</td>
<td>50%</td>
</tr>
<tr>
<td>Protestant</td>
<td>50%</td>
<td>0%</td>
<td>25%</td>
</tr>
<tr>
<td>Other</td>
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<td>0%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Hypothesis 1

In this hypothesis, we investigate whether psychological treatment significantly affects patient cortisol levels. We hypothesized that psychological treatment will significantly reduce patient stress level (as measured by cortisol).

Pearson correlation coefficient (r) was used to evaluate the degree of relationship between the number of therapy sessions (i.e. dosage of treatment) and cortisol levels (i.e. chronic stress level). The total number of therapy sessions used was not significantly
correlated with the average cortisol level \((r = .85, p = .149)\). These results are in the opposite direction hypothesized indicating that as a patient receives more treatment their distress level increases. However, with a small sample it is difficult to make inferences from this result. When a scatter plot was produced (see Figure 6), it became evident that a single extreme score changed the direction of the correlation. Without this score, the correlation results shifted dramatically \((r = -.91, p = .279)\). These results suggest an inverse relationship between chronic stress and doses of therapy sessions that indicate as participants receive psychological treatments, their level of chronic stress is reduced.

![Figure 6. Scatterplot of total number of sessions and cortisol posttreatment scores.](image)

A paired samples T-test was used on the pretreatment cortisol level and the posttreatment cortisol level to investigate whether there are significant differences between how chronic stress levels change before treatment and after treatment. The
analysis indicates that the mean cortisol level at pretreatment ($M = 6.45$) was significantly greater at the $p < .01$ level than the mean cortisol level at posttreatment ($M = 3.13$). These results point to a clinically relevant change between the pretreatment and posttreatment cortisol levels ($t (4) = 7.000; p < .01$) indicating that as participants receive psychological treatments their level of stress decreases considerably.

**Hypothesis 2**

This hypothesis examines change scores in stress levels both psychologically and physiologically. We hypothesized that change scores in psychological distress as measured by the OQ-45 will coincide with the physiological change scores as measured by cortisol. After changing the cortisol and OQ-45 scores into a common metric (standardized Z-scores) a paired samples T-tests were used to investigate whether there are significant differences in change scores between cortisol levels and OQ-45 scores. Several change scores were produced and analyzed.

Specifically, a paired samples T-test was conducted to examine the change scores between pretreatment and time of signal OQ-45 scores and pretreatment and time of signal cortisol levels in the NOT group. The results indicate no significant change in comparing the OQ-45 and cortisol change scores from participants initial intake to time of signal in the NOT group ($t (2) = 1.118; p = .465$). This indicates that as participant’s report an increase in their perceived level of distress, the amount of cortisol found in their biological systems also increases in similar manner.
Another paired samples T-test was conducted to examine the change scores between time of signal OQ-45 scores and cortisol levels and the posttreatment OQ-45 scores and cortisol levels in the NOT group. The results indicate no significant change in comparing the OQ-45 and cortisol change scores from participants time of signal to posttreatment scores in the NOT group \((t (2) = -2.831; p = .216)\). This indicates that as participant’s report a decrease in their perceived level of distress, the amount of cortisol found in their biological systems also decreases significantly.

A paired samples T-test was conducted to examine the change scores between pretreatment OQ-45 scores and cortisol levels and posttreatment OQ-45 scores and cortisol levels in the NOT group. The results indicate no significant change in comparing the OQ-45 and cortisol change scores from participants initial intake to posttreatment scores in the NOT group \((t (2) = -0.058; p = .963)\). This indicates that as participant’s report a decrease in their perceived level of distress, the amount of cortisol found in their biological systems also decreases in similar fashion.

One last paired samples T-test was conducted to examine the change scores between pretreatment OQ-45 scores and cortisol levels and posttreatment OQ-45 scores and cortisol levels in the OT group. The results indicate no significant change in comparing the OQ-45 and cortisol change scores from participants initial intake to posttreatment scores in the OT group \((t (2) = 0.035; p = .978)\). This indicates that as participant’s report a decrease in their perceived level of distress, the amount of cortisol found in their biological systems also decreases significantly.
Hypothesis 3

This hypothesis investigates the affect of feedback to therapists on patient progress and its relation to distress levels. We hypothesized that the group of patients whose therapist receives feedback on patient progress and psychological distress levels will have better OQ-45 outcomes than those patients whose therapist does not receive feedback. We further predicted that the group of patients whose therapist receives feedback on patient progress and psychological distress levels would have lower levels of cortisol than those patients whose therapist does not receive feedback. A One-Way ANOVA was used to investigate whether there are significant differences in how patients responded to treatment as a function of their status in the control (treatment as usual) or experimental (feedback provided to clinician) group.

Specifically, a One-Way ANOVA was conducted to compare the difference between the posttreatment OQ-45 scores in the control group versus the feedback group. The results were statistically insignificant $F(1, 2) = 2.48, p = .256$. However, the effect size ($\eta^2 = .554$) for feedback is quite large in that feedback accounts for 55.4% of the variance in patient outcomes indicating a compelling clinical relevance to utilizing a system of feedback while providing treatment. This suggests that those patients whose therapists received feedback reported a clinically significantly lower level of distress at posttreatment than those patients whose therapist did not receive feedback.

Another One-Way ANOVA was conducted to compare the difference between the posttreatment cortisol levels in the control group versus the feedback group. The results were statistically insignificant $F(1, 2) = .745, p = .479$ with an effect size of $\eta^2 = .271$. 
indicating that feedback accounts for 27.1% of the variance in patient cortisol outcomes.

Although the results were not statistically significant, the effect size is moderate. Given
the sample size, this result is encouraging and suggests that those patients whose
therapists received feedback have significantly lower levels of cortisol in their physiology
at posttreatment than those patients whose therapist did not receive feedback.
Case Studies

Several case studies are presented for providing an alternate viewpoint from the quantitative results presented above. The mixed method approach recognizes that every method has limitations associated with particular philosophical assumptions that make it impossible for a one-method approach to be sufficient in providing a complete understanding of the phenomenon being investigated (Slife, 1999). It is expected that those cases presented will capture the complexity of the individual and those additional variables not measured quantitatively that are associated with the patient’s care and success. We hope to demonstrate how a qualitative approach, using case studies, is able to complement and provide additional insights into understanding chronic stress and recovery that is not available through the quantitative approach by itself.

To gain a clearer appreciation for the following case studies, some information regarding the treatment facility and its approach to patient care is provided. The partial hospitalization program (PHP) at this clinic provides assistance and treatment for those struggling with eating disorders. The clinic utilizes a multidisciplinary team approach to providing patient care that combines medical and therapeutic treatments to challenge these complex and dangerous illnesses. The PHP provides support five days a week for seven hours a day implementing a structured program including group therapy, individual therapy, and supervised meals and snacks. The healthcare team works in collaboration with the patient to identify the impact, consequences, and distortions of the eating disorder.
A brief description of the treatment programs used in the PHP is provided. The cognitive-behavioral therapy groups help patients address the symptoms and cognitive distortions of their eating disorders in order to recognize the connection between their thoughts, feelings, and behaviors and to choose a healthier lifestyle. Goals groups are meant to assist in establishing realistic goals for the week and weekend and to aid in indentifying ways of receiving support. Individual therapy represents an eclectic approach (e.g. CBT, psychodynamic, emotion-focused, etc) to supplement the work done through groups. Family therapy and support is used to educate patients and families about the process of recovery and to help families address the factors that allow the eating disorder to exist within the system. Mindfulness groups provide a skills-based educational-experiential experience that will increase their ability to regulate mood, decrease anxiety, and remain grounded while undergoing internal or external distress. With yoga, the patient learns the importance of the mind-body connection, which entails identifying tension and increasing relaxation skills and flexibility while remaining present in the moment. Spiritual care groups provide an opportunity for patients to increase their awareness around nurturing their own spirituality. The focus is to increase meaning, purpose, and hope.

Case Descriptions

Case 1: Amanda. Amanda is a 20-year-old, single, Asian-American college student attending a private university. She sought psychological services for an eating disorder, depression, and alcohol use. She began a binging and purging pattern since
high school and remembers being teased (e.g. being called "fat girl"). After binging, purging, and restricting her diet, she lost 40 pounds. She describes being terrified of weight gain and recalls other students refer to her as "bony and gross." Her parents divorced when she was seven years old. She describes her relationship with her father as "really good." However, he is obese and also struggles with binging and purging and will make blunt and hurtful comments toward Amanda about her eating habits. She described her mother as a binge drinker who is now on her third marriage. Amanda does not currently visit her mother.

