

SELF-PERCEPTION ON LANGUAGE PERFORMANCE FOLLOWING STROKE:
IMPLICATIONS FOR REHABILITATIVE EFFORTS

By

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This document is dedicated to my family who I am blessed to give my love to everyday.

To my husband, Tom, you are my favorite part of my life. You make everything good and all things possible. I will love you for all of my sunsets. To my dad, Larry, it is so good to be your daughter. Thank you for all of the sacrifices you made for me over the past 28 years. No other dad could ever live up to the bar you have set. To my mom,

Cheryl, thank you for every hug and every tear you wiped away. You have been my greatest fan for as long as I can remember. I hope that you are as proud of me as I am to have you for a mom. To my sister, Laura, there is no one else in this world that I admire more than you. To my brother, Gary, you have made us whole. I am so glad to have you in my life. To Chris and Noah, you are remembered, you are missed, and you are loved, every moment.

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TABLE OF CONTENTS

	<u>page</u>
ACKNOWLEDGMENTS	iv
LIST OF TABLES	vii
LIST OF FIGURES	viii
ABSTRACT	ix
 CHAPTER	
1 INTRODUCTION	1
Anxiety	3
Self-Perception	10
Self-Efficacy	10
Fear of Failure, Social Desirability and Need for Achievement	12
Implications for Rehabilitative Efforts	14
2 HYPOTHESES	22
Hypothesis 1	22
Hypothesis 2	23
3 METHOD	25
Participants	25
Procedure	26
Screening Tasks	26
Study Tasks	27
Object-naming tasks	27
High frequency “easy” group	29
Low frequency “hard” group	29
Task Presentation	30
Naming tasks	30
Rating tasks	31
Self-Presentation and Performance Anxiety Measures	31
4 ANALYSES AND RESULTS	37

Hypothesis 1	39
Hypothesis 2	40
Post Hoc Analyses	43
Group Differences	43
Manipulation Checks.....	46
Reliability of Instructions Across Participants	48
5 DISCUSSION	56
APPENDIX	
A THE PERFORMANCE FAILURE APPRAISAL INVENTORY-REVISED (Conroy et al., 2002).....	67
B TASK RATING SCALES	69
C STIMULI FOR LINE DRAWINGS	75
Set 1	75
Set 2	75
Easy items.....	76
Hard items	77
D AWARENESS INTERVIEW	78
LIST OF REFERENCES.....	80
BIOGRAPHICAL SKETCH	83

LIST OF TABLES

<u>Table</u>	<u>page</u>
3-1. Participant demographics by group (mean and standard deviation).....	26
4-1. Baseline means and standard deviations by group (“easy” vs. “hard”).....	38
4-2. Comparison of hypothesized and revised models for order	46
4-3. Performance on test measures for the “easy” and “hard” groups.....	50
4-4 Correlations of rating scales for the “easy” group (N = 10).....	51
4-5. Correlations of rating scales for the “hard” group (N = 11).....	52
4-6. Correlations Among PFAI-R Scales for Nonfluent Aphasics (N = 21)	53
4-7. Correlations Between High BNT, Low BNT scorers and the PFAI-R.	54
4-8. Inter-rater reliability for tape task descriptions (N = 21).....	55

LIST OF FIGURES

<u>Figure</u>	<u>page</u>
1-1. Model of influence of anxiety and self-perception on actual performance	20
2-1. Model of influence of anxiety and self-perception on actual performance with associated measures	24
3-1. Outline of procedures	36

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Acquiring disability in adulthood must be personally devastating. The purpose of this study was to understand the relationship between psychosocial constructs and language production in participants with aphasia. Twenty-one participants with nonfluent aphasia completed measures of confrontation naming and severity of aphasia before completing questionnaires about anxiety and self-perception of their upcoming performance on an object-naming task. Participants completed a baseline object-naming task. A stratified randomization was used to divide participants into two groups: an “easy” group and a “hard” group. Participants in the “easy” group received an easy induction practice task. Participants in the “hard” group received a hard induction task. Following the induction tasks, participants were asked to complete several rating scales designed specifically for this study to measure feelings of anxiety and ratings of self-perception of upcoming performance. Participants in both groups received the same experimental task; however participants in the “easy” group were led to believe that the

task would be easy, while participants in the “hard” group were led to believe that the task would be hard. The proposed model for this study suggested that the relationship between anxiety and performance on the experimental task was modulated by self-perception. Results indicate that the proposed model was backwards. Findings suggest that the pattern of the data better fit a model where the relationship between self-perception and performance on the experimental task was modulated by anxiety.

