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# Do Trait Positive and Trait Negative Affect Predict Progress and Discharge Outcomes in an Inpatient Medical Rehabilitation Population

Valerie Dominique Ward

*Old Dominion University*, wardvaleried@gmail.com

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**DO TRAIT POSITIVE AND TRAIT NEGATIVE AFFECT PREDICT PROGRESS AND  
DISCHARGE OUTCOMES IN AN INPATIENT MEDICAL REHABILITATION  
POPULATION**

by

Valerie Dominique Ward  
B.S. May 2005, James Madison University  
M.A. May 2008, Webster University

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Approved by:

---

Michael L. Stutts (Director)  
Eastern Virginia Medical School

---

Desideria Hacker (Member)  
Norfolk State University

---

Serina Neumann (Member)  
Eastern Virginia Medical School

---

Barbara Winstead (Member)  
Old Dominion University

---

David Powell (Member)  
Hampton Veterans Affairs Hospital

## **ABSTRACT**

### **DO TRAIT POSITIVE AND TRAIT NEGATIVE AFFECT PREDICT PROGRESS AND DISCHARGE OUTCOMES IN AN INPATIENT MEDICAL REHABILITATION POPULATION**

Valerie Dominique Ward  
Virginia Consortium Program in Clinical Psychology, 2016  
Director: Dr. Michael L. Stutts

Differences in emotional adjustment were examined as predictors of medical rehabilitation gains within an inpatient setting. Specifically, the International Positive Affect and Negative Affect Schedule Short Form (I-PANAS-SF), along with the Functional Independence Measure (FIM), were administered to adult patients during their inpatient medical rehabilitation hospitalizations. The I-PANAS-SF was used to examine if trait affect plays a significant role in rehabilitative treatment, as well as final outcomes (i.e. total number of days spent in rehabilitative treatment, and amount of measurable cognitive and physical improvement). Previous research has demonstrated significant correlations between emotional constructs such as trait affect and medical outcomes. However, this study also aimed to demonstrate that those results could be replicated using an exceptionally brief, low-cost, non-invasive measure such as the well-validated, language-stable I-PANAS-SF. Results of this study did not find higher Trait Positive Affect (TPA) and lower Trait Negative Affect (TNA) to be significantly associated with greater gains in FIM scores, and found that higher levels of TPA were predictive of longer rehabilitation stays. Additionally, significant differences were found based on demographic of age and race, with older age having a correlation with shorter lengths of stay, and with Caucasian race being correlated to greater levels of independence at time of discharge.

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This dissertation is dedicated to my mom, my husband, and my beautiful daughter, for their love, support and encouragement throughout this process. This document is as much theirs, as it is

mine.

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## CHAPTER I

### INTRODUCTION

Over the past three decades, interest in the relationship between emotional adjustment and health has increased significantly (Karim, Weisz & Rehman, 2011). In conjunction with this, the concept of subjective well-being (SWB), understood as the way individuals feel within the context of their own standards and values, has received particular attention (Diener & Lucas, 1999). Two major components of SWB have been revealed: an affective factor and a cognitive factor (Diener, Emmons, Larsen & Griffin, 1985; Lucas, Diener, & Suh, 1996). However, the research has been broad in scope and has examined various positive psychological constructs including self-esteem, extraversion, purpose, mastery, optimism, and positive affect (Lyubomirsky, King, & Diener, 2005; Ryff, 2003, Salovey, Rothman, Detweiler, & Steward, 2000; Zautra, 2003). This type of approach has made it difficult to separate social and cognitive influences from the unique effect of Trait Positive Affect (TPA), and Trait Negative Affect (TNA), particularly on health (Pressman & Cohen, 2005). TPA has been identified by numerous researchers as a strong predictor of both physical and psychological well-being (Lightsey, Gharghani, Katz, McKinnery, & Rarey, 2013), and a stimulator of success across multiple life domains (Lyubomirsky et al., 2005).

It is important to highlight that trait affect is different from state affect, and also different from mood. Moods are diffuse affect states, characterized by subjective feelings, and emerge either in response to an event, or without specific cause (Scherer, 2005). Moods can last hours to days, and are more vulnerable to external influence. State affect is closely related to moods, and describes a pattern of momentary dispositions. Whereas trait affect refers to longer-term dispositions, more closely related to personality disposition. Differences between these

constructs can be confusing as words like "upset" or "hostile" can be used to describe emotions, state affect, and trait affect. Additionally, trait affect is the propensity to experience certain emotions over others, to remain open to new experiences, and to seek out support from others.

While there are instruments deemed appropriate for the measurement of trait and state affect, temporal instructions provided determine which construct is being examined. Literature reviewed as part of this study revealed that a disproportionate number of studies examined state affect rather than trait affect, didn't specify type of affect examined either explicitly or by providing information on temporal instructions utilized, or inaccurately presented their work as assessing trait affect while actually examining state affect.

The present study aims to examine the relationship of TPA and TNA, when measured as stable constructs, on medical rehabilitative outcomes at time of discharge. An additional goal of this study is to enhance the existing literature on the relationship of trait affect to resiliency and health with a well-validated and brief trait affect measure.

### **Affect Defined**

The terms mood, affect, and emotion have been used interchangeably throughout the literature (Ekkekakis, 2012), and there continues to be some disagreement between researchers on what is actually meant by TPA and TNA (Cohen & Pressman, 2006). Scherer (2005) wrote one of the most comprehensive articles on the subject, and provided an extensive review and explanation of differences between emotion, feelings, and affect states. He clearly outlines the problematic use of everyday language in conceptualizing and naming constructs for emotion researchers from various disciplines of social science, and provides differentiation between the terms *preferences*, *attitudes*, *mood*, *affect dispositions*, *interpersonal stances*, *aesthetic emotions*, and *utilitarian emotions*. Furthermore, Scherer highlights the difference between mood and trait

affect, the former being a transient state that is often linked to a specific event, or appraisal of a situation which can last hours to days, while the latter is a type of disposition that results in a person being more or less prone to certain emotions; whether.

TPA is generally defined as the extent to which a person feels enthusiastic, active, and alert; TNA is characterized by feelings of nervousness, worry, tension, and guilt (Watson & Clark, 1984; Watson et al., 1988). These definitions have been widely accepted by contemporary affect researchers (Berry, Willingham, & Thayer, 2000; Fayard, Roberts, Robins, & Watson, 2012, Karim, Weisz, & Rehman, 2011; Lightsey et al., 2013; Mroczek, & Almeida, 2004; Nejad, Besharat, & Haddadi, 2011; Riepl, Mussel, Osinsky, & Hewig, 2016). Both positive affect and negative affect can be considered as brief, longer lasting, or as stable traits (Pressman & Cohen, 2005), and can be measured either as a transient fluctuation in mood (state) or as a stable individual difference in affective level (trait; Cohen, Doyle, Skoner, Gwaltney, & Newsom, 1995), depending on the temporal instructions provided (Watson et al., 1988). In a study by Elkins, Pollina, Scheffer and Krupp (1999), a clear disregard for these temporal differences is present as the researchers describe using the Positive and Negative Affect Scales (PANAS; Watson & Tellegen, 1985), to assess patient mood with the instructions “*in general, or on average,*” which targets stable trait affect rather than state affect, that is more closely related to transient mood.

Diener’s (1984) tripartite structure of well-being presents TPA and TNA (conceptualized as affective dimensions), and life satisfaction (conceptualized as a cognitive dimension), as components of an individual’s overall well-being. However, Gana and colleagues (2016) argue that state positive affect “unlike life satisfaction, is assumed to be strongly influenced by daily hassles and uplifts” (p. 232). Their article highlights another major problem with much of the

research exploring affect's influence on various outcomes: many researchers have inadequately distinguished between trait and state affect, both in the literature they have reviewed and in their own explanations of theory and methods utilized in their studies. There is strong evidence supporting the concept that state and trait affect are distinct constructs (Zuckerman, 1983), and this evidence has continued to grow over the past thirty years (Lightsey, Gharghani, Katz, McKinney, & Rarey, 2013). Further adding to the lexicon utilized within this type of research is the use of the term *NA* in some studies to represent the personality characteristic of *negative affectivity*, also termed *neuroticism*, or *N* (Howren & Suls, 2011).

### **Stability of the Trait Affect Construct**

Several studies have presented strong evidence supporting the conceptualization of state affect and trait affect as two different dimensions, with the former being more influenced by external stimuli and the latter demonstrating stability over time, regardless of life circumstances. One study conducted on bargaining behaviors, by Riepl, Mussel, Osinsky, and Hewig (2015), highlighted the difference between trait and state affect, having administered both types of measures to their participants. The authors found that while higher state positive affect scores were related to a greater likelihood of accepting unfair offers, and greater state negative affect scores were related to a lower likelihood of accepting an unfair offer. The opposite was found when examining trait affect, as individuals with higher TPA scores were more likely to reject unfair offers than participants with higher TNA scores. Several other studies have demonstrated the stability of trait TPA and TNA by administering both trait and state measures to subjects, prior to and following exposure to various stress or relaxation conditions (e.g., Auerbach, 1973; Johnson, 1968; Johnson & Spielberger, 1968; Korn, Ascough, & Kleemeier, 1972; Spielberger, Auerbach, Wadsworth, Dunn, & Taulbee, 1973; Stoudenmire, 1972). These studies demonstrated

significant changes in subject's state anxiety scores, but not on trait anxiety scores, which clearly supports the theory that different mechanisms are at play in state and trait affect, that these are two distinct constructs, and that trait affect is stable.

TPA and TNA can be conceptualized as stable characteristics of an individual, similar to personality traits (Caspi, 2005), as well as temporary states depending on the temporal instructions (e.g. *“how have you felt during the last day/week/month?”* versus *“Thinking about yourself and how you normally feel, to what extent do you generally feel?”*) (Watson et al., 1988). The strongest correlations between affect and health have been found in studies examining trait affective style, which measures an individual's typical emotional experience, rather than state affect, which measures an individual's momentary response to a particular event (Cohen & Pressman, 2006), and by using trait affect tests which have high internal consistency and high re-test reliability (Zuckerman, 1976; 1983). Several measures demonstrate this pattern: the anxiety, depression, and hostility scales on the Multiple Affect Adjective Check List (MAACL; Zuckerman & Lubin, 1965); the anxiety scale on the The State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970); fear arousal, positive affect, anger and aggression, attentive-coping, and sadness on the Zuckerman Inventory of Personal Reactions (ZIPERS; Zuckerman, 1977); sensation seeking as trait and state (Zuckerman, 1979); and most of the 24 trait scales of the Adjective Check List (ACL; Gough-Heilbrun, 1965). Trait version re-test reliabilities for these measures have been found to range from .60 to .80 (Zuckerman, 1983). Additionally, Zuckerman (1983) posited:

*“This is not to deny that some tests may reflect both traits and states to some degree. However, it is best to use an appropriate tool for a particular task. To use a trait test to measure change or a single state test to assess a disposition is like using a hammer to*

*drive in a screw or measuring body temperature with an outdoor thermometer. If one is lucky, the less appropriate method might work, but with considerable impreciseness”* (p. 1085).