She explained that as a child growing up, food was given as a reward and she often binges during times of stress or anger. After beginning college, she began binge drinking. This eventually culminated in her being hospitalized for alcohol poisoning. At this time, she was mandated into treatment at the university counseling center where she attends college. She has received about eight sessions before entering the partial hospitalization program.

As part of the intake procedures, a psychological assessment was given that reveals certain aspects of her personality and coping styles. Amanda is overly self-critical and often views herself as performing at substandard levels in comparison to others. This reinforces her beliefs that she is inadequate and useless, which creates a powerful motivation to avoid her difficulties or personal predicaments. Consequently, she has little hope of success and lacks incentive to work on tasks or activities to alleviate her pain. This tends to leave her feeling very alone as she withdraws and ruminates.
about her problems. It is difficult for her to trust and open up to others, as she believes
no one is able to understand what she experiences. This tendency to be hypersensitive to
people’s reactions and feel mistreated is probably best understood in the context of her
family life growing up. Amanda describes family discord and family members being
constantly critical of her as a common part of life. This creates an interactional style of
pronounced passivity accompanied with the belief that personal assertiveness is
destructive to relationships. Friends and family may misinterpret or grow frustrated with
her submissiveness and attempt to take responsibility for her life.

*Case 2: Katelyn.* Katelyn is a 23-year-old, single, Caucasian who works in a
hospital and attends college part-time. She presents for psychological services for an
eating disorder, depression, and social anxiety. She received treatment elsewhere for her
eating disorder three years ago for about 4 months. Katelyn stated that she realized she
needs additional help and is more aware of other contributing factors to her distress and
dysfunction. She explained that as a child neighborhood boys sexually abused her
multiple times over the course of several years. She expressed determination to work
through these painful events this time in treatment, whereas she was not several years ago
when in a previous treatment program. Presently, she appears to cope with her intense
emotional hurt with social isolation and self-mutilating behaviors (e.g. cutting). These
coping mechanisms serve to exacerbate the negative emotional states she feels, which
perpetuates her depression and eating disorder.
She describes her family as having emotional and psychological difficulties. Her father reportedly suffers from depression and her brother experiences bouts of depression and anxiety as well as substance abuse problems. Katelyn describes her relationship with her mother as "rejecting" and with her father as superficial. She conveyed that her relationship with her brother is "good" and that she admires him partly because he was able to overcome his substance abuse problems. Although she is single, she has been in a romantic relationship for three years and portrays it as satisfying.

As part of the intake procedures, a psychological assessment was given that reveals certain aspects of Katelyn’s personality and coping styles. She feels considerable dissatisfaction with her body size and shape and often utilizes binge-eating behaviors with subsequent purging behaviors in an attempt to avoid feelings of personal insecurity and inadequacy. These behaviors produce emotional distress and lead to a persistent pattern of negative self-evaluation where Katelyn believes she is unable to live up to her personal standards. This persistent sense of failure constructs a perception of hopelessness and of being out of control. Consequently, she considers herself alone and emotionally empty.

She tends to prefer seclusion as social interactions cause her to feel very anxious and uncomfortable. Katelyn’s coping style to withdraw from relationships seems to be motivated out of a personal difficulty to express personal thoughts and feelings to others and a learned response to intimacy that signals distrust and danger (e.g. sexual abuse history). Due to these perceptions and learned responses about her and others, it is quite
difficult for Katelyn to experience love and understanding from people. In addition, her lack of emotional regulation abilities creates mood instability and impulsivity that lead her to engage in self-destructive behaviors (e.g. cutting, binging and purging) in order to escape or avoid the intensity of her emotional experience.

Case 3: Anna. Anna is a 23-year-old, single, Hispanic high school coach. She presented for treatment with concerns regarding her eating disorder, depression, and alcohol abuse. Anna explained how she would restrict her diet to pretzels and water for up to four months, engage in binge-purge eating patterns, and increase her exercise routines in order to control her weight. She recalled being teased in middle school and came to regard herself as “too fat.” In high school, she began drinking alcohol and using marijuana on the weekends. The alcohol use increased to three to four times during weekdays, which eventually led her to be hospitalized for alcohol poisoning. She received treatment for her substance abuse in high school and stated that she continues to use alcohol about three times in the past 3 months and has not used marijuana in the past two years.

Anna explained that her family environment was difficult with strained familial relationships. Her father suffers from depression and her brother is a polysubstance user who was emotionally and verbally abusive toward her growing up. Anna experiences her relationship with her mother as having a high degree of conflict and the other familial relationships as either poor or superficial. She reported experiencing violence in her home growing up. She denies being physically or sexually abused; however, she
describes an aggressive environment where she perceived herself as being repeatedly threatened with physical harm by her brother.

She disclosed having recurrent difficulties with sustaining meaningful and intimate relationships in her life. She explained that she allows herself to be “taken advantage of a lot” and that she often feels pressured by boyfriends to act out sexually. She recalled a particularly frightening experience in high school where she admitted that it “might be considered rape.” She has a few close friends where she feels genuine support and caring, but is reserved in sharing too much of herself emotionally.

A psychological assessment was given as part of the intake procedures that illuminates certain features of Anna’s personality and coping styles. Anna tends to view herself as largely ineffective and having little personal worth. These beliefs seem to be reinforced by her consistent negative self-appraisal in response to her consistent “failure” in achieving her goals. This leads her to view herself and the world as largely uncontrollable, has a poor sense of who she is, and lacks insight into understanding her difficulties. Consequently, she has a tendency for self-disparagement and expresses a strong desire to be someone else.

Not surprisingly, she feels a great deal of apprehension in social situations and extreme difficulty in creating a rewarding and safe intimate relationship. When confronted with social situations or relationships she tends to withdraw from the experience, which cause others to experience her as lacking interest and unwilling to trust others. This is combined with a lack of skills in regulating her emotions, which are
frequently experienced as too strong and confusing. In response to her inability to recognize or contain her emotional experience, she is inclined to avoid them by dismissing her emotional life as invalid or inappropriate. This makes it very difficult for her to connect emotionally with herself or to explain her relational desires adequately to others, leaving her feeling alone and hopeless. She finds a restoration of hope in God and in her spirituality, which she relies on to get her through difficult times. She stated that she actively seeks out a relationship with God, in particularly his love and care.

Case 4: Mina. Mina is a 27-year-old, married, Native American stay-at-home mother. She seeks treatment for an eating disorder, depression, and alcohol abuse. She began binging-purging behaviors at age 13 and has continued to struggle with her eating disorder intermittently throughout the years. She sought treatment through a local psychiatric hospital about three years ago and described the experience as unhelpful. In addition to the binge-purge behaviors, she describes a persistent pattern of using laxatives and over exercise as a means to control her weight. She recalls being called “chubby” and teased at age 13 by peers and remembers members of her family making demeaning comments about her weight (e.g. “I don’t want fat kids”). She acknowledged using alcohol since she was 19 years old and preferring hard alcohol (i.e. vodka). Mina describes her alcohol use as a way to avoid or control her eating disorder and symptoms of depression. She stated that she stopped in 2005, but recently started drinking again. In addition, she has incorporated self-mutilating behaviors (e.g. cutting and burning
herself) in an attempt to find relief and a sense of control over the unbearable emotions she experiences.

Mina has been married 15 years and has several children. She describes her marriage as supportive where her husband is interested in her treatment and progress. Her family environment growing up was unstable. Her parents divorced when she was 7 years old precipitated by her father’s extramarital affair. She witnessed violence in the home stating that her father “hit mom a lot” and described a particularly threatening event at age 7 when he choked her mother “almost killing her”. She depicts her relationship with her father as a “broken, scary, and sad” relationship. Mina related that her father abused drugs while raising his children and suspects that he continues to do so. Her brother has difficulty with depression and drug use that cause her to feel distant from him. She suggests that her relationship with her mother is somewhat unstable, but is sympathetic towards her in that she views her mother as someone who has “been through a lot” and treated unfairly. Mina currently struggles with being aggressive toward her husband relating occasions where she hits, punches, or pushes her husband.

As part of the intake procedures, a psychological assessment was given that makes available certain elements of Mina’s personality and coping styles. Mina often feels depressed and sad that seems to be structured around her pessimistic view of the future combined with her tendency toward self-criticism and guilt. Mina experiences a limited range of emotions and constricts what is available to her socially, in part by adopting a fixed and narrow range of interests she believes represents the expectations of
others. Consequently, she has developed few coping skills for dealing with psychological stressors and her eating disorder is currently her primary coping mechanism for dealing with stress. She ruminates about her problems, which leads her to feel overly anxious and tense. These negative emotional states tend to produce well-rehearsed irrational beliefs and fears.

Mina describes herself as shy and reserved and experiencing a general dissatisfaction with her circumstances. Understanding this interactional style, her history, and tendency to cope with distressing emotional situations by withdrawing, she is hard to get to know, which further enhances her feelings of alienation and failure. Consequently, Mina will generally avoid interacting with other people if she can and is unsure of how to behave when in a group of people. She is sensitive to what others think and fears peer evaluation and judgment.

**Exploratory Analyses and Results of Case Studies**

The qualitative data collected for these case studies includes a semi-structured intake and clinical interview, a psychological assessment, and clinician case notes. This data was gathered in addition to the OQ-45 and cortisol samples described earlier. In this exploratory analysis, the qualitative results of each case study will be investigated along side the quantitative results presented earlier (i.e. cortisol and OQ-45 data). Furthermore, additional quantitative analyses will be presented in order to observe trends across cases. For instance, the descriptive data regarding a patient’s perception of their strengths and weaknesses will be discussed individually, case by case. Then, that information will be
presented quantitatively as we examine developments across cases in relation to outcomes.

As an exploratory analysis, several variables were created or quantified from the qualitative data. Those variables and the process of quantification are described below. The first variable is the patient’s perception of their strengths. In order to quantify the patient’s strengths, the number of strengths listed by each patient was added together yielding a total number of perceived strengths. The patient’s degree of motivation toward treatment was placed on a scale ranging from 1-3 with one being poor motivation, two being fair, and three being good motivation. The third variable created was a quantification of how many losses the patient had experienced in the past two years. This was done in an additive way where one loss equals one, two losses equals two, and so on. These variables were then correlated, using a Pearson $r$, to the cortisol and OQ-45 posttreatment outcome scores.

*Case 1: Amanda.* The treatment recommendations for Amanda included a variety of modalities and indicated a short-term focus emphasizing behavioral interventions that center on her reasons for entering treatment. Individual therapy was provided to assist Amanda with developing a more positive sense of self-worth and self-efficacy as well as focusing on development of more appropriate social skills. An individual therapist would also be able to assist Amanda in addressing such issues as stress tolerance, emotional regulation, and processing emotions. Cognitive-Behavioral approaches were used that focused on her depressed cognitions and poor self-concept. In order to address
her pronounced interpersonal and social concerns, group psychotherapy was utilized for providing a social perspective to her problems and in dealing directly with her avoidant behaviors.

Amanda reportedly utilized therapy in a way that challenged her entrenched perceptions of herself and the world. Although she has pronounced tendencies for being overly self-critical and avoidant, thus creating little incentive to work on tasks meant to alleviate her symptoms, she remained willing to “take on challenges to create change.” At intake, it was suspected by the staff that she was underreporting the level of abuse or traumatic events in her life. This corresponded to her difficulties in opening up and trusting others that reinforce her belief, that no one is able to understand or help her through her problems. As she began to relate her life experiences to her therapist in individual therapy and trust her peers in her group therapy sessions, she began to relate years of verbal and emotional abuse from family members (especially her alcoholic mother). She described one major loss in her life in the past two years. The loss was a romantic relationship where she felt safe and accepted that ended poorly, with anger, feelings of betrayal, and the total loss of the relationship. This loss was especially difficult given her disposition to withdraw socially and ruminate about her pain. In speaking openly about this loss and the pain and confusion she felt and continues to feel, she was able to invite others into a more intimate relationship with her. Over the course of therapy, she identified several strengths. She felt she was introspective, good at communicating, and “real” or honest with others. These strengths were emphasized in providing treatment as she was asked to recognize and rely on the worth she sees in her.
As seen in Figures 7, Amanda’s initial self-report of psychological stress was substantial according to her OQ-45 score. These substantially high levels of negative affect and arousal are consistent with those scores of patients in an inpatient treatment facility (Lambert, Whipple, Smart, Vermeersch, Nielsen, and Hawkins, 2001; Lambert, Whipple, Vermeersch, Smart, Hawkins, Nielsen, and Goates, 2002). Figure 8 provides a physiological measure of distress as indicated by Amanda’s elevated saliva cortisol reading. After receiving twenty-one sessions of combined individual and group psychotherapy in the partial hospitalization program, we observe a considerable change in her reported level of distress as well as a sizable change in her physiological measurement of chronic stress. It is significant to note that Amanda’s therapist received feedback as to her progress granting an opportunity to reevaluate her case and modify treatment objectives at time of signal. This pattern of elevated self-report and elevated biological measure of distress followed by significant decreases in self-reported and physiological distress as Amanda received treatment is indicative of the types of changes we would expect given the recent research in psychoneuroimmunology (Sapolsky, 2002; Seaward, 2005). That is, that the psychological and physiological manifestations of distress reflect each other at pretreatment and posttreatment scores.
However, the hypothesized results of her cortisol measurements and OQ-45 scores mirroring each other only partially held together in this case. Amanda reported a significant increase in distress according to her OQ-45 score that resulted in a "signal message" indicating the likelihood that she might drop out of treatment early. This pattern is not observed in her cortisol levels. Instead, her cortisol decreased during the same time she self-reported an increase in distress. As seen in Figure 8, her cortisol level was initially high, and then steadily decreases over time as she received treatment. Her cortisol pattern presents some complications in reconciling this result with the psychoneuroimmunology research that would suggest an increase in reported psychological distress would demonstrate an increase in cortisol. Possible explanations for this result are presented in the discussion.
**Case 2: Katelyn.** Katelyn’s treatment recommendations called for her to experience group dynamics where she could be appropriately monitored in her interactions with her peers. The emphasis on communication skills, emotional expression, and healthy engagement in group-oriented activities was provided for her to assist in developing adaptive interpersonal skills. It was further suggested that Katelyn learn cognitive behavioral therapy techniques to challenge her body image concerns, depression, and anxiety. Individual therapy was also provided to offer a more intimate setting for her explore and verbalize her fears in connection with her sexual abuse history and current relationships. She was continually monitored for suicidal ideation as well as other self-injurious behaviors.

Katelyn’s motivation for treatment was described as fair with a guarded prognosis. She exhibited coping styles toward isolation and self-injurious behaviors (e.g.}
cutting) that precluded her from developing intimate relationships with others that would challenge her hesitancy for expressing personal thoughts and feelings to her peers. She was described as guarded, distrusting of others, and lacking insight as to what motivates her and the relevant factors creating her difficulties. The staff felt optimistic in that she had entered therapy on her own accord and expressed a sincere desire to work on traumatic sexual abuse history to help her with her emotional reactions. During the intake procedures, she indicated having one identifiable strength – that she is caring. She did not report experiencing any losses in the past two years. These responses, combined with her work in therapy, were interpreted as Katelyn’s desire to remain alone and emotionally distant from others as well as to confirm her belief that she does not deserve love and understanding from others. These therapeutic difficulties are clearly related to her abuse history, which demonstrated the common pattern in trauma victims of alternating between being unable to feel and being overwhelmed by feelings of fear and panic (Elliot, Watson, Goldman, Greenberg, 2003). Her guardedness in therapy evoked a sense of guilt and failure in her that seemed to bolster her already established pattern of negative self-evaluation.

The complicated patterns of her cognitive-emotional and behavioral insufficiencies described above are reflected in her outcome measures. As seen in Figure 7, her initial OQ-45 score is consistent with someone experiencing a great deal of psychological distress similar to those presenting for treatment in an inpatient hospital (Lambert, et al., 2001; Lambert, et al., 2002). As she went through treatment, she reported an increase amount of distress (i.e. signaled with a yellow or red message) and
recovered only partially from this elevated state of distress as indicated by her posttreatment score on the OQ-45 (her initial score was 120, her signal score was 130, and her posttreatment score was 125). This signifies someone who would typically not benefit from treatment and is at risk for premature drop out and may become more distressed in response to treatment efforts (Lambert, 2001; Lambert, Hanson, and Finch, 2001). Katelyn’s cortisol saliva measurements indicated a similar pattern of increased distress as she went through treatment (see Figure 8); however, her posttreatment cortisol level decreases dramatically whereas her OQ-45 score only slightly decreases from time of signal. Possible explanations for this lack of congruency are addressed in the discussion. It is significant to note that Katelyn’s therapist did not receive feedback as to her progress or lack thereof. Although she did not benefit from treatment and likely dropped out prematurely, the pattern observed between her OQ-45 scores and her cortisol measurements seem to correspond with one another in their association with chronic stress.