Few researchers take caution in specifying their use of the term *affect*, as either the construct described above, or as a colloquial term. Many recommend use of the terms *pleasant affect* and *unpleasant affect* as a potential way to avoid confusion with the technical terms of *trait* and *state* positive or negative affect (Brown & Morowitz, 1997; Larsen & Diener, 1992).

While significant life events can influence an individual’s self-reported state affect, the effect is fairly transient and most individuals return to their emotional baseline within three to six months (Suh, Diener, & Fujita, 1996). A number of studies have demonstrated impressive stability on both trait TPA and trait TNA across time periods ranging from two to seven years (Suh, Diener, & Fujita, 1996; Watson & Walker, 1996). This evidence suggests that trait TPA and TNA should be regarded not as transient emotions but rather as true, enduring and stable traits (Berry, Willingham, & Thayer, 2000).

Limited research has demonstrated that affect does not contribute to predictions of role participation, occupational engagement, social integration, or functional skills, as these studies largely examined state affect rather than trait affect (Kortte, Stevenson, Hosey, Castillo, & Wegener, 2012). There is extensive evidence that TPA and TNA are stable constructs as measured by instruments like Positive Affect and Negative Affect Schedule (PANAS; Watson & Tellegen, 1985); the PANAS Reduced Form (PANAS-RF; Kercher, 1992), the first abbreviated version of the PANAS; the Positive and Negative Affect Schedule Extended Form (PANAS-X; Watson & Clark, 1994), an expanded version of the PANAS; and the International Positive and

Negative Affect Schedule – Short Form (I-PANAS-SF; Thompson, 2007), the most recently revised, abbreviated, and culturally validated version of this instrument.

Watson and Walker (1996) examined the long-term temporal and predictive utility of the PANAS (Watson, Clark, & Tellegen, 1988), and found a significant level of stability in both the TPA and TNA scales of this measure, in college-student participants who were re-tested after six to seven years. They also found that scores on both scales of the PANAS had significant positive correlations with other trait affect scales such as the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), the Multiple Affect Adjective Check List-Revised (MAACL-R; Zuckerman & Lubin, 1985), and the Differential Emotions Scale (DES; Izard, Dougherty, Bloxom, & Kotsch, 1974). These measures of trait affect have been shown to be reliable, valid, and internally consistent (e.g., Spielberger et al., 1983; Watson, Clark, & Tellegen, 1988; Zuckerman & Lubin, 1985) and have demonstrated high cross-situational consistency (Diener & Larsen, 1984). Furthermore, Quale and Schanke (2010), found no significant relationship between state positive affect and TPA ( $r = .439$ ), and state NA and TNA ( $r = .268$ )

### **Trait Positive Affect and Trait Negative Affect as Orthogonal Constructs**

TPA and TNA have been identified as orthogonal dimensions, as identified by Watson and Tellegen in the original PANAS (1985) and supported by extensive empirical research (Tuccitto, Giacobbi, & Leite, 2010). It is imperative to emphasize that lower levels of TPA do not necessarily imply that an individual experiences a greater degree of anger, anxiety, depression, or general TNA (Cohen & Pressman, 2006), and that lower TNA scores are not necessarily indicative of higher contentment, greater joy, or general TPA.

TPA is not the mere opposite of TNA, as both affect states can be experienced simultaneously (Larsen, McGraw, & Cacioppo, 2001), each may have an adaptive function during times of stress in relation to coping (Viney, 1986), and most researchers have found them to be uncorrelated with one another (Ostir, Smith, Smith, & Ottenbacher, 2005; Mackinnon, Jorm, Christensen, Korten, Jacomb & Rodgers, 1999). In fact, a review of previous literature posits that each trait affect style appears to operate through distinct mechanisms in influencing an individual's health (Clark & Watson, 1988; Folkman, 1997; Watson, Clark, & Carey, 1988). Furthermore, extensive confirmatory factor analyses of the internal structure of the PANAS have failed to yield a significant correlation between the TPA and TNA constructs (Tuccitto, Giacobbi, & Leite, 2010), and there is strong evidence supporting a bivariate model, rather than a bipolar model (Merz et al., 2013). This is to say that TPA and TNA are separate dimensions, rather than opposite poles of a single dimension.

Early research suggested that TNA is more conducive to deeper processing of problems and evolutionarily adaptive reactions such as fight or flight (Lazarus, 1991). More recently, however, TNA has been associated with the extent to which a person focuses on the problem or stressor at hand, while TPA is associated with an individual's ability to consider alternative problem-solving techniques and seek support (Fredrickson, 1998). This type of flexibility in thinking and ability to request assistance from others in challenging times, may be particularly critical for individuals facing disease, injury, or other medical concerns.

A comprehensive literature review (Pressman & Cohen, 2005) revealed several possible reasons for a less consistent correlation between TPA and health as compared to TNA. One of the main reasons appeared to be a disagreement between researchers regarding the nature of TPA: specifically whether TPA is the absence of TNA, or whether it is an entirely different



emotional state (Keyes, 2003). Another area of disagreement for researchers lies in the conceptualization and operationalization of TPA (Finch et al., 2012), as evidenced by Levy, Slade, Kunkle, and Kasl's (2002) research. In this study, a strong correlation between TPA and health was identified, yet TPA was never measured directly. Instead, Levy and his colleagues (2002) used a satisfaction with aging measure to gauge affect. This, unfortunately, has been a trend in affect research, where a variety of measures (reports of subjective well-being, satisfaction with life, and positive psychological traits like optimism) have been used interchangeably to assess what researchers describe as TPA (Finch et al., 2012). It cannot be overstated that low TPA and high TNA are both linked to more symptoms of depression, and that each of these affect dimensions make independent contributions to these correlations (Watson et al., 1988).

### **Relationship Between Affect and Personality**

Personality has consistently been found to be a robust predictor of TPA and TNA (DeNeve & Cooper, 1998; Diener & Lucas, 1999). Extraversion and neuroticism make up the basic dimensions of emotional temperament that in turn affect an individual's susceptibility to either positive or negative emotional experiences (Tellegen, 1985). People with high levels of extraversion tend to also experience more optimism and greater amounts of TPA in general, both of which are associated with better health and longevity (Danner, Snowdon, & Friesen, 2001). Additionally, there is strong evidence to suggest that dimensions of trait affect correlate with the five-factor, or "Big Five," model of personality (Barrick, Mount, & Judge, 2001; McCrae & Costa, 1987). TNA has been found to be positively correlated with neuroticism, and unrelated to extraversion, while TPA has been found to be positively correlated with extraversion, even after

controlling for type and level of engagement in social activities (Lucas, Le, & Dyrenforth, 2008), and unrelated to neuroticism (Schmutte & Ryff, 1997; Tellegen, 1985).

Furthermore, factor-analytic studies have revealed an undeniable relationship between personality and affect, specifically neuroticism-negative affect and extraversion-positive affect (Berry & Hansen, 1996; Wilson & Gullone, 1999). This two-factor structure, made up of personality and affect dimensions, was found to share a common structural basis (Wilson & Gullone, 1999). Wilson and Gullone's study also demonstrated that the relationship between trait affect and personality is present from early adolescence and equally as strong in both young and older adults, thereby strengthening support for conceptualizing trait affect as a stable characteristic.

### **Role of Affect on Health**

The relationship between TPA and health has historically been examined through one of two, opposing models: top-down approach versus the bottom-up model (Feist, Bodner, Jacobs, Miles, & Tan, 1995). The top-down approach, otherwise known as Watson and Pennebaker's *psychosomatic hypothesis* (1989), suggests that chronically elevated levels of TNA may in fact lead to a number of health problems through a series of pathways including cortisol profiles, inflammatory processes, and sleep disturbances, and proposes that TPA and TNA are antecedents to physical health; while the bottom-up approach represents Watson and Pennebaker's *disability/ability hypothesis* (1989), which reverses the direction of causality and posits that life events (including physical discomfort and poor health) lead to decreased levels of TPA and increases in TNA. There is a growing amount of evidence supporting the top-down approach in analyzing the relationship between affect and health (Diener & Chan, 2011; Gana et al., 2016; Pressman & Cohen, 2005).

Throughout history, folk wisdom has encouraged maintaining positive emotions as a way to promote better health (Tugade, Frederickson, Feldman, & Barrett, 2004), but contemporary research is finding that positive emotions, particularly in the form of TPA, do in fact buffer against illness and improve resiliency by increasing effective coping behaviors (Fredrickson, 2000; Tugade et al., 2004). Studies also have found that acute and chronic stress affect a variety of clinically meaningful immune parameters, including wound healing, antibody responses to vaccines, susceptibility to infectious illnesses, and the ability of the immune system to suppress latent viruses as well as inflammatory processes (Coe, 2010). One study (Cohen, Doyle, Turney, Alpert, & Skoner, 2003) found that individuals with higher positive emotion endorsement were significantly less likely to develop a cold, even after controlling for age, sex, education, negative emotions, and baseline immunity, and Koivumaa-Honkanen and colleagues (2000) found that lower levels of life satisfaction were associated with an increased rate of injury and an increase in number of fatal injuries.

Few studies have examined positive affect and negative affect simultaneously to predict physical health. One such study conducted by Dua (1993), found that negative affect, but not positive affect, significantly predicted physical health. However, a later study also conducted by Dua (1994), found that while negative affect was a better predictor, both positive and negative affect predicted physical health significantly. It should be noted however, that Dua examined state positive and negative affect, rather than stable trait affect, in both of these studies.

Despite the growing interest in examining TPA and TNA, the literature continues to reflect a more rapidly growing focus on the effect of specific personality traits on physical health (Nejad, Besharat, Haddadi, & Abdolmanafi, 2011). Additionally, research on TPA and TNA has primarily focused on TNA and its effect on mood disorders, physical disease, and disability, due

to its strong correlation with stress (Folkman & Moskowitz, 2000). The research on psychological wellness in the form of TPA, and its relationship to physical recuperation post-injury or post-disease, was minimal as of two decades ago (Seligman & Csikszentmihalyi, 2000). More recently, researchers have begun to examine positive affect's effect on moderating adversity by increasing resiliency in medical rehabilitation patients; they have found that self-reports of higher positive affect and lower negative affect predicted patient's level of adjustment at time of discharge (Quale & Schanke, 2010) and their post-discharge prognosis (Meyer, Kanel, Saner, Schmid, & Stauber, 2015). However, Quale and Schanke's (2010) study examined trait affect in patients categorized into trajectory groups based on their level of psychological distress, and Meyer et al.'s study was limited to participants in a cardiovascular rehabilitation program. While, Quale and Schanke did not address differences between trait and state affect, and did not clearly state which type of affect they were examining, they indicate that instructions provided to their participants asked for them to complete the PANAS measure and consider how they felt during the past week. These instructions appear to be more reflective of state positive and negative affect, rather than TPA and TNA.