**Case 3: Anna.** The treatment plan for Anna included various groups as well as individual therapy. Her excessive difficulties with interpersonal communication was identified as a major barrier to the successful outcome of her treatment. She was consequently placed into group therapy where she experienced group dynamics meant to teach effective communication skills as well as to monitor her interactions with her peers. It was hoped that from these activities she would develop communication skills, be able to appropriately express her emotions, and grow in her abilities to interact with others in a healthy way (i.e. develop adaptive interpersonal skills). In addition, she was placed in
individual cognitive-behavioral therapy where she would learn techniques to challenge her body image concerns.

Anna proceeded with treatment in a cautious manner that seemed to reflect her tendency to be reserved in sharing too much of herself emotionally. Although she complains about her multiple relationship failures and apparent inability to sustain meaningful connections with others, she was resistant to exploring those obstacles related to these difficulties. The staff reported her motivation for treatment as poor due to her lack of insight into the multiple factors that create her life’s dilemmas and her inflexibility in seeking concrete solutions limited to her eating disorder behaviors that disregarded connections to her depression and anxiety. These experiences in therapy combined with her apprehension in social situations reinforced her irrational beliefs that she is a failure and that the world is uncontrollable. She would often revert to her usual coping mechanisms when confronted with what seemed to be overwhelming emotions by withdrawing from her peers. Her religious beliefs were taken into account during the course of treatment as a potential coping mechanism to provide relief from her symptoms. She expressed a strong sense of spirituality and belief in God stating often, “Christ is in me” and drew relevant strength from her connection with God. Although she felt supported in her spirituality by the staff, she was unable to draw connections between her apparent successful relationship with God and translate that into how she might build other successful relationships.

Anna’s struggles in the partial hospitalization program are duplicated in her OQ-45 and partially replicated in her cortisol scores. According to her OQ-45 scores (see
Figure 7), she is consistent with those individuals seeking outpatient psychological services (Lambert, et al., 2001; Lambert, et al., 2002). Her pattern of progress as demonstrated by her OQ-45 scores suggests a similar distress level as when she began treatment indicating that she may have experienced no therapeutic gain. As seen in Figure 8, her cortisol measurements relate a slightly different account of her distress levels. She began treatment with a cortisol reading relatively elevated as compared to her posttreatment reading indicating a decrease in her level of distress by the time she ended treatment. She was placed in the no feedback group in which her therapist did not receive reports on her progress or reported levels of distress. This may explain her lack of therapeutic gain and reported distress levels as indicated by her OQ-45 scores.

Case 4: Mina. Understanding Mina’s tendency to give up when faced with personal difficulties, she believes treatment is unlikely to improve her condition. Individual therapy was recommended for her in order to allow her to develop a relationship in a safe and challenging environment. However, her reluctance to tell others about herself is a barrier to establishing a therapeutic alliance, at least initially. Furthermore, she was referred to group therapy to build social skills and assertiveness. This type of interaction provided her with opportunities to experience a healthy engagement with her peers that will likely lead to adaptive interpersonal proficiency. In these groups, Mina worked on communication skills, emotional regulation and expression, and how to set boundaries appropriately. In addition, she was taught
cognitive-behavioral techniques to confront her body image distress, her depression, and anxiety. She was monitored frequently for suicidal ideation and self-injurious behaviors.

Mina progressed through treatment consistently well. She identified several factors motivating her toward improving her condition. She stated she is a highly motivated individual, feels supported by her family, and wants to “be around a lot.” She was able to dedicate herself early on to her therapeutic goals of finding the reasons for her eating disorder, discover what motivates her, increase personal coping skills, and confront her excessive guilt with the belief that she is deserving and worthwhile. Although she had much to overcome, she expressed an attitude that can be described as determined and wanting to restore her sense of responsibility. Through different therapeutic modalities, her tendencies for ruminating, isolating, self-criticism, and excessive guilt were appropriately challenged. She began to develop alternative coping mechanisms when confronted with the desire to engage in self-injurious behaviors brought on by overwhelming negative emotional stress. In part, she was able to adjust her expectations and approach relationships with greater flexibility and range of emotional expression. Her uncertainty in social situations was discussed openly in group therapy assisting in increasing her ability to trust others and diminish her fears associated with concerns about peer evaluation and judgment.

Mina’s progression in therapy is documented in her OQ-45 and cortisol scores (see Figures 7 and 8). Her initial OQ-45 score at intake is consistent with those patients being treated in an inpatient hospital unit (Lambert, et al., 2001; Lambert, et al., 2002),
indicating a substantial level of distress. Mina was placed in the feedback group where her therapist received information regarding her progression in treatment. Previous research by Lambert and colleagues suggests that this would have an important impact on her recovery (Lambert, 2001; Lambert, Hanson, and Finch, 2001). By the conclusion of her treatment, we observe a considerable change in her reported level of distress as indicated by her OQ-45 score, as well as a sizable reduction in her physiological measurement of chronic stress. This pattern of elevated self-report and elevated biological measure of distress followed by significant decreases in self-reported and physiological distress as Mina received treatment is indicative of the types of changes we would expect given the recent research in psychoneuroimmunology (Sapolsky, 2002; Seaward, 2005). That is, that the psychological and physiological manifestations of distress reflect each other.

*Cumulative case study results.* In this section, we examine developments across cases in relation to outcome variables (i.e. OQ-45 scores and cortisol) by creating several variables (as described earlier) for exploratory analyses. In order to accomplish this, three variables (losses, motivation, and perceived strengths) are correlated, using a Pearson $r$, to the cortisol and OQ-45 posttreatment outcome scores. To examine further trends across individuals, average scores are compared by no feedback versus feedback groups and “not on track” versus “on track” groups for both cortisol and OQ-45 scores. Lastly, we briefly examine the scores of four other biomarkers (i.e. estadiol, progesterone, testosterone, DHEAS) and cortisol in comparison with the OQ-45 scores.
The purpose is to provide an alternative viewpoint to the qualitative data just presented by investigating group developments in the data quantitatively.

Pearson correlation coefficient ($r$) was used to evaluate the degree of relationship between the patient’s perceived strengths, experienced losses, and treatment motivation and posttreatment OQ-45 scores (i.e. psychological distress). The correlations between these exploratory variables and posttreatment OQ-45 scores is presented in Table 4. The patient’s perceived strengths was inversely correlated with OQ-45 posttreatment scores ($r = -.89, p = .112$). Although the results did not reach statistical significance, they suggest a strong inverse relationship between self-reported psychological distress and perception of personal strengths that indicate as participants’ perception of personal strengths increases their level of chronic stress is reduced.

Table 4

<table>
<thead>
<tr>
<th>Measure</th>
<th>OQ-45 Posttreatment Scores (N = 4)</th>
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<tr>
<td>OQ-45-45 Posttreatment Score</td>
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<tr>
<td>Experienced Losses</td>
<td>.585</td>
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<tr>
<td>Perception of Strengths</td>
<td>-.888</td>
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<td>Motivation Level</td>
<td>-.458</td>
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Experienced losses was positively correlated with OQ-45 posttreatment scores ($r = .59, p = .602$). Although the results did not reach statistical significance, they suggest a moderately successful relationship between self-reported psychological distress and
losses experienced by patients in the last two years. This signifies that the more losses experienced by patients’ their level of chronic stress increases. The patient’s level of motivation was inversely correlated with OQ-45 posttreatment scores ($r = -.46, p = .542$). Although the results did not reach statistical significance, they suggest a moderately convincing relationship between self-reported psychological distress and a patient’s level of motivation that indicate as their motivation for treatment increases their level of self-reported psychological distress decreases.

Pearson correlation coefficient ($r$) was used to evaluate the degree of relationship between the patient’s perceived strengths, experienced losses, and treatment motivation and posttreatment cortisol levels (i.e. chronic stress level). The correlations between these exploratory variables and posttreatment cortisol levels is presented in Table 5. The patients perceived strengths were not statistically significantly correlated with cortisol posttreatment levels ($r = -.15, p = .851$). While the results did not reach statistical significance, they suggest a small inverse relationship between a person’s physiological level of distress and their perception of personal strengths that indicate as participants’ perception of personal strengths increases their level of chronic stress is somewhat reduced.
Table 5

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<th>Measure</th>
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<tr>
<td>Perception of Strengths</td>
<td>-.149</td>
</tr>
<tr>
<td>Motivation Level</td>
<td>-.794</td>
</tr>
</tbody>
</table>

Experienced losses was positively correlated with cortisol posttreatment levels ($r = .91, p = .275$). Although the results did not reach statistical significance, they suggest a strong relationship between a person’s physiological level of distress and losses experienced by patients in the last two years that accounted for 82.8% of the variance in posttreatment cortisol levels in this sample. This signifies that the more losses experienced by patients’ their level of chronic stress increases. The patient’s level of motivation was inversely correlated with cortisol posttreatment levels ($r = -.79, p = .206$). Though the results did not reach statistical significance, they suggest a another strong and convincing relationship between the physiological distress levels of a patient and their level of motivation that indicate as their motivation for treatment increases their level of physiological distress decreases.

As observed in Figure 9 and Figure 10, when we examine patterns of average scores according to groups we notice familiar trends that substantiate previous OQ-45 outcome research. Figure 9 depicts a clear example of those patients that were predicted by the signaling system to have a negative outcome (i.e., patients whose therapists
received a red or yellow message at any time during treatment) as experiencing little therapeutic gain (a change score of 7.5 OQ-45 points at pretreatment score – posttreatment score). However, when we consider the reduction in reported distress from the time of signal to posttreatment scores, this group of patients were able to make clinically significant gains (a change of 16 OQ-45 points from time of signal to posttreatment scores). Furthermore, Figure 9 depicts an apparent trend of clinically significant gains for patients who are having a positive response to therapy (a change of 32 OQ-45 points from pretreatment to posttreatment scores). Lambert and colleagues (1996) judge those patients in the latter group (the “on track” patients) as having recovered (patients whose score decreases by 14 or more points and passes below the cutoff score of 64), while judging those patients in the former group (the “not on track” patients) as having received no change (patients whose score changes by less than 14 points in either direction). This brings into clear relief one of the main purposes motivating outcome research: How to improve outcomes for those patients who do not respond positively to treatment. One solution is to provide feedback to therapists on patient progress (Lambert, Whipple, et al., 2001; Lambert et al., 2002; Whipple et al., 2003).
Figure 9. OQ-45 results presented by on-track or not on track groups

Figure 10. OQ-45 results presented by feedback or no feedback groups
As seen in Figure 10, the differences between those patients whose therapist receives feedback on their progress and those who do not are plainly apparent. A few notable patterns emerge. First, the difference between the two groups in terms of their initial pretreatment OQ-45 scores is negligible (a difference of 5.5 points). This lends confidence that the two groups of patients are relatively equal when beginning treatment. This is where the similarities end. At time of signal, the difference between the groups is considerable (29 points) and at posttreatment the difference is again substantial (48 points). As previously reported, a One-Way ANOVA was conducted to determine the effect of feedback to therapists on patient outcome. The results were statistically insignificant $F(1, 2) = 2.48, p = .256$. However, the effect size ($\eta^2 = .554$) for feedback is quite large in that feedback accounts for 55.4% of the variance in patient outcomes indicating a compelling clinical relevance to utilizing a system of feedback while providing treatment. These results lend support to the hypothesis that feedback on patient progress to the treating clinician enhances outcome for patients.

The cortisol readings provide mixed results in terms of corresponding to the self-reported distress levels of the OQ-45. As Figure 11 illustrates, those patients that were predicted by the signaling system to have a negative outcome (i.e. “not on track” patients) experienced significant therapeutic gain according to the change in cortisol levels (a change score of 3.5 ng/ml at pretreatment level – posttreatment cortisol level). In addition, those designated as “not on track” did not have an incident of increased cortisol release into their biological system at time of signal when they were reporting a
significant increase in psychological distress. Possible reasons explaining this apparent discrepancy is elaborated on in the discussion. Those patients in the “on track” group (see Figure 10) provide an apparent trend of clinically significant gains and as having a positive response to therapy (a change of 3.2 ng/ml from pretreatment to posttreatment levels). The general pattern found in the OQ-45 outcome research indicating that those patients who do not respond positively to treatment are at risk for premature drop-out, deteriorating, or having no gain is not necessarily suggested in the cortisol results of those patients in the “not on track” group. However, those patients identified as “on track” demonstrate a pattern consistent with previous outcomes research. The overall trend of improvement or significant decreases in cortisol despite “on track” or “not on track” status of patients is encouraging.

![Cortisol results](image)

**Figure 11.** Cortisol results presented by not on track and on track groups
The differences between those patients whose therapist received feedback and those whose therapist did not receive feedback indicate a clear benefit to final outcomes when regular feedback is provided to clinicians (see Figure 12). The difference between the two groups in terms of their initial pretreatment cortisol levels is minor (a difference of 0.8 ng/ml). This gives us confidence that the two groups of patients are relatively equal when beginning treatment and mirrors the initial intake OQ-45 scores. At time of signal, the difference between the groups begins to grow (a difference of 1.2 ng/ml) and at posttreatment the difference is substantial (a difference of 1.95 ng/ml) demonstrating that feedback has an important impact on outcome and reducing chronic stress. However, the cortisol levels at time of signal do not follow the self-reported increase of psychological distress. That is, an incident of increased cortisol release into the biological system at time of signal did not occur when there was a reported increase in psychological distress. Even with this noticeable irregularity it is important to notice that those patients whose therapist received feedback consistently had lower levels of cortisol than those whose therapist did not receive feedback. As previously reported, a One-Way ANOVA was conducted on posttreatment cortisol levels to determine the effect of feedback to therapists on patient outcomes. The results were statistically insignificant $F(1, 2) = .745, p = .479$ with an effect size of $\eta^2 = .271$ indicating that feedback accounts for 27.1% of the variance in patient cortisol outcomes. Although the results were not statistically significant, the effect size is moderate. Given the sample size, this outcome is encouraging. These results lend support to the hypothesis that feedback on patient
progress to the treating clinician enhances outcome for patients and reduces a person’s physiological reaction to stress.

Figure 12. Cortisol results presented by feedback or no feedback group

Additional hormones were measured that may lend some clarification to relationships between mind and body. Specifically, estradiol, progesterone, testosterone, and DHEAS were measured at the same time as cortisol. A series of graphs are presented to illustrate the patterns of hormonal shifts that took place in several of the case studies (Figures 13, 14, 15, and 16; additionally, we refer the reader to Figure 8 to examine cortisol levels).
**Figure 13.** Testosterone Levels at Intake, Time of Signal, and Posttreatment

**Figure 14.** DHEAS Levels at Intake, Signal, and Posttreatment
In general, the patterns demonstrated in these results do not appear to follow an identifiable model related to change during the course of treatment. However, some consistencies exist that may be noteworthy. One of the more apparent ones is related to
the estradiol and cortisol results. When the pre and post scores are compared, it seems that an inverse relationship exists between cortisol and estradiol so that as cortisol decreased through the course of treatment (i.e. patients become less distressed) estradiol increased. Some other regularities are noticed in progesterone and DHEAS levels. That is, Katelyn and Anna’s progesterone and DHEAS levels remain relatively flat indicating little or no change in these hormone levels through the course of treatment. Whereas Amanda’s progesterone and DHEAS levels follow an inverted V pattern indicating a spike in these hormones during time of signal followed by a period of decreased progesterone and DHEAS.

Clinical and normative data were analyzed by Lambert and colleagues (1996) to establish a Reliable Change Index (RCI) and a cutoff score for the OQ-45. The RCI obtained on the OQ-45 was 14 points, indicating that patient changes of 14 or more points on the OQ-45 can be considered reliable (i.e., not due to measurement error). The cutoff score on the OQ-45 was calculated to be 64, indicating that scores of 64 or higher are more likely to come from a dysfunctional population than a functional population, and scores of 63 or below are more likely to come from a functional population than a dysfunctional population. Using this information, patients can be placed in the following categories based on the change observed in their OQ-45 scores:

Recovered (i.e., clinically significant change) – Patients whose score decreases by 14 or more points and passes below the cutoff score of 64.

Improved (i.e., reliably changed) – Patients whose score decreases by 14 or more points but does not pass below the cutoff score of 64

No Change – Patients whose score changes by less than 14 points in either direction
Deteriorated – Patients whose score increases by 14 or more points

One way of improving the interpretability and comparability of the OQ-45 scores and the five biomarker levels (i.e. estradiol, progesterone, testosterone, DHEAS, and cortisol) is to identify a clinically significant change in the OQ-45 scores of the patients and compare this to the changes that occur at a biological level. To accomplish this, we utilized the categories generated by the RCI for the OQ-45 scores and made observations about whether the patient’s biological status was “low”, “normal”, or “high” (see Table 6).