More recent research has aimed to gain a better understanding of the relationship between affect and physical health (Finch et al., 2012). However, most studies have examined correlations between self-reported physical health and self-reported affect utilizing cross-sectional designs, and have examined these relationships with a number of different types of constructs (quality of life, mood, PA, NA, and SWB; Lyubomirsky, King & Diener, 2005; Suls & Bunde, 2005). These types of studies have been criticized for failing to examine the causal direction between trait affect and physical health, and failing to distinguish between subjective health (i.e., self-perceived health) and objective health (e.g., external measures of specific

disorders; Gana et al., 2016), along with a failure to use appropriate assessment measures. Finally, researchers are often vague regarding the nature of their operationalization of TPA and TNA (as a trait or state), and often omit information regarding the temporal instructions provided to subjects, which could potentially allow readers to discern this difference.

Several studies claiming to examine TPA and TNA not only fail to address the differences between these constructs as traits and states, they utilize inadequate measures in the research. Van den Broek and colleagues (2013) conducted one such study in which they purportedly examined the relationship between PA and rates of mortality in individuals with implantable cardioverter defibrillators (ICDs), and utilized the Hospital Anxiety and Depression Scale (HADS; Zidmond & Snaith, 1983) as a measure of TPA. However, the HADS is made up of two subscales – depression and anxiety and the researchers conceptualized lower scores on both measures as indicative of greater TPA, thereby treating TPA and TNA as bipolar extremes of a single measure (Merz et al., 2013). This is inaccurate considering previous findings that TPA and TNA can be experienced simultaneously (Larsen et al., 2001) and are orthogonal dimensions (Ostir et al., 2005; Mackinnon et al., 1999). Lamer et al.'s (2012) meta-analysis of 17 studies examining affect revealed the predominant use of depression scales, like the HADS and CES-D, and highlight a resulting low subscale reliability as previously found by Penninx (2000). The researchers also included a recommendation that future studies utilize reliable questionnaires designed to appropriately measure affect, suggesting the PANAS (Watson & Tellegen, 1985) and the Mental Health Continuum-Short Form (MHC-SF; Lamers et al., 2011).

A vast amount of research has focused on exploring relationships between personality and health outcomes (Turiano, Pitzer, Armour, Karlamangla, Ryff, & Mroczec, 2012), and certain personality traits have been found to be excellent predictors (Hampson & Friedman,

2008). Specifically, both high neuroticism and low conscientiousness are associated with earlier death (Friedman et al., 1993; Wilson, Mendes de Leon, Bienas, Evans, & Bennett, 2004).

Neuroticism is defined as both negative emotions related to exposure to unpleasant events, as well as an individual's response, or overreaction, to such events (Bolger & Schilling, 1991; Kling, Ryff, Love, & Essex, 2003; Mroczek & Almeida, 2004). High neuroticism has been found to correlate strongly with greater risk of hypertension (Spiro, Aldwin, Ward, & Mroczek, 1995), along with obesity and metabolic syndrome (Hampson & Friedman, 2008). Low conscientiousness is typically operationalized as a lack of personal organization, responsibility, and discipline, and is correlated with a number of unhealthy behaviors such as smoking, alcohol consumption, poor diet, and lack of exercise (Hampson, Goldberg, Vogt, & Dubanoski, 2007; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). However, examining trait affect can be an equally efficient method of studying the relationship between psychological patterns and overall physical health and recovery (Cohen & Pressman, 2006).

**Positive Affect.** The ability to evaluate a negative situation in a positive light, or engage in positive reappraisal, is associated with higher levels of TPA during acutely stressful events (Aldwin, 1994) and more effective coping (Moskowitz, Folkman, Collette, & Vittinghoff, 1996). Several studies have demonstrated that positive affect is a strong predictor of physical illness prognosis (Lamers, et al., 2012). Specifically, patients who endorse higher baseline levels of emotional well-being demonstrate significantly better recovery and survival rates at follow up, an average four years after initial evaluations (Lamers et al., 2012). It should be noted however, that Lamers and colleagues examined studies of trait affect and state affect collectively. Additionally, state positive affect has been identified as a potential buffer against both psychological and physiological effects of stress (Fredrickson & Levenson, 1998; Cacioppo &

Gardner, 1999) and as a key factor in preventing stress-related depression (Gross & Munoz, 1995) as well as disability-related stress (Zautra, Reich, & Guarnaccia, 1990).

Similarly to state affect, individuals with high reported levels of TPA have been found to endorse significantly fewer and less severe symptoms, even when controlling for objective markers of disease and better health practices (Cohen et al., 2013). On the other hand, individuals who endorse low levels of state positive affect at time of admission to rehabilitative care or hospital care demonstrate decreased walking speeds and greater decline in their ability to engage in activities of daily living (Ostir, Markides, Black, & Goodwin, 2000), and those with lower levels of TPA demonstrated greater cognitive decline and higher endorsement of disease-related symptoms (Elkins, Pollina, Scheffer, & Krupp, 1999). Physical problems associated with recovery, such as chronic pain, also have been found moderated by higher levels of state positive affect (Zautra, Johnson, & Davis, 2005). Additionally, individuals with higher state positive affect are more likely to engage socially (Ryff & Singer, 1998) and thereby demonstrate better coping when faced with stressors (Folkman, 1997). It is stipulated that positive affect also may result in better health due to improvement in overall health practices and increased endogenous opioids (Pressman & Cohen, 2005). Pressman and Cohen's (2005) metanalysis also examined studies of trait and state affect collectively.

**Negative Affect.** Several studies have revealed strong associations between state negative affect and somatic complaints (Watson & Pennebaker, 1989). State negative affect also has been associated with a number of physical and mental health outcomes including increased stress and poor coping (Clark & Watson, 1988), has been correlated with greater endorsement of health complaints (Beizer, 1974; Tessler & Mechanic, 1978), and has been consistently associated with inflated symptom reporting (Williams & Wiebe, 2000; Watson, Clark, & Carey,

1988). In fact, individuals who endorse higher state negative affect report significantly more symptoms than the average individual diagnosed with the same disease, even after controlling for observable and measurable signs of disease (Cohen et al., 1995). A widely accepted explanation for this relationship is the perception hypothesis, which posits that those who endorsed higher state negative affect, attend more closely to bodily sensations, and they are more vigilant, internally focused, and more sensitive to pain compared to those with low state negative affect (Watson & Pennebaker, 1989). This suggests that state negative affect may, at times, influence the perception of an illness severity rather than true declines in health, and may lead to slower recovery. Additionally, both medical professionals and researchers rely on patient reports of physical symptoms in order to measure the effects of disease, and these reports have been found to be influenced by patient's affective traits (Watson & Pennebaker, 1989).

State negative affect has been associated with higher levels of self-reported physical limitations in patients diagnosed with rheumatoid arthritis (Revenson & Felton, 1989), and Steptoe, O'Donnell, Marmot, and Wardle (2008) found a significant correlation between TNA and chronic stress, depressed mood, overall pessimism, and an avoidant coping style in middle-to older-aged individuals. Cohen and Herbert's (1996) comprehensive literature review on psychological factors affecting physical disease highlights extensive findings on the correlation between state negative affect and decreased immunological functioning, disease onset, and progression. While Kiecolt-Glaser, McGuire, Robles, and Glaser (2002) did not examine the effects of TNA as a specific construct on physical health, their examination of negative emotions (depression, anxiety, and hostility/anger) revealed that negative emotions positively correlated with increases in systolic blood pressure, osteoporosis, stroke, pulmonary disease, and cardiovascular disease. Given the rapid rise of cardiovascular disease and its economic toll on



this country, an increasing number of researchers have sought to research the relationship between emotional factors and cardiovascular disease. Large-scale literature review on these types of studies have found that negative emotions do in fact appear to increase risk of cardiovascular disease in healthy samples (Suls & Bunde, 2005), thereby supporting the notion that emotional factors play a role in physical health.

### **Resiliency**

Affect also has been conceptualized as a major component of resiliency, the extent to which a person can use available resources to cope, despite adversity (Collard & Kennedy, 2007). Studies on the effects of psychosocial stress on asthma, for example, have highlighted a widely accepted life stress model where individuals' cognitive appraisals of environmental demands as threatening, coupled with perceived inadequate resources, results in negative emotional states due to increased stress (Wright, Rodriguez, & Cohen, 1998). Furthermore, there is a known effect of perceived stress on immunological function, inflammatory processes, and neuronal function, as a result of hypothalamic-pituitary-adrenocortical axis activation (Sergerstrom, & Miller, 2006). TPA appears to moderate individuals' levels, both in relation to stressful events and day-to-day living.

The relationship between resilience and emotions has been well established. A number of studies have demonstrated that positive emotions are consistently associated with higher levels of resilience, while negative emotions are associated with lower levels of resilience (Fredrickson, 2003), even after individuals are presented with aversive or negative cues (Vaughn, Fredrickson, & Taylor, 2008). Fredrickson (1998; 2001; 2003; 2004), on the other hand, proposed that PA indirectly leads to better health by buffering stress. Her research found that individuals who endorse higher levels of TPA seek more social, psychosocial, and physical resources.

Fredrickson's work builds on the work of Alice Isen, whose many studies in the 1980s demonstrated that individuals with higher levels of state positive affect demonstrated greater mental flexibility and creative thinking, better memory, and a greater willingness to broaden their scope of action (Isen, Daubman, & Nowicki, 1987).

While there is considerable evidence that examines state positive affect and self-reported health outcomes, there is a large amount of variability in the way individuals label physiological symptoms, the method and frequency with which they report these symptoms to others, and how or when they chose to seek medical attention (Cohen & Williamson, 1991). Interestingly, these factors have been shown to vary with state affect (Watson & Pennebaker, 1989). Perhaps most notable is the finding that individuals with higher levels of TPA appear to report fewer and less severe symptoms in response to illnesses, even when objective markers of disease are held constant (Cohen et al., 2003).

**Mortality Studies.** Mortality studies examine death rates within certain populations. Several studies have focused on geriatric populations specifically, and assessed positive affect at the study's onset and at pre-determined intervals. While few of these studies utilized a version or component of the PANAS instrument, all utilized a standardized and well-validated state or trait affect measures.