Table 6

<table>
<thead>
<tr>
<th>OQ-45 Categorization of Patients and Biomarker Comparisons</th>
<th>Intake</th>
<th>Signal</th>
<th>Posttreatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Measures</td>
<td>Score, Category</td>
<td>Score, Category</td>
<td>Score, Category</td>
</tr>
<tr>
<td>Katelyn OQ-45</td>
<td>120</td>
<td>130, no change</td>
<td>125, no change</td>
</tr>
<tr>
<td>Estradiol</td>
<td>1.3, normal</td>
<td>0.5, normal</td>
<td>2.2, normal</td>
</tr>
<tr>
<td>Progesterone</td>
<td>14, low</td>
<td>11, low</td>
<td>14, low</td>
</tr>
<tr>
<td>Testosterone</td>
<td>10, low</td>
<td>8, low</td>
<td>18, normal</td>
</tr>
<tr>
<td>DHEAS</td>
<td>4.2, normal</td>
<td>4.1, normal</td>
<td>5.1, normal</td>
</tr>
<tr>
<td>Cortisol</td>
<td>4.4, normal</td>
<td>5.6, normal</td>
<td>2.1, low</td>
</tr>
</tbody>
</table>

Amanda OQ-45

| Estradiol        | 0.8, normal | 2.4, normal | 2.4, high | pg/ml |
| Progesterone     | 15, normal | 24, low | 20, normal | pg/ml |
| Testosterone     | 7, low | 22, normal | 9, low | pg/ml |
| DHEAS            | 10.0, normal | 37.6, high | 11.7, normal | ng/ml |
| Cortisol         | 5.7, normal | 4.4, normal | 1.1, low | ng/ml |

Anna OQ-45

| Estradiol        | 1.2, normal | 2.4, normal | pg/ml |
| Progesterone     | 11, low | 11, low | pg/ml |
| Testosterone     | 21, normal | 12, low | pg/ml |
| DHEAS            | 3.4, normal | 3.2 normal | ng/ml |
| Cortisol         | 9.3, normal | 6.1, normal | ng/ml |
These results show mixed results in terms of similarities in patterns. When we consider both Katelyn's and Anna's scores across the different biomarkers in comparison to reported distress levels as indicated by the OQ-45, we notice that they are categorized as having experienced "no change" therapeutically. This pattern of no gains is reflected in their biological markers that remain essentially the same through time, that is, at intake, time of signal, and posttreatment. In contrast, we detect some hormonal fluctuations in Amanda's biological scores. According to the OQ-45 scores, she is categorized as "improved". Her cortisol levels shift from "normal" to "low" indicating a decrease in distress. In addition, her DHEAS scores increase from pre to post indicating that as her cortisol levels decrease her DHEAS scores increase.
Discussion

Hypothesis 1

This hypothesis considers whether psychological treatment significantly affects patient cortisol levels. We hypothesized that psychological treatment would significantly reduce patient stress level (as measured by cortisol). This research question is derived from the recent interest in the relationship between the brain, immune and endocrine systems, and health outcomes. An extensive body of literature exists on stress, which has traditionally been defined unidimensionally as physiological stress. More recently, social and biological scientists as well as clinical practitioners have utilized this research in an attempt to ameliorate the emotional distress, dysfunction, physical diseases, and social ills created by stress (Lazarus, 1999). Consequently, this work has focused on the implications of psychological and social factors on health and well-being (Rabin, 1999). Not surprisingly, we have witnessed a flooding of stress reduction and coping techniques aimed at preventing, eliminating, managing, or learning to live with the experience of daily stress (Lazarus, 1999). Growing out of this focus is an emphasis on interdisciplinary development of theory and research as it is evident that social, physiological, and psychological health factors are important.

The results of the correlation documenting the relationship between number of sessions used and cortisol levels of patients undergoing treatment showed mixed results. The initial result suggested that as patients receive more treatment their cortisol levels increase. This is counter-intuitive to what the psychoneuroimmunology research
suggests (Lazarus, 1999; Rabin, 1999; and Seaward, 2005) as well as different from what psychological outcomes research has found with regards to dose-response and outcomes (Lambert, Whipple, Smart, Vermeersch, Nielsen, and Hawkins, 2001; Lambert, Whipple, Vermeersch, Smart, Hawkins, Nielsen, and Goates, 2002). One important issue is the sample size and basing inferences about a relationship between variables on a small sample. This may account for this result. Another relevant observation is the dramatic shift in direction and magnitude of the results when a single extreme score was removed. The results following this adjustment suggest a strong inverse relationship between chronic stress and doses of therapy sessions that indicate as participants receive psychological treatments, their level of chronic stress is decreased.

Furthermore, upon further investigation where the pretreatment cortisol level and the posttreatment cortisol level were compared, a significant difference was found between how chronic stress levels change before treatment and after treatment. These results point to a clinically relevant change between the pretreatment and posttreatment cortisol levels indicating that as participants receive psychological treatments their level of stress decreases considerably. This result strengthens what previous research has found, which suggests that the stress-response is situation specific and is associated with psychological perceptions and levels of distress. A clinical advantage in using cortisol is that it provides more information about a specific physiological process that the clinician may utilize in treatment planning. This allows for a greater degree of specificity in terms of planning interventions to bolster a patient’s ability to cope with life stressors.
Hypothesis 2

The second research question examined change scores in stress levels both psychologically and physiologically. We hypothesized that change scores in psychological distress as measured by the OQ-45 will coincide with the physiological change scores as measured by cortisol. This hypothesis was based on the understanding that stress is conceptualized in a variety of ways with a variety of connotations and definitions depending on what part of the human experience are being described.

When we study stress in terms of its physiological ramifications it is described as the wear and tear on the human body. Psychologically, stress is frequently understood as occurring when a person’s ability to cope is exceeded by external stressors or events that produce a state of anxiety (Lazarus, 1999). In an attempt to combine psychoneuroimmunological data with a holistic approach to stress, the following definition of stress was used: Stress is the inability to cope with a perceived (real or imagined) threat to one’s mental, physical, emotional, and spiritual well-being, which results in a series of responses and adaptations (Seaward, 2005). Since this definition seeks to incorporate the multiple dimensions of a person’s experience, placing equal emphasis on perceptions as well as physiological reactions to stress, it is a useful and more accurate description of what happens to us when we feel “stressed.”

When considering the concept of stress within this working definition, the relevance of perception becomes unavoidable. A person creates or constructs their reality from theories and concepts about the world that reflect their beliefs, values, and biases. Since groups of people differ in their perceptions of reality, there is little, if any, clear
consensus. These differences are therefore important to understand how people interpret their worlds and how these interpretations affect the meaning we attribute to stressful situations (Lakey and Cohen, 2000; Kelley, 1969). In other words, what is distressful to one person may not be to another. Furthermore, what was distressful to a person may not be later on or the next time a similar situation arises. Therefore, defining what is or is not distressful is ultimately identified by how a person constructs or interprets the situation along the multiple dimensions (e.g. physical, emotional, spiritual, etc) affecting him or her.

To attempt to understand how closely linked patient perceptions are with what occurs physiologically, a series of tests were used to investigate whether there are significant differences in change scores between cortisol levels and OQ-45 scores during different times of treatment (i.e. pretreatment, signal, and posttreatment). We predicted that the change scores between measurements (i.e. OQ-45 and cortisol) would be irrelevant founded on the holistic definition of stress expressed earlier. The results indicated no significant differences between these forms of measurements at any of the times measured (i.e. pretreatment, signal, or posttreatment). This implies that the self-reported psychological measurement of distress does not differ appreciably from what is measured physiologically. Thereby lending support to the mind-body integration hypothesis represented in psychoneuroimmunology research (Daruna, 2004; Rabin, 1999).
Hypothesis 3

The third hypothesis investigated the affect of feedback to therapists on patient progress and its relation to distress levels. We hypothesized that the group of patients whose therapist receives feedback on patient progress and psychological distress levels would have better OQ-45 outcomes than those patients whose therapist did not receive feedback. We further predicted that the group of patients whose therapist receives feedback on patient progress and psychological distress levels would have lower levels of cortisol than those patients whose therapist did not receive feedback.