Evidence regarding the relationship between state and trait affect and mortality has been fairly consistent, but the majority of studies have focused on elderly populations. However, studies that have examined a wider age-range of adults, spanning several decades, have found that lower levels of TPA were associated with higher rates of mortality, after controlling for age, marital status, socio-economic status, and smoking and drinking habits (Kivvumaa-Honkanen et al., 2000). Van den Broek and colleagues (2013) assessed patients aged 18 to 80 who received

ICDs and found that higher levels of state negative affect were related to greater mortality, while lower levels of state positive affect were not. It should be noted that their study utilized a cardiac patient-specific scale (The Global Mood Scale; Denollet, 1993), which appears to measure state affect, as opposed to the stable constructs of TPA and TNA.

While earlier research has demonstrated that individuals who are happy and healthy tend to underestimate their vulnerability to negative health outcomes (Salovey & Birnbaum, 1989), more recent studies have revealed that individuals who score at the highest ranges of happiness, rather than simply over the mean, are at true risk. These very elevated response patterns may reflect risk factors for younger individuals who are more vulnerable to death by accidents or violence, but remain a protective factor for older individuals facing causes of death like cancer and vascular disease (Pressman & Cohen, 2005).

**Morbidity Studies.** Morbidity studies examine the incidence of illness within an identified population. Individuals diagnosed with serious illnesses often report lower levels of PA compared to healthy controls, and PA also has been shown to decline as an illness progresses.

Ostir, Markides, Peek, and Goodwin (2001) found that lower endorsement of TPA was associated with higher rates of stroke for healthy adults ages 65 and older over a 6-year follow-up. This relationship remained valid after controlling for income, education, marital status, BMI, systolic blood pressure, smoking status, and history of heart disease and/or diabetes; it was found to be strongest for male participants. Pressman and Cohen's (2005) comprehensive literature review on the matter revealed that while there appears to be a strong correlation between low quality of life ratings and low state positive affect in those suffering from chronic disease, this

likely reflects the influence of disease on state positive affect rather than state positive on disease.

When studying relapse and hospital readmission, Middleton and Byrd (1996) assessed patients with cardiovascular disease over the age of 55, all of whom had at least one prior hospitalization. They utilized the Affect Balance Scale (ABS; Bradburn, 1969) and calculated a combined affect score by subtracting negative affect from positive affect subscales. Middleton and Byrd found that this score, termed their “happiness” score, was highly predictive of re-hospitalization, even after controlling for additional chronic illnesses, length of initial hospital stay, participant perceived health, hope for the future, and activities of daily living. However, this measure appeared to measure state affect rather than TPA, and took a bipolar, not bivariate, approach in measuring affect, which may not measure TPA adequately.

In sum, the evidence for a robust relationship between state positive affect and TPA and health has been demonstrated by several cross-sectional and prospective studies. TPA appears especially beneficial in people with conditions such as stroke, re-hospitalization for coronary issues, the common cold, and injury resulting from accidents. Research on TNA, on the other hand, has not yielded results that would suggest a similar relationship between TNA and medical outcomes (Cohen et al., 2003; Ostir et al., 2001, Smith et al., 1997). Meanwhile other studies have used measures that confound state and trait positive and negative affect (Middleton & Byrd, 1996). It is clear that more research is needed to explore the potential role of TNA on morbidity.

### **Medical Rehabilitation**

Demand for medical rehabilitation is on the rise as life expectancy increases (Gibson, Lin, Clark, Fish, & Phillips, 2010). Furthermore, urbanization in developed countries, like the United States, coupled with high fat diets, tobacco use, and sedentary lifestyles, have led to

exponential rises in cardiovascular disease (Meyer, Kanel, Saner, Schmid, & Stauber, 2015; Reddy & Yusuf, 1998). Cardiovascular disease is a known risk factor for atherosclerosis, a buildup of plaque in the lining of arteries, which can affect blood supply to the heart or brain, resulting in heart attack or stroke (Evenson, et al., 1999). One in three Americans will develop cardiovascular disease during their lifetime, and it is one of the country's leading causes of disability for both men and women in the form of stroke (Roger et al., 2012). Additionally, traumatic brain injury affects 1.7 million Americans each year, and an additional 10,000 incur a spinal-cord injury each year (Ghobrial et al., 2014).

In recent years a majority of healthcare organizations have begun to track patient expense and treatment outcomes diligently in efforts to improve care while reducing costs (Harmon, Sheehy, & Davis, 2008). In 2011 alone, there were 434,115 documented cases of medical rehabilitation in 846 facilities that report to the Uniform Data System for Medical Rehabilitation (UDSMR, 2012) across the nation. Participating facilities make up 70% of all U.S. inpatient rehabilitation facilities (IRFs; e.g., skilled nursing, sub-acute, long-term care, Veteran Administration Hospitals). These IRFs routinely use the Functional Independence Measure (FIM) to evaluate patient progress, as it is a standardized assessment tool completed by healthcare professionals that allows for uniform, accurate, and rapid collection of patient data (Granger et al., 2012).

While the FIM measures both physical and cognitive disability, it fails to assess patient emotional adjustment. It is an unspoken cultural assumption that incurring a severe physical injury will result in functional loss and will prevent an individual from returning to any semblance of a normal life (Quale & Schanke, 2010); however, many patients are able to adjust to their physical changes and overcome some limitations thereby allowing them to return to a

relatively normal life (Dunn, Uswatte, & Elliot, 2009). As the literature reviewed above reveals, trait affect plays a role in resiliency, and can have a profound effect on one's health and medical recovery. Therefore, examination of trait affect in medical rehabilitative settings may allow for the early identification of patients who may demonstrate affect patterns consistent with poorer resiliency, as well as allow for medical providers to make additional recommendations aimed at bolstering resiliency as a way to improve rehabilitative outcomes.

Kortte and colleagues (2012) found that affect, as measured by the Craig Handicap Assessment and Reporting Technique (CHART; Whiteneck et al., 1992), did not predict FIM change scores. However, they examined FIM scores at three months post-discharge, whereas this study will examine changes in FIM scores between admission and discharge. Unlike Kortte and colleagues (2012), this study utilized the I-PANAS-SF, a measure with strong dimensional and configural invariance across different cultural groups (Karim et al., 2011) and across age, sex, marital status, education, and financial status variables (Mackinnon et al., 1999) as well as non-native English Speakers (Thompson, 2007), and by utilizing temporal instructions ("*indicate the extent to which you usually feel*"), aimed at measuring trait affect rather than state affect.

### **The Present Study**

The present study was designed to add to previous findings by investigating whether trait affect is predictive of greater medical rehabilitation gains and final discharge outcomes, and whether this could be captured utilizing a brief affect measure.

Two hypotheses will be examined in this study. First, we predict that higher PA and lower NA scores will be associated with greater improvements in FIM scores over the course of admission. Second, we predict that higher PA and lower NA scores will be associated with shorter rehabilitation treatment stays.

## Hypotheses

1. The first hypothesis was that higher TPA and lower TNA scores, as measured by the I-PANAS-SF, would be associated with greater improvements in FIM scores over the course of admission.
2. The second hypothesis was that higher TPA and lower TNA scores, as measured by the I-PANAS-SF, would be associated with shorter rehabilitation treatment stays.

## CHAPTER II

### METHOD

#### Participants

The subject population included 119 inpatients from Sentara Norfolk General Hospital's Medical Rehabilitation ward. Ages ranged from 19 to 83 with an average age of 50.42 ( $SD = 15.52$ ). Race was recoded into two racial groups Caucasian and African-American. A small number of charts indicated a race other than Caucasian or African American ( $n = 6$ ), and were excluded from analyses in order to have comparable group sizes. As seen in Table 1, more than half of the participants were male (58%,  $n = 69$ ) and more than one half were Caucasian (53.8%,  $n = 64$ ).

Table 1

*Frequencies and Percentages for Participant Demographic Factors*

Demographic Variable	<i>N</i>	%
Gender		
Female	50	42.0
Male	69	58.0
Total	119	100.0
Race		
Caucasian	64	53.8
African-American	55	46.2
Total	119	100.0

*Note.* Table includes demographics for final participants ( $N = 119$ ), after removal of outlier ( $n = 1$ ), and exclusion of participants with only discharge PA and NA scores ( $n = 4$ ).

#### Recruitment and procedure

Data were collected using convenience sampling from a retrospective paper medical chart review (December 1, 2012 through March 31, 2015) from inpatients who were referred for psychological consultation, consisting of an interview and brief assessment of cognitive and emotional functioning, during their inpatient rehabilitation stay at Sentara Norfolk General



Hospital (SNGH), Norfolk, Virginia, for non-research purposes. Patient data were de-identified prior to review, and 130 total charts were examined for inclusion into analyses. While these inpatient charts included more comprehensive evaluative data, only FIM and I-PANAS-SF scores were examined as part of this study. Inclusion criteria for this investigation were as follows: aged 18 years or older, who had data for both admission and discharge FIM, and who completed the I-PANAS-SF measure at admission.

Based on data provided by the participating rehabilitation facility, most patients were admitted for a stroke-related event (between 27% and 38% of patients admitted to this facility since 2007), miscellaneous impairment (between 9% and 23% of patients admitted to this facility since 2007), and amputation (between 5% and 10% of patients admitted to this facility since 2007). As most patient charts had reflected more than one diagnosis, neither admission nor discharge diagnoses were utilized as part of this analysis due to concerns about artificial categorization of patients. Patients admitted to this ward are typically referred from within SNGH or other area hospitals for post-acute care, have been assessed to have good potential to benefit from medical rehabilitation, have indicated adequate post-discharge social support such that they would be likely to return to the community and relatively independent living. In recent years there have typically been 10-15 patients on the unit at a given time with approximately 50-75% referred for psychological consultation.

### **Study Design**

Institutional Review Board (IRB) approval was obtained from both Eastern Virginia Medical School (EVMS), and Sentara Norfolk General Hospital (SNGH) prior to chart review. All researchers involved in the collection of archival data for this proposed study completed HIPAA and Human Subjects Research training, and reviewed the Standard Operating Procedures

for Research Practice for the Department of Psychiatry and Behavioral Sciences. Archival data were retrieved and compiled from the data source described above. Demographic and background information provided in patient medical records was reviewed to determine eligibility for inclusion or exclusion for this study, in accordance with criteria outlined above.

All data were collected from medical records of patients from the Sentara Norfolk General Hospital Rehabilitation Center via convenience sampling. Specifically, FIM and I-PANAS-SF scores were recorded for all eligible charts within the time frame identified above. Trained and qualified healthcare professionals who were members of the center's interdisciplinary treatment team administered the FIM. Clinical psychology graduate students and EVMS' pre-doctoral psychology interns, who are trained and supervised by a clinical neuropsychologist/co-director of the Neuropsychology program at EVMS, and director of psychological services at the SNGH's Rehabilitation Center, administered the I-PANAS-SF. Both measures were administered according to standardized instructions. The outcome variable of length of stay was defined as days spent in the medical rehabilitation ward, beginning on first day of admission into the ward, and ending on day of discharge from ward. Data were maintained by the clinical neuropsychologist in accordance with appropriate guidelines. All participant data were examined ethically, and in accordance with the "Ethical Principles of Psychologists and Code of Conduct" (American Psychological Association, 2002).

A retrospective chart review for data collection was selected in an effort to reduce impact on patients. This is a popular and widely applied methodology in many healthcare-based disciplines such as epidemiology, quality assessment, professional education and residency training, inpatient care, and clinical research (Gearing, Mian, Barber, & Ickowicz, 2006).

A power analysis using G\*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) indicated that a minimum of 109 cases were needed in order to adequately examine the relationship between PA and NA on both FIM improvement and length of stay. We considered  $p$  values less than .05 significant as significant.

## **Materials**

**The Functional Independence Measure (FIM).** The FIM (see Appendix A) is a well validated, nationally used, and highly structured assessment of disability severity and medical rehabilitation outcome (Linacre, Heineman, Wright, Granger, & Hamilton, 1994; Dickson & Kohler, 1995) for adults aged 18 and older (UDSMR, 2012). Interrater reliability has consistently been found to be greater than .85 (Hamilton, Laughlin, Fiedler, & Granger, 1994; Ottenbacher, Hsu, Granger, & Fiedler, 1996). Clinicians (physicians, nurses, physical therapists, and psychologists) completing this scale received formal FIM training and certification, have demonstrated 80% accuracy or greater, and have one or more months of experience in its administration. The FIM has excellent internal consistency (ranging from  $\alpha=.88$  to  $\alpha=.98$ ; Dodds, Martin, Stolov, & Deyo, 1993; Hsueh et al., 2002; Hobart et al., 2001; Sharrack et al., 1999). The FIM also has demonstrated good concurrent validity with the 10-item version of the Barthel Index (BI; a scale measuring independence and activities of daily living; Mahoney & Barthel, 1965) ranging from  $r = .83$  to  $r = .94$  (Hsueh et al., 2002; Denti et al., 2004). The BI was a widely used instrument in IRFs, home care environments, nursing care centers, and skilled nursing facilities prior to adoption of the FIM (Liu, Unick, Galik, & Resnick, 2015).

There are two dimensions examined within the FIM (motor and cognitive), and patients are rated on their level of dependence on others in order to complete functional and instrumental tasks of daily living (Hall, Mann, High, Wright, Kreutzer, & Wood, 1996). Professionals in the

medical field (physicians, nursing staff, physical therapists, liaison psychologists, and trainees) must receive specialty training before assessing patients and, once proficient, can administer this paper and pencil measure, and score the instrument in about 30 to 45 minutes (Hamilton, Granger, Sherwin, et al 1987). This measure allows healthcare providers to track individual patient progress, compare their own facility's outcome figures to other centers nationwide, monitor program effectiveness, and generate data for accreditation purposes (UDSMR, 2012). It is administered within 72 hours of admission, and subsequently, within 72 hours of discharge (Fisher, Graham, Krishnan, & Ottenbacher, 2016).

The FIM is scored on a 126 point scale, and contains 18 items assessing patient functional skills that fall into two dimensions: cognitive and motor. Five items assess cognition (*comprehension, expression, social interaction, problem solving, and memory*), while 13 items assess physical domains (*eating, grooming, bathing, dressing upper body, dressing lower body, toileting, bladder management, bowel management, transfer to bed/chair/wheelchair, transfer to toilet, transfers to tub/shower, locomotion walk/ wheelchair, and locomotion stairs*; Linacre, Heinemann, Wright, Granger, & Hamilton, 1994). Sample scoring of cognitive items include “*comprehension,*” where a score of 7 indicates “*independent; understands complex or abstract directions and conversation. Understands either spoken or written language,*” and a score of 1 indicates “*total assistance; understands directions/conversation about basic daily needs <25% of the time, or does not understand simple commonly used spoken expressions, or gestures or does not respond appropriately or consistently despite prompting.*” Sample scoring of motor-related items include “*transfers: bed, chair/wheelchair,*” where a score of 7 indicates “*independent; if walking, patient safely approaches, sits down on a regular chair, then returns to a standing position. Transfers in a safe and timely manner. If using a wheelchair, patient locks*

*brakes, lifts foot rests, removes arm rests (if necessary) and performs either a pivot or sliding transfer to chair (without sliding board), then returns,*” and a score of 1 indicates *total assistance; patient performs <25% of task. Patient is unable to bear weight, or does not help at all, or requires two helpers.*” Each item is scored based on a patient’s observed level of independence on an ordinal scale, where 1 represents total dependence (*performs <25% of a task or requires two helpers*), 2 represents maximal assistance (*performs 25%-49% of task*), 3 represents moderate assistance (*performs 50%-74% of task*), 4 represents minimal assistance (*contact guard; performs 75% or more of task*), 5 represents supervision (*not touch; requires only set-up, cuing or coaxing*), 6 represents modified independence (*requires equipment/adaptive devises for medication*), and 7 represents total independence (*performs task alone & in a timely/safe manner*). A score of 0 on any given item is only possible upon admission, when the patient is unable to perform the task and a helper does not assist the patient. Scores range from 18 to 126, with higher scores reflecting higher levels of functioning. Chumney and colleagues (2010) found that the FIM was able to effectively measure and predict functional outcomes in stroke patients.

**The International Positive and Negative Affect Schedule Short Form (I-PANAS-SF).**

The I-PANAS-SF (see Appendix B) was developed by Thompson (2007) and is derived from Watson’s original Positive and Negative Affect Schedule (PANAS; 1988), which has been used in over 2,000 scholarly papers (Thompson, 2007). It is a self-administered measure, streamlined in efforts to increase administration efficiency and improve validity across different cultures. In a validation study by Crawford and Hendry (2004), several words from the original PANAS instrument were identified as more colloquial to North America, and more ambiguous in certain regions of the country. Whereas the original PANAS scale included 20 items, 10 measuring

positive and 10 measuring negative affect, the I-PANAS-SF contains 10 items total. Thompson (2007) reasoned that the original PANAS instrument was subject to respondent fatigue due to its length, and Mackinnon et al. (1999) found that a truncated version of the PANAS by Kercher (1992) was problematic in its inclusion of several redundant items, which ultimately spuriously inflated subscale reliabilities. Thompson (2007) sought to address both of these concerns by developing the I-PANAS-SF as an appropriate measure for use with competent, but non native English speakers, and encompassing domains from the original measure in a more concise, yet just as reliable and valid, form. A similar distribution of items can be found in the I-PANAS-SF as compared to the original PANAS. This measure includes five items that pertain to positive affect (*active, determined, attentive, inspired, and alert*) and five items that pertain to negative affect (*afraid, nervous, upset, hostile, and ashamed*). Patients are asked to rate each negative and positive affect word on a 5-point scale (*never=1 to always=5*). Both subscale scores are created by summing relevant item.

The I-PANAS-SF provides instructions for patients to rate the level to which an affective word described their mood on the I-PANAS-SF. For example, "*Thinking about yourself and how you normally feel, to what extent do you generally feel?*" (Thompson, 2007). The literature supports that asking individuals "*rate how you feel right now/today*" renders less stable measurements, while using the instructions "*how do you feel in general/during the past year*" results in trait-like stability (Pressman & Cohen, 2005; Thompson, 2007; Watson et al., 1988).

The I-PANAS-SF has been found reliable in medical rehabilitation settings (Ostir et al., 2005) and stable across cultures (Karim et al., 2011). Kercher (1992) found high internal consistency reliability ( $\alpha=.75$  for PA and  $\alpha=.81$  for NA) when using the I-PANAS-SF with an elderly sample. While little reliability research is available on the I-PANAS-SF, the original

PANAS was found to have high reliability (ranging between  $\alpha=.86$  and  $\alpha=.90$  for PA, and between  $\alpha=.84$  and  $\alpha=.87$  for NA) and low correlations between PA and NA (ranging from  $\alpha=-.1$  to  $\alpha=-.3$ ; Diener & Emmons, 1984; Watson et al., 1988; Watson, 1988a). The low correlation between PA and NA suggests that positive and negative affect are in fact two independent dimensions, each measuring a different aspect of emotional adjustment. The condensing of the PANAS to the I-PANAS-SF reduced reliability alphas only slightly ( $\alpha=.82$  for PA and  $\alpha=.74$  for NA), and resulted in marginally higher correlations between PA and NA ( $r=-.32, p<.01$ ; versus  $r=-.29, p<.01$ ; Thompson, 2007). Test-retest reliability, over two months, also has been stable for both PA and NA ( $\alpha=.84, p<.01$ ; Thompson, 2007). Robust convergent validity for PA has been found when compared to Diener's (1994) five-item measure of SWB ( $r=.33, p<.01$ ) and Lyubomirsky and Lepper's (2005) four-item Subjective Happiness Scale (SHS;  $r=.39, p<.01$ ; Thompson, 2007). Thompson (2007) also found convergent validity for NA as it was found to negatively correlate with each of these measures (SWB;  $r=-.33, p<.01$ ), and (SHS;  $r=-.51, p<.01$ ). The PANAS has been used in hundreds of studies, and has a considerable amount of research supporting its validity and reliability among a variety of populations (Lightsey et al., 2013). In this sample, high internal consistency for the PA subscale was found as Cronbach's alpha was .74 at admission and .83 discharge. Similarly, high internal consistency was found for the NA subscale at admission and discharge ( $\alpha = .83$  and  $\alpha = .79$ , respectively).

### **Data Analysis**

Data analyses were performed using SPSS version 21 (SPSS Inc., Chicago, IL), and included only inpatient charts that had the I-PANAS-SF and the FIM. Prior to conducting main analyses, data were tested for appropriate assumptions for each type of analysis. Bivariate correlations were conducted in order show the relationships between predictors and outcomes in

the sample. The decision regarding which variables were included as covariates was data driven. Three paired-samples t-tests were conducted to examine differences on the outcome variables at admission and discharge. A MANOVA was used to determine if differences existed between gender and race for all outcome variables. Hierarchical multiple regression analyses were performed to test this study's two main hypotheses.



## CHAPTER III

### RESULTS

#### Descriptive Statistics

Prior to conducting any analyses, the data were examined and missingness was found to be less than 3% for most variables with the exception of TPA and TNA at discharge (both 82%). Despite the large amount of missingness on these variables, the data were not modified as the TPA and TNA scales measure stable trait affect (Berry et al., 2000; Suh et al., 1996; Thompson, 2007; Watson & Walker, 1996) instead, only the TPA and TNA scores at admission were used in this study's analyses. This resulted in the loss of ten participants.