These hypotheses originated from the understanding that research points to a connection between what occurs psychologically with what reactions take place physiologically. Psychotherapy research has consistently reported a well-documented trend of patient deterioration. The rate, prevalence, and magnitude of deterioration are difficult to determine. However, Lambert and Bergin (1994) suggest that deterioration rates vary between 5% and 15%, which is consistent with other meta-analytic reviews. It is noteworthy that the rate of deterioration among patients cuts across patient populations, theoretical orientation, and a variety of treatment modalities, including group and family therapies (Mohr, 1995; Shapiro and Shapiro, 1982; Smith, Glass, and Miller, 1980).

Moreover, a deterioration rate of 5% was found in untreated groups (Lambert, DeJulio, and Stein, 1978), which suggests that a small percentage of patients entering treatment will either receive no gain from treatment or worsen compared to if they had not began treatment at all. This underscores the importance to discover the factors that lead to poor treatment outcomes and early termination from psychotherapy. Once these
factors are known and understood, then clinicians are able to address these factors to minimize their affect and improve treatment outcome for those predicted to have a poor treatment response.

In order to test these hypotheses, the system developed by Lambert and colleagues was used to track patient progress on a session-by-session basis and feed back this information to clinicians in order to assist them in treatment planning. Participants were randomly assigned to either a control group (treatment as usual) or an experimental group (feedback condition where the therapist receives feedback on patient progress). The differences between the control group and experimental group on both the self-report psychological questionnaire and the cortisol measure at posttreatment were statistically insignificant. However, the results are very encouraging given the effect sizes ($\eta^2 = .554$ for OQ-45 measure and $\eta^2 = .271$ for the cortisol measure) indicating a clinically significant amount of variance in outcome accounted for by these measures (55.4% and 27.1% respectively). Given the sample size, these results are heartening and suggest that those patients whose therapists received feedback reported lower levels of psychological distress and have considerably lower levels of cortisol in their physiology at posttreatment than those patients whose therapist did not receive feedback.

Furthermore, these results substantiate a series of studies aimed at assessing the impact of feedback on patient outcomes (Lambert, Whipple, Smart, Vermeersch, Nielsen, and Hawkins, 2001; Lambert, Whipple, Vermeersch, Smart, Hawkins, Nielsen, and Goates, 2002) that found feedback improves outcomes for patients who are deteriorating in therapy and are predicted to drop out of therapy or have a poor final outcome. It also
provides preliminary support for the noted limitations of these outcome research studies by making available data outside of a university counseling center population.

The stress response provides a valid indicator of chronic stress situations with the hormone cortisol, which supplies a type of "body" marker. Understanding that stress and emotions are interdependent and that isolating and researching one at the expense of the other necessarily limits our understanding of how people react to treatment and the struggle they experience to adapt. Psychotherapy outcome research has a history of tracking the degree of psychological distress experienced by those receiving treatment. Lambert et al's program (Lambert, Whipple, Smart, Vermeersch, Nielsen, and Hawkins, 2001; Lambert, Whipple, Vermeersch, Smart, Hawkins, Nielsen, and Goates, 2002) tracks the psychological distress level of clients on a session-by-session basis allowing for the development of a "mind" marker with which to compare and contrast the "body" marker of cortisol. These ideas of merging the psychological with the physiological are well represented in these preliminary results.

*Case Studies*

In the last section, several case studies were presented to lend a qualitative view or investigation to the research data. It was expected that this alternative method would provide a productive complement to the quantitative method used in analyzing the previous hypotheses and that it would offer a more complete picture of both the physiological and psychological adaptation to chronic stress experienced by these patients. The general assumption of a mixed method approach is that it provides
numerous viewpoints that allow fixing on a real effect in a way that is unattainable from a single perspective (Brewer and Collins 1981). This recognizes that every method has limitations associated with particular philosophical assumptions that make it impossible for a one-method approach to be sufficient in providing a complete understanding of the phenomenon being investigated (Slife, 1999), which avoids the difficulties associated with basing the validity of the results of a study on a single method.

The results of the case studies present a variety of outcomes where some patterns converge on previous research findings while others diverge. The results associated with the three exploratory variables (i.e. experienced losses, patient motivation, and perception of strengths) were expected given other research done on loss, motivation, and positive perception of self. When examining the relationship between experienced losses and outcome, a moderately strong relationship was found signifying that the more losses experienced by patients' their level of chronic stress increases. This is consistent with psychoneuroimmunology research as well as research on depression, grief, and treatment outcomes (Coughlin, Edwards, Buenaver, Redgrave, Guarda, and Haythornthwaite, 2008; Linde, Jeffery, Levy, Sherwood, Utter, Pronk, and Boyle, 2004) where negative emotional states predict poor treatment outcomes.

The patient’s perceived strengths suggest a strong inverse relationship between both physiological and psychological distress and perception of personal strengths that indicate as participants’ perception of personal strengths increases their level of chronic stress is reduced. This result was anticipated given the research on psychoneuroimmunology that predicts interactions that occur between thoughts and
emotions, the biological nature of the body, and socio-cultural factors as well as the research on patient perception of self and outcomes (Berkman, Lohr, and Bulik, 2007; Brownley, Berkman, Sedway, Lohr, and Bulik, 2007).

The patient’s level of motivation was inversely correlated with both physiological and psychological distress posttreatment levels. The results suggest a strong and convincing relationship between the physiological distress levels of a patient and their level of motivation that indicate as their motivation for treatment increases their level of physiological distress decreases. This strong correlational relationship was duplicated in the self-reported psychological distress a patient was experiencing and their level of motivation. That is, as their psychological distress decreases their level of motivation increases. This trend is reproduced in current research on patient motivation and treatment outcomes (Jones, Bamford, Ford, and Schreiber-Kounine, 2007; Touyz, Thornton, Rieger, George, and Beumont, 2003) where patient motivation directly affected treatment outcome with more highly motivated clients making more significant changes to their eating disorder symptomology.

The significance of these three variables in interpreting outcome scores, despite what outcome measure is used (e.g. OQ-45 or cortisol), is relevant in assisting the treating clinician to decipher the process inherent in the patients change in distress level. For instance, if a patient signals during the course of treatment, the clinician can investigate the patient’s motivation level, his or her self-perception, or what types of losses the patient has experienced. This adds layers of meaning to the outcome measures score that may be relevant to treatment planning and management.
To examine further trends across individuals, average scores were compared by no feedback versus feedback groups and “not on track” versus “on track” groups for both cortisol and OQ-45 scores. The purpose was to provide an alternative viewpoint to the qualitative data just presented by investigating group developments in the data quantitatively. When considering the OQ-45 scores, the patterns demonstrated substantiate previous outcome research in different populations that used the same measure (Lambert, Whipple, et al., 2001; Lambert et al., 2002; Whipple et al., 2003). These findings, although preliminary due to the small number of participants, provide additional evidence that the those patients that were predicted by the signaling system to have a negative outcome (i.e., patients whose therapists received a red or yellow message at any time during treatment) as experiencing little therapeutic gain. Furthermore, for those patients who are having a positive response to therapy (i.e. patients who did not signal a red or yellow message during treatment) a significant therapeutic gain was observed.

Similar evidence is provided in support of previous outcome research that utilizes the OQ-45 in regards to the differences between those patients whose therapist receives feedback on their progress and those who do not. In a series of studies aimed at assessing the impact of feedback on patient outcomes, Lambert and colleagues (Lambert, Whipple, Smart, Vermeersch, Nielsen, and Hawkins, 2001; Lambert, Whipple, Vermeersch, Smart, Hawkins, Nielsen, and Goates, 2002) found that feedback improves outcomes for patients who are deteriorating in therapy and are predicted to drop out of therapy or have a poor final outcome. The results given in this research lend support to
the hypothesis that feedback on patient progress to the treating clinician enhances outcome for patients.

The cortisol readings provide mixed results in terms of corresponding to the self-reported distress levels of the OQ-45. Those patients that were predicted by the signaling system to have a negative outcome (i.e. "not on track" patients) experienced a significant amount of change that implies relevant therapeutic gain in the direction not predicted by the OQ-45 system. That is, when comparing their pretreatment cortisol level with their posttreatment cortisol level, they show a significant decrease in cortisol levels. Additionally, those designated as "not on track" did not have an incident of increased cortisol release into their biological system at time of signal when they were reporting a significant increase in psychological distress.

Those patients in the "on track" group exhibited a trend of clinically significant gains that implies a positive response to therapy. However, the cortisol results of those patients in the "not on track" group do not necessarily follow the general pattern found in the OQ-45 outcome research indicating that those patients who do not respond positively to treatment are at risk for premature drop-out, deteriorating, or having no gain. However, those patients identified as "on track" demonstrate a pattern consistent with previous outcomes research. Moreover, the psychoneuroimmunology research suggests some discrepancies between psychological measures of distress and physiological measure of distress (Marcus, Fine, Moeller, Khan, Pitts, Swank, and Liehr, 2003). Nevertheless, the results suggest that the treatment interventions may influence the physiological response to stress for individuals in a therapeutic community. This
supports the use of salivary cortisol as an indicator of the level of distress experienced in a patient that is involved in a treatment program.

The results comparing the OQ-45 scores with estradiol, progesterone, testosterone, DHEAS, and cortisol show mixed outcomes in terms of similarities in patterns. However, understanding that the sample consists of women participating in an eating disorders clinic, it is expected that abnormal hormonal levels are likely (Ehlert, Gaab, and Heinrichs, 2001; Yakahara, Hosogi, Yunoki, Hashimoto and Uneki, 1976; Wheatland, 2005). There were some interesting results that indicate possible relationships between psychological distress, DHEAS, cortisol, and the other hormones. It would be worthwhile to investigate these relationships at a greater depth.

Several discrepancies have been noted between what patients reported on the OQ-45 and what was revealed in their saliva cortisol samples. Although there are more similarities than differences, it is important to examine these differences to understand the factors that may account for them. As mentioned before, it is problematic to base inferences about treatment effectiveness from a small sample taken from a highly specialized treatment program. With that note of caution, some possible explanations are suggested to account for the observed discrepancies between what was reported psychologically and what was measured physiologically.

Adrenal fatigue is the result of prolonged physical and psychological stress causing the adrenal glands to function below baseline (Benson, 1976; Wheatland, 2005). A daily output of cortisol is important to maintain normal metabolic activity, help regulate steady state glucose levels, and optimize immune function. Adrenal
insufficiency is most commonly caused by psychosocial, emotional, or other stressors (e.g. sleep deprivation, poor diet, nutrient deficiencies, or diseases) (Benson, 1976; Wilson, 2002). In this research sample, some of the discrepancies we found that appeared to be inconsistent with previous outcome research as well as incompatible with psychoneuroimmunology research might be explained by adrenal fatigue. Under this condition, it is possible to have lower cortisol output that is not consistent with the situations of excessive stress that the person is actually experiencing. This pattern suggests that the adrenal glands have been overworked. Some research has shown that those undergoing treatment for eating disorders may benefit from corticosteroid supplements that would allow the patients to have the corticosteroids they require for daily functioning and daily stressors. It is hypothesized that this treatment will relieve the patients of their symptoms of adrenal fatigue and avoids issues related to increased pathological problems (Ehlert, Gaab, and Heinrichs, 2001; Yakahara, Hosogi, Yunoki, Hashimoto and Uneki, 1976; Wheatland, 2005).

Despite the inconsistencies brought out by some of the results, the idea that what the mind thinks, perceives, and experiences is relayed from the brain to the rest of the body and that faith, belief, and a positive attitude improves health outcomes and positively affects quality of life seems intuitively obvious and naturally alluring. Furthermore, it is apparent that psychosocial factors influence behaviors and have implications for physical health. Psychosocial factors have been found to increase longevity (Blazer, 1982; Cerhan and Wallace, 1997; Vogt, Mullooly, Ernst, Pope and Hollis, 1992), decrease the likelihood of heart attacks (Kaplan, Salonen, Cohen, Brand,
Syme, and Puska, 1988) and upper respiratory illness (Cohen, Doyle, Skoner, Rabin, and Gwaltney, 1997), increase survival of breast cancer patients (Vogt et al., 1992; Helgeson, Cohen, and Fritz, 1997), lower levels of physical morbidity in general and reduce the effects of life stressors on adverse outcomes (Cohen and Wills, 1985), lower levels of disease and mortality (Hanson, Isacsson, Janzo, and Lindell, 1989; Orth-Gomer, Rosengren, and Wilhelmsen, 1993), and aid in recovery from life-threatening illness (Berkman, Leo-Summers, and Horwitz, 1992; Williams, Barefoot, Califf, Haney, Sauders, Pryor, Hlatley, Siegler, and Mark, 1992). In fact, the health risks associated with an inadequately integrated social support network (one psychosocial variable) are comparable in enormity to those risks associated with cigarette smoking, high blood pressure, and obesity (House, Landis, and Umberson, 1988).

These results support the mind–body research that posits the inseparable connection between the mind and the body, treating the person as a complex set of interactions that occur between thoughts and emotions, the biological nature of the body, and socio-cultural factors. That the mind and body “communicate” constantly, that personal beliefs, attitudes, psychological and social factors, and stress affect the development and maintenance of illness and disease is well supported in research (Benson, Beary, and Carol, 1974; Goleman, and Gurin, 1993; Daruna, 2004) and suggested here with these results.

Limitations

Several limitations of the study are apparent. The most obvious limitation is related to the limited sample size. Additionally, both the experimental and control
groups were limited to a very specific subset of individuals, namely, adult female patients participating in a partial hospitalization program specializing in treating eating disorders. This necessarily places constraints on our ability to generalize the results and conclusions from this study to other types of groups and populations (e.g. outpatient populations or non-eating disorder programs). Measures collected for the qualitative data were done primarily at intake or pretreatment. Some additional information was collected in the form of case notes. However, because the qualitative data was not collected throughout the treatment process in a regular fashion (i.e. at time of signal and at posttreatment along with OQ-45 and cortisol measurements) we are lacking some qualitative data that would have been useful in drawing clearer parallels to what the patients were reporting and experiencing both objectively and subjectively. This would have provided valuable understanding in illuminating with greater detail how patients react to the treatment process that could alert us to certain trends and possibilities for increasing the effectiveness of interventions.

**Future Research**

It was the aim of this research to investigate the degree to which psychological and physiological distress levels coincide for those receiving psychological treatment. Another aim of this research was to examine the effects of feedback to therapists on patient progress on a psychological and physiological outcome measure. As noted in the limitations, additional research with a larger sample size that included both males and females would be beneficial to alleviate the issue of a lack of confidence in the results of
this study in terms of the ability to generalize to other partial hospitalization treatment programs for eating disorders. In addition, samples from different settings (e.g. psychiatric hospital, outpatient clinics) would add to our understanding of how patients react to treatment in different settings and may assist in developing programs and service delivery options specific to certain populations of patients.

In order to conduct research that is interdisciplinary and have the results be relevant to multiple fields of study (e.g. social, psychological, and biological scientists as well clinical practitioners) the use of a mixed method approach seems appropriate. Furthermore, additional testing of cortisol, minimally in the morning and before bed at night, but preferably four times throughout the day may be beneficial in clarifying the fluctuations of cortisol in patients as they become involved in the treatment program. Another consideration is to investigate other dimensions of health in a similar manner. For instance, one fruitful hypothesis would be to examine patient spirituality in relation to a self-reported spiritual measure, a psychological outcome measure, and cortisol as treatment is being delivered. This type of research would give us information on how people react to treatment in terms of their spiritual, psychological, and biological experiences.

An overarching purpose in conducting research that combines information from different fields of study is to create out of that synthesis a new understanding or development that would have implications for our conception of the patients we work with and how treatment is delivered. The closely correlated functions of a person’s mind, brain, and behavior translate into a particularly powerful triangulation or alliance between
philosophy, psychology, and biology (Damasio, 1999) that provide an incredible potential for the development of fresh and creative ideas concerning our understanding of humans. Albert Einstein is quoted as saying, “Concepts which have proved useful for ordering things easily assume so great an authority over us that we forget their terrestrial origins and accept them as unalterable facts” (Slife, 1993 p.16). Certain ideas or ways of perceiving the world or the phenomena in it can become so ordinary and so extensively acknowledged that they become unrecognized.

In endeavoring to merge what research has shown us in explaining how we are connected together biologically, psychologically, socially, spiritually, intellectually, and emotionally it is imperative that research is conducted in a multi-faceted way. This pilot study attempted to define a person’s stress response along more than one dimension (i.e. physical stress) by connecting a psychological marker of distress to a physical marker of distress. It was hoped that this would blur the boundaries between abstract theoretical constructs across different branches of science that too often serve to segregate our understanding of a person into parts rather than integrate those components into a comprehensible whole.
References


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