Univariate outliers were detected by first standardizing the variables. Cases whose standardized values fell above the absolute value of 3.29 were deemed to be univariate outliers (Tabachnick & Fidell, 2007). One case had a standardized value of 5.17 for length of rehab stay in days, which is far above the absolute value of 3.29; there were no other univariate outliers. Multivariate outliers on the x- and y-space were detected via the Cook's  $D$  values yielded by the multivariate linear regression procedure. Cases whose Cook's  $D$  values were two standardized deviations ( $SD_{\text{Cook's } D} = .02$ ) above the Cook's  $D$  mean ( $M_{\text{Cook's } D} = .03$ ) were considered to be multivariate outliers. One case met this criterion (i.e., the same case identified as a univariate outlier) and was thus deleted from the data set prior to checking assumptions and running any analyses, bringing the final sample to 119. Per Kline (2011), a variable is normally distributed if its skewness index (i.e., skewness statistic/standard error) is less than three and if its kurtosis index (i.e., kurtosis statistic/standard error) is less than 20. The length of rehab stay in days was skewed given that its skew index was as follows:  $1.25/.21 = 5.71$ . Thus, length of rehab stay in days exceeded the critical value and the assumption of normality was not met. A square root

transformation was used to address skewness with this variable. The square root transformed skew coefficient of 0.48 was divided by the skew standard error of .21 resulting in a z-skew coefficient of 2.54. This transformed variable was used in the subsequent analyses; untransformed mean for this variable ( $M = 14.86$ ,  $SD = 7.21$ ) can be found in Table 2, while transformed mean ( $M = 3.81$ ,  $SD = 0.90$ ) is presented in Table 3. Descriptive statistics and bivariate correlation for study variables also appear in Table 2 and Table 3.

Table 2

*Descriptive Statistics of Main Study Variables*

<i>Variable</i>	<i>M(SD)</i>	<i>Min-Max</i>	<i>Skewness (S.E.)</i>	<i>Kurtosis (S.E.)</i>
PA-A	18.97(4.26)	5-25	-.720(.217)	.461(.430)
NA-A	9.15(4.15)	5-25	1.37(.216)	2.01(.428)
FIM-A	62.76(11.63)	25-88	-.286(.213)	-.035(.423)
FIM-D	91.37(15.30)	50-123	-.796(.213)	-.072(.423)
LOS	14.86(7.21)	3-44	1.26(.213)	2.54(.423)

*Note.* S.E. = standard error; PA-A = positive affect at admission; NA-A = negative affect at admission; FIM-A = Functional Independence Measure at admission; FIM-D = Functional Independence Measure at discharge; LOS = length of medical rehabilitation stay measured in days.

Table 3

*Intercorrelations and Descriptive Statistics for Study Variables*

<i>Variables</i>	1	2	3	4	5	6	7	8	M	<i>SD</i>
1. Gender	--	-.07	-.16	.08	-.08	-.05	-.10	-.10	--	--
2. Race		--	-.07	.08	.04	-.14	<b>-.19*</b>	.156	--	--
3. Age			--	-.15	.06	<b>.22*</b>	.07	<b>-.19*</b>	50.42	15.52
4. PA-A				--	-.13	.07	.05	.14	18.95	4.26
5. NA-A					--	-.10	-.01	.16	9.16	4.18
6. FIM-A						--	<b>.57**</b>	<b>-.61**</b>	62.33	11.62
7. FIM-D							--	<b>-.22*</b>	90.85	15.54
8. LOS								--	3.81	0.90

*Note.* \*  $p < .05$ , \*\* $p < .01$ ; Intercorrelations for the entire sample ( $N = 119$ ) are presented above the diagonal.; Gender coded as Male or Female, Race coded as Black or White; Age measured in years, PA-A = Positive affect at admission; NA-A = Negative affect at admission; FIM-A = Functional Independence Measure at time of admission; FIM-D = Functional Independence Measure at time of discharge; LOS = length of medical rehabilitation stay measured in days. Means and standard deviations for the entire sample are presented in the vertical columns.

To further examine bivariate correlations, a MANOVA was utilized to examine the impact of gender and race on outcomes. The results revealed significant differences based on race for FIM at discharge,  $F(1, 118) = 5.82, p = .017, Wilks' \lambda = .932, \text{partial } \eta^2 = .048$ . Specifically, Caucasian patients had higher scores on FIM at discharge ( $M = 94.45; SD = 1.94$ ) compared to African American patients ( $M = 87.64; SD 2.05$ ). Based on these results, race and age were used as a covariate in analyses of FIM at time of discharge. Detailed results are presented in Table 4.

Table 4

*MANOVA for Gender and Race*

Variable	Gender		F(p)	Race		F(p)
	Male	Female		Caucasian	African American	
PA-A	19.30(.52)	18.54(.61)	.91(.34)	18.55(.55)	19.29(.58)	.87(.35)
NA-A	8.93(.51)	9.58(.59)	.69(.41)	9.16(.54)	9.35(.57)	.06 (.80)
FIM-A	61.68(1.41)	62.98(1.64)	.36(.55)	64.05(1.49)	60.61(1.57)	2.51(.12)
FIM-D	89.35(1.84)	92.74(2.14)	1.44(.23)	94.45(1.94)	87.64(2.05)	5.82(.02)*
LOS	3.84(.11)	3.78(.13)	.13(.72)	3.67(.11)	3.95(.12)	2.86(.09)

*Note.* \*  $p < .05$ ; PA-A = positive affect measured at admission; NA-A = negative affect measured at admission; FIM-A = Functional Independence Measure measured at admission; FIM-D = Functional Independence Measure measured at discharge; LOS = length of medical rehabilitation stay measured in days; ( $N = 119$ )

**Comparison of FIM scores at admission and discharge.** A paired samples  $t$ -test was used to examine the difference between FIM scores for all participants at admission and discharge (see Table 5). The average FIM score admission was 62.33 ( $SD = 11.62$ ) and the average FIM score at discharge was 90.85 ( $SD = 15.54$ ) indicating a mean difference of 28.52.

The difference between the FIM scores was statistically significant  $t(118) = -23.97, p = .001, d = -2.11$ . Average FIM scores were significantly lower at admission than at discharge. This test demonstrated that FIM scores increased as expected from admission to discharge during medical rehabilitation stay. This finding further supports other literature (Chumney et al., 2010), demonstrating that the FIM is an appropriate measure examining patient progress during medical rehabilitation. As such, this measure was utilized in this study.

Table 5

*Paired Samples T Test Comparing FIM scores Admission and Discharge*

Pair	<i>M</i>	<i>SD</i>	<i>S.E.</i>	95% CI		<i>t</i>	<i>df</i>	<i>p</i>
				Lower	Upper			
FIM Admission	62.33	11.62	1.07	-30.88	-24.17	-23.97	118	<b>.001***</b>
FIM Discharge	90.85	15.54	1.42					

*Note.* \*\*\* $p < .001$ ; FIM = Functional Independence Measure; ( $N = 119$ )

## Main Analyses

***Hypothesis 1. The first hypothesis was that higher PA and lower NA scores, as measured by the I-PANAS-SF, would be associated with greater improvements in FIM scores between admission and discharge.***

*Hypothesis 1 Assumptions.* The independent variables (PA and NA at admission) and dependent variable (FIM at discharge) were examined for Hypothesis 1 to determine if a linear relationship exists between the two. There was a linear relationship between the variables, meeting this assumption. The assumption of multicollinearity was tested by calculating correlations between variables and collinearity statistics (Tolerance and Variance Inflation

Factor). Per Aiken and West (1991) and Cohen, Aiken, and West (2004), the results indicated that multicollinearity was not an issue given that Tolerance values were above .10 and VIF values were less than 10, therefore this assumption was also met.

*Hypothesis 1 Results.* A hierarchical multiple regression was conducted to determine whether PA and NA at admission added any additional contribution to the prediction of FIM at discharge above and beyond that accounted for by FIM at admission. Race and age were included as covariates in this model. FIM at admission was entered in block 1, race and age were entered in block 2, and both PA and NA at admission were entered in block 3. Results indicated that FIM at admission explained 33.3% of the variance in FIM at discharge,  $F(1, 117) = 58.32, p < .001$ . Race and age did not account for any additional variance above and beyond FIM at admission. Furthermore, PA and NA at admission did not account for any additional variance above and beyond FIM at admission (see Table 6).

Table 6

*Hierarchical Regression Coefficients for FIM at Discharge*

Models		B	S.E. B	$\beta$	<i>t</i>	Sig.	95% CI
1	FIM-A	42.74	6.41	.577	6.67	<b>.001***</b>	[30.06, 55.43]
2	FIM-A	.77	.10	.574	7.37	<b>.001***</b>	[.56, 0.97]
	Race	-3.48	2.36	-.112	-1.47	.14	[-8.16, 1.21]
	Age	-.06	.08	-.059	-.76	.45	[-.21, 0.09]
3	FIM-A	.78	.11	.58	7.31	<b>.001***</b>	[.57, .99]
	Race	-3.58	2.39	-.12	-1.50	.14	[-8.31, 1.16]
	Age	-.06	.08	-.06	-.78	.43	[-.22, .10]
	PA-A	.05	.28	.01	.17	.86	[-.52, .61]
	NA-A	.23	.29	.06	.79	.43	[-.34, .80]

*Note.* \*\*\* $p < .001$ ; PA-A = positive affect at admission; NA-A = negative affect at admission; FIM-A = Functional Independence Measure at admission; Race coded as Black or White; Age measured in years. ( $N = 119$ )

***Hypothesis 2. The second hypothesis was that higher PA and lower NA scores, as measured by the I-PANAS-SF, would be associated with shorter rehabilitation treatment stays.***

*Hypothesis 2 Assumptions.* The independent variables (PA and NA at admission) and dependent variable (length of rehabilitation stay) were examined for Hypothesis 2 to determine if a linear relationship exists between the two. There was a linear relationship between the variables, meeting this assumption. The assumption of multicollinearity was tested by calculating correlations between variables and collinearity statistics (Tolerance and Variance Inflation Factor). Per Aiken and West (1991) and Cohen, Aiken, and West (2004), the results

indicated that multicollinearity was not an issue given that Tolerance values were above .10 and VIF values were less than 10, therefore this assumption was also met.

*Hypothesis 2 Results.* A hierarchical multiple regression was conducted to determine whether PA and NA at admission added any additional contribution to the prediction of length of stay in medical rehabilitation above and beyond that accounted for by FIM at admission. Race and age were included as covariates in this model. FIM at admission was entered in block 1, race and age were entered in block 2, and both PA and NA at admission were entered in block 3. Results indicated that FIM at admission explained 37% of the variance in length of stay,  $F(1, 117) = 58.32, p < .001$ . Race and age did not account for any additional variance above and beyond FIM at admission. Entering PA and NA at admission in the third step accounted for an additional 4.7% of the variance in length of stay in medical rehabilitation,  $F(2, 113) = 4.48, p = 0.12$ . Specifically, PA at admission ( $\beta = 0.19, p = .009$ ) uniquely accounted for the 22% of the variance in length of rehabilitation stay after controlling for FIM at admission, race, and age. However, NA at admission ( $\beta = 0.13, p = .08$ ) did not account for a significant amount of additional variance in the model. While technically not statistically significant, NA appeared to demonstrate a trend that is congruent with our hypothesis that greater NA would be predictive of longer stays in medical rehabilitation. Results are presented in Table 7.



Table 7

*Hierarchical Regression Coefficients for Length of Rehab Stay*

Models		B	S.E. B	$\beta$	<i>t</i>	Sig.	95% CI
1	FIM Admission	-.05	.01	-.61	-8.29	<b>.001***</b>	[-.06, -.04]
2	FIM Admission	-.05	.01	-.59	-7.70	<b>.001***</b>	[-.06, -.03]
	Race	.12	.13	.07	.94	.35	[-.14, .39]
	Age	-.003	.004	-.06	-.79	.43	[-.01, .005]
3	FIM Admission	-.05	.006	-.59	-7.96	<b>.001***</b>	[-.06, -.03]
	Race	.09	.13	.05	.67	.51	[-.17, .34]
	Age	-.002	.004	-.04	-.51	.61	[-.01, .006]
	PA Admission	.04	.02	.19	2.65	<b>.009**</b>	[.01, .07]
	NA Admission	.03	.02	.13	1.77	.08	[-.003, .06]

*Note.* \*  $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ ; PA-A = positive affect measured at admission; NA-A = negative affect measured at admission; FIM-A = Functional Independence Measure measured at admission; Race coded as Black or White; Age measured in years. ( $N = 119$ )

## CHAPTER IV

### DISCUSSION

The goal of the present study was twofold: to examine a possible relationship between trait affect and functional improvement between admission and discharge from medical rehabilitation and to examine a possible relationship between trait affect and length of medical rehabilitation stay. Prior research has indicated that PA and NA play a role in health, recovery, and resiliency; however, the literature reveals that there remains confusion regarding differences between trait affect and state affect, and the use of appropriate measures for assessment of stable trait affect. Zautra (2005) for example, purportedly measured trait affect, however, did so with temporal instructions asking participants to endorse items based on how they were feeling for the past week, thereby assessing transient state affect. This study operationalized and measured trait affect as two stable, orthogonal constructs (PA and NA), using a well-validated trait affect measure; the I-PANAS-SF, and using appropriate temporal instructions for measuring stable trait affect. There is an abundance of research supporting the validity and usefulness of the original PANAS measure (Watson, 1988), and while well validated, the I-PANAS-SF has received less attention as compared to other contemporary affective measures.

*Hypothesis 1.* The first hypothesis was that higher trait PA and lower trait NA scores would be associated with greater increases in FIM scores, between admission and discharge. Examination of possible differences based on demographic variables revealed that in our sample there were significant differences in TPA at admission between Caucasian and African American patients. Specifically, Caucasian inpatients were found to have higher independence scores, as measured by the FIM, at time of discharge. This difference, however, no longer existed when accounting for FIM at time of admission. Additionally, only level of disability at admission was

found to be predictive of FIM disability at discharge. This is to say that those with higher levels of independence as measured by FIM had higher levels of independence at discharge. Patient scores at discharge were not better predicted when race and age were added to model, nor when PA and NA admission scores were added. Given these findings, the hypothesis that higher PA scores and lower NA scores would predict FIM scores at time of discharge was not supported in this sample.

While this study did not find a significant relationship between trait affect and amount of rehabilitative improvement, this finding is contrary to several other studies that have found a significant relationship between trait affect and health outcomes. One potential explanation for this difference is the use of self-report measures, for both affect and physical health, in many of these studies. This is to say that because individuals who have higher levels of PA and lower levels of NA are generally more optimistic (Tugade & Fredrickson, 2004), this may also result in more optimistic evaluations of their own physical health. One such study (Kvaal & Patodia, 2000) utilized The McGill Pain Questionnaire-Short Form (MPQ-SF; Lezack, 1987), a 15-item self-report measure to assess hospital inpatients, whereas the present study examined FIM score as an objective measure of health. Several researchers have acknowledged that greater health complaints among people high in NA could be attributable to biases in reporting symptoms, actual (biologically based) health problems, or a combination of both (Cohen & Williamson, 1991; Costa & McCrae, 1985a; Watson & Pennebaker, 1989). Finch et al. (2012), highlights subjective bias as a major limitation of their study, as well the use of a fairly homogenous sample where most of their participants were Caucasian, male, healthy college students.

Many studies have found a significant relationship between emotional well-being and recovery or survival from medical illness. However, these studies utilized measures that assessed

state positive affect: The Orthotics and Prosthetics Users' Survey Quality of Life Scale - Emotional Reactions section (OPUS; Heinemann, Bode, & O'Reilly, 2003; utilized by Walsh, Armstrong, Poritz, Eilliot, Jackson, & Ryan, 2016); the Global Mood Scale (GMS; Denollet, 1993; utilized by Van Der Broek et al., 2013); The WHO-5 (Heun, Burkart, Maier, & Bech, 1999; used by Birket-Smith et al., 2009); the Mood Adjective Checklist (MACL; Nowlis, 1965; used by Brown et al., 2003; Olofson et al., 2009); the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977; used by Brummett et al., 2009; Fisher et al., 2004; Moskowitz, 2003; Moskowitz et al., 2008; Ostir et al., 2002; 2008); the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983; or utilized by Denollet et al., 2008; Scherer & Hermann-Lingen, 2009); the GMS (Denollet, 1993; used by Pelle et al., 2009; Versteeg et al., 2009), and other researchers simply provided a vague explanation of their method for measuring affect. For example, Lucas et al. (2008) reported that PA was "calculated from multiple administrations of a broad emotion measure," which was administered four times throughout the semester to college student participants, and that "item scores were averaged to create an overall measure of global positive affect" (p. 391). In Lamers et al.'s (2012) meta-analysis of studies examining the impact of well-being, PA, and life satisfaction on recovery and survival of medically ill individuals, they highlight the use of mood measures to assess what studies often term as "trait affect." The authors instead recommend two more appropriate measures: the PANAS (Watson & Tellegen, 1985), and the MHC-SF (Lamers et al., 2011). However, Lamer et al.'s study may support using emotion measures instead of trait affect measures in assessing patient emotional well-being, specifically when examining this as a predictor of medical outcomes.

*Hypothesis 2.* The second hypothesis of this study was that higher PA and lower NA scores would be associated with shorter stays in a medical rehabilitation setting. The use of length of stay in days as an outcome variable was utilized in this study as a measure of how rapidly patients made progress or sufficient functional gains leading to discharge. Our study found that patients with lower levels of disability at admission, as measured by the FIM, had shorter stays in medical rehabilitation. Age and race were not found to add to this prediction, nor did NA at admission. However, contrary to our hypothesis, individuals with higher PA scores at admission were found to have longer rehabilitation stays.

The finding that patient's level of disability predicts their length of stay is congruent with an expectation, and prior research (Huang et al., 2009; Mackenzie & Chang, 2002), that individuals with the most severe disability symptoms or limitations would require a greater amount of care prior to discharge from rehabilitation (MacNeill & Lichtenberg, 1998). However, the finding that greater positive affect predicts longer rehabilitation stays is both interesting and unexpected. The length of a patient's stay in medical rehabilitation can have a profound impact on not only the individual, but also a larger medical system (Woznowski-Vu, 2015). Shorter stays in rehabilitation may result in cost savings for patients and medical systems, and may reduce wait times for others awaiting treatment. While several studies have examined length of stay as an outcome variable in medical rehabilitation, emotional affect's relationship to length of stay has not been as well studied. Managed care has also influenced length of stay in medical rehabilitation for many patients as most insurance plans require evidence of ongoing improvement in order to continue to reimburse the hospital for treatment. It should be noted that patients admitted to this particular medical rehabilitation ward were pre-assessed for social support and resources available to them following discharge. This is to say that patients were

pre-screened for admission based on the likelihood that they will make significant gains during a relatively brief period of time, and have a likelihood of returning to independent living post-discharge.

The sample included data from patients referred to medical rehabilitation following a stroke event. The effects of stroke can vary widely, depending on location, severity, and recency of the event (Farinelli et al., 2015). While there are numerous studies that have found that stroke can affect emotional lability (Hoffmann, Benes Cases, Hoffmann, & Chen, 2010), agitation and inhibition (Angelelli et al., 2004; Dafer, Rao, Shareef, & Sharma, 2008), there is a lack of research examining the impact of stroke on stable trait affect. Perhaps this is a limitation of an affect measure like the I-PANAS-SF - in that it may be more beneficial to analyze different diagnostic groups independently.

Some may argue that affect scores would be expected to be impacted by the point in time when a patient completes the measure as they may experience more negative emotions upon arrival in rehabilitation, while experiencing more positive emotions upon discharge. However, while individuals completed the I-PANAS-SF at different time points, time between admission and first administration was at times longer than number of days between second administration and discharge. Therefore, it is unlikely that much variance in these scores can be attributed to this factor. It is worth emphasizing that prior research has demonstrated that trait affect is a stable trait, even within inpatient populations. Trait affect is a stable underlying disposition that characterizes affective response for months, years, or even a lifetime (Cohen et al., 1995; Costa & McCrae, 1985).

### **Limitations and Future Directions**

There are a number of limitations to this study, which warrant discussion. While the present study examined trait affect's relationship with rehabilitative outcomes, other studies have examined PA and NA's roles in moderating relationships with perceived social support and stress (Civitci, 2015), and functional health in geriatric populations (Gana et al., 2016). These studies contributed to the literature on affect's role as a moderator, and the present study aimed to examine whether assessment of trait affect could be predictive of improvement in health outcomes.

Other studies examining medically ill populations limited their design and examined a single illness type (ventricular arrhythmias; Van Der Broek et al., 2013; osteoarthritis and fibromyalgia; Zautra, 2005; respiratory viral disease; Cohen et al., 1995; Lyme disease; Elkins et al., 1999), whereas the present study examined a mixed rehabilitation population. It is possible that in efforts to increase generalizability of this study that some effects were lost due to variance in diagnoses examined collectively. More specifically, certain patients admitted to medical rehabilitation (e.g. stroke patients, traumatic brain injury patients), may have a compromised ability to self-assess their own affect, and recall typical (trait) affect instead of current (trait affect) due cognitive deficits (Rashid, Clarke & Rogish, 2013). There is a lack of research specifically examining the potential effect of cognitive deficits on self-assessment of trait affect.

All patient data originated from a single site, and from patients referred for psychological consultation thereby demographically and geographically limiting generalizability of results to the general population. Retrospective chart reviews, however, are widely used and a valuable method of conducting research in a number of healthcare and disciplines (Vassar & Holzmann, 2013), presents minimal risk to patients, and incurs little to no cost to researchers.

Results of this study may also be limited due to the sample that was examined. Data were solely obtained from a sample of inpatients within medical rehabilitation that were referred for psychological consultation during medical rehabilitation stay, approximately 50-75% of inpatients within this ward are typically referred for this type assessment. Assessment of cognitive functioning and/or emotional adjustment were the primary reasons for referral. It may be possible that by virtue of being referred for a psychological consultation that these patients were inherently different from the general medical rehabilitation population.

Additionally, the I-PANAS-SF measure is a self-report measure, and patients can at times misread measures. It is possible that some individuals' responses were indicative of state affect rather than trait affect simply due to misinterpretation of instructions, especially if patients were asked to complete multiple self-report emotion measures, which typically inquire about current or recent emotional states. It is also possible that patients' state affect during their medical rehabilitation stay may have impacted their response styles on this measure of trait affect. However, the I-PANAS-SF has been found to be a reliable measure used within medical rehabilitation inpatients (Ostir et al., 2005). Additionally, patient response styles may be influenced by social desirability (Fisher, 1993). Specifically, inpatients within a medical rehabilitation ward may feel pressure to present themselves in favorable ways that are congruent with the treatment team's expectations of steady functional improvements and high levels of emotional resiliency.

Several demographic variables were examined as part of this study, however these were limited by the availability of information included in patient charts. While gender, age, and race, were examined, other variables such as marital status, level of education, and socio-economic status may be interesting variables to examine in future studies. Prior studies have found that



marriage is a protective factor for health for men (Kiecolt-Glaser & Newton, 2001), as is level of education for both men and women (Lleras-Muney, 2005). Additionally, we must presume that only individuals who have adequate English-language reading, writing, and comprehension abilities completed the measure during psychological consultation. While the instrument has a location to indicate whether the individual received some type of assistance in completing the measure, most assessing providers failed to complete this section, therefore, we were unable to examine potential effects that verbally reporting a response to an assessor, versus completing the measure independently, could have on response style.

A strength of this study was that patient data originated from a single medical rehabilitation unit treating a variety of conditions, versus examining a single diagnosis. This added to the generalizability of the results. However, future studies should replicate the design of this study and also examine possible differences between diagnostic groups. Specifically, the implications of injuries or illnesses that may result in more profound cognitive dysfunction, and that may impact an individual's ability to accurately assess their general affective style. As previously described, the FIM score reflects a total composite score of all functioning, both cognitive and physical. Future study designs may instead examine separate scales within the FIM measure to more specifically assess for potential differences based on type of functional limitations, or utilize other measures of ability.

Although the sample size used in the regression analyses for this study exceeded the minimum sample size as identified by a power analyses, previous studies have typically utilized larger sample sizes (Finch et al., 2012; Meyer, et al., 2015). Other studies also found that effect of well-being differed between genders, and specifically that the effect of well-being on recovery was stronger for males than females (Brummett, et al., 2008; Fisher et al., 2004), however, both

of these studies examined elderly patients exclusively, while the present study examined patients from a wider range of ages. Our preliminary results did not yield correlations between gender and the outcomes we examined, therefore gender was not included in main analyses.

Finally, it should be mentioned that an original goal for this study was to examine discharge location one of the outcome variables, return to independent living, versus discharge to long-term facility. However, upon further discussion with the rehabilitative center from which data were retrieved, it was evident that nearly all patients returned to home life, or were re-admitted to hospital care following an acute event or decline in health during their time in rehabilitative care. Conducting a pilot test prior to a conducting this study may have been beneficial in identifying some of the limitations addressed within this discussion, and would have perhaps allowed for the opportunity to problem solve around some of these concerns. Yet, it should be noted that at the time of planning this study administration of the I-PANAS-SF had only recently been incorporated into psychological evaluations at the above-mentioned rehabilitative setting.

## **Conclusions**

There is extensive evidence demonstrating trait and state affect are different constructs, however, many contemporary researchers continue to disregard differences and confound findings by utilizing inappropriate measures of other emotion variables and presenting that work as an examination of affect. The present study contributes to the current literature regarding the relationship between trait affect and health outcomes, in light of ongoing discrepancies in the field regarding the differentiation of trait and state affect and the use of inappropriate measures, and a failure to use temporal instructions that assess stable affect traits.

Medical rehabilitation is on the rise, and while the relationship between the mind-body connection is well-established, mechanisms influencing resiliency are still not well understood. While this study did not find that trait affect styles predicted reduction in disability, we did find that greater TPA was predictive of longer stays in medical rehabilitation. Future research should attempt to replicate this study, and further examine the relationship between trait affect and medical rehabilitation outcomes. Whereas the current study examined only individuals referred for psychological consultation, future studies should include a wider range of inpatients, should control for past psychiatric history, and should obtain data from multiple medical rehabilitation sites in order to improve generalizability of results obtained. In summary, this is the first study of its kind that utilizes the I-PANAS-SF to directly examine the relationship between trait affect and medical outcomes, within a medical rehabilitation population.

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## APPENDIX A

## The Functional Independence Measure (FIM™)

<b>L E V E L S</b>	7 Complete Independence (Timely, Safely) 6 Modified Independence (Device)	<b>NO HELPER</b>		
	<b>Modified Dependence</b> 5 Supervision (Subject = 100%+) 4 Minimal Assist (Subject = 75%+) 3 Moderate Assist (Subject = 50%+)  <b>Complete Dependence</b> 2 Maximal Assist (Subject = 25%+) 1 Total Assist (Subject = less than 25%)	<b>HELPER</b>		
		<b>ADMISSION</b>	<b>DISCHARGE</b>	<b>FOLLOW-UP</b>
<b>Self-Care</b>				
A. Eating		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Grooming		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Bathing		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Dressing - Upper Body		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Dressing - Lower Body		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Toileting		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Sphincter Control</b>				
G. Bladder Management		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H. Bowel Management		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Transfers</b>				
I. Bed, Chair, Wheelchair		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J. Toilet		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K. Tub, Shower		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Locomotion</b>				
L. Walk/Wheelchair		<input type="checkbox"/> <input type="checkbox"/> W Walk C Wheelchair B Both	<input type="checkbox"/> <input type="checkbox"/> W Walk C Wheelchair B Both	<input type="checkbox"/> <input type="checkbox"/> W Walk C Wheelchair B Both
M. Stairs		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Motor Subtotal Score</b>		<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>Communication</b>				
N. Comprehension		<input type="checkbox"/> <input type="checkbox"/> A Auditory V Visual B Both	<input type="checkbox"/> <input type="checkbox"/> A Auditory V Visual B Both	<input type="checkbox"/> <input type="checkbox"/> A Auditory V Visual B Both
O. Expression		<input type="checkbox"/> <input type="checkbox"/> V Vocal N Nonvocal B Both	<input type="checkbox"/> <input type="checkbox"/> V Vocal N Nonvocal B Both	<input type="checkbox"/> <input type="checkbox"/> V Vocal N Nonvocal B Both
<b>Social Cognition</b>				
P. Social Interaction		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q. Problem Solving		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R. Memory		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Cognitive Subtotal Score</b>		<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>TOTAL FIM Score</b>		<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>NOTE:</b> Leave no blanks. Enter 1 if patient not testable due to risk				

## APPENDIX B

### The International Positive and Negative Affect Schedule Short Form (I-PANAS-SF)

Name: \_\_\_\_\_

*Circle one:*

Date: \_\_\_\_\_

Time: Admission or Discharge

Administered by: \_\_\_\_\_

Type: Assisted or Unassisted

(Assisted administration = reading or writing items for patients due to visual, motor, or other impairment)

### The International Positive and Negative Affect Schedule Short Form (I-PANAS-SF)

Thinking about yourself and how you normally feel, to what extent do you generally feel:  
(Use the scale next to each item to indicate your answers.)

Upset	1 Never	2	3	4	5 Always
Hostile	1 Never	2	3	4	5 Always
Alert	1 Never	2	3	4	5 Always
Ashamed	1 Never	2	3	4	5 Always
Inspired	1 Never	2	3	4	5 Always
Nervous	1 Never	2	3	4	5 Always
Determined	1 Never	2	3	4	5 Always
Attentive	1 Never	2	3	4	5 Always
Afraid	1 Never	2	3	4	5 Always
Active	1 Never	2	3	4	5 Always

*Adapted from: Thompson, E.R. (2007). Development and validation of the internationally reliable short-form of the positive and negative affect schedule (PANAS). Journal of Cross-Cultural Psychology, 38, 227-242*

## VITA

Valerie Dominique Ward  
700 Park Avenue/MCAR-410  
Norfolk, VA 23504

### EDUCATION

- 2010 - present                      Psy.D., Clinical Psychology, The Virginia Consortium Program in Clinical Psychology, Norfolk, VA  
University-based, APA accredited program, jointly sponsored by: Old Dominion University, Eastern Virginia Medical School, and Norfolk State University
- 2008                                      M.A., Counseling, Webster University, St. Louis, MO
- 2005                                      B.S., Psychology, James Madison University, Harrisonburg, VA

### CLINICAL TRAINING

- Aug 2014 - June 2016              Clinical Psychology Intern (*APA Accredited, 2-year, part-time program*)  
Counseling and Psychological Services - George Mason University  
Fairfax, VA
- Sept 2013 – May 2014              Graduate Student Assessment Clinician  
Virginia Beach City Public Schools, Virginia Beach, VA
- May 2013 – Sept 2013              Graduate Student Psychotherapy Clinician  
Hampton Veterans Affairs Medical Center, Hampton, VA
- Feb 2012 – May 2013              Graduate Student Assessment Clinician  
Community Psychological Resources, Norfolk, VA
- Jan. 2012 – May 2013              Graduate Student Integrated Care & Psychiatric Consultation Clinician  
Sentara Norfolk General Hospital, Norfolk, VA
- Jul 2011 – May 2013              Graduate Student Neuropsychology Assessment Clinician  
Eastern Virginia Medical School, Norfolk, VA
- Aug 2011 – Aug 2012              Graduate Student Psychotherapy Clinician  
Hampton Veterans Affairs Medical Center, Hampton, VA
- Jan 2011 – Aug 2011              Graduate Student Neuropsychology Assessment Clinician  
Chesapeake Assessment and Therapy Associates, Chesapeake, VA
- Aug 2010 - Dec 2010              Graduate Student Assessment Clinician  
Virginia Beach City School System
- Oct 2007 – Jun 2008              Graduate Student Psychotherapy Clinician  
Womack Army Medical Center, Fort Bragg, NC