CHAPTER 1 INTRODUCTION

There have been no studies examining the impact of self-perception and performance anxiety on cognitive task performance following stroke. The implications of the psychological sequelae of stroke, while often addressed in acute assessment, have not appeared as noteworthy targets of research in post-acute stages of recovery. If addressed at all in literature, the psychological impact of stroke is measured in terms of depressive symptomatology. Anxiety and the patient's perception of his or her ability to perform tasks post-stroke have not been studied. Consequently, the model for the present study, as explained in detail below, is proposed as a logical application of components of anxiety and self-perception from non-stroke literature to stroke survivors. The relevance of the present model is to examine not only the relationship between anxiety, self-perception and task performance, but also the usefulness of the model in rehabilitation. It is important to note that literature does not exist examining the variables included in the present model in stroke populations. Therefore, we have had to rely on anxiety, self-perception, traumatic brain injury (non-stroke), and rehabilitation literature (non-stroke) to build the present model.

In a society whose core foundation is language based, acquired production deficits can result in an inability to function adequately in society. Often, when receptive language abilities remain intact, people with acquired expressive deficits will withdraw from society, seemingly because they view themselves as no longer able to function effectively in social interactions. The purpose of this study is to understand the relationship among

self-perception, performance anxiety, fear of failure, and language performance in participants with chronic non-fluent aphasia.

Addressing anxiety and self-perception of ability following stroke would seem to be particularly important since approximately 500 of every 100,000 people will suffer at least one stroke in their lifetime (Kertesz & McCabe, 1977; Mayo, 1993; Paolucci et al, 1988; Sudlow & Warlow, 1997; all cited in Nadeau et al., 2000). Some people who suffer a stroke acquire aphasia. The neural substrates of language in patients with acquired aphasia have been well studied. Rehabilitation of aphasia has also been studied for some time. While the focus of aphasia literature has been rehabilitation research and maximizing functional abilities, no studies that have adequately examined patients' perceptions of themselves and their perceived capabilities following stroke could be found. However, some literature on traumatic brain injury and physical disability addresses this issue.

Lilliston (1985) suggests that the patient's psychological response to traumatic injury and/or chronic disease, and subsequent behavior, is determined by the person, his/her social, physical and biological environments, and the ecological fit between these factors. In particular, the unfamiliarity with the physical self and the disruption of the patient's body image contribute to considerable anxiety about the loss of functionality that had once been mastered (Lilliston, 1985). Perception of the self is not only altered following sudden trauma or decline stemming from chronic disease, but also the perception of the person within their environment may be distorted as well. Thus, the patient strives for personal adjustment, self-satisfaction with one's own functioning, and freedom from undue distress (Newton & Johnson, 1985). Personal adjustments, and related self-

perception features such as self-esteem and self-worth are integral components of the psychological response.

Psychological response to physical or cognitive impairment can manifest itself in a variety of ways. However, the severity of the psychological response, as well as adaptation to physical and/or cognitive disability, appears directly related to the person's perception of himself/herself and his/her functional abilities.

Self-perception is a broad topic that encompasses, and is affected, by many features including self-efficacy; social and performance anxiety; fear of failure; social desirability; and need for achievement. This is not to suggest that the aforementioned features constitute an exhaustive list of the constructs associated with self-perception, but they are proposed to have the most significant impact on how a person views him or herself. Further, in the current model it is the person's beliefs about him or herself, and his/her beliefs about his/her ability to perform a task, that are proposed to modulate the ability to perform the naming task.

In sum, we will examine self-perception, performance anxiety, and actual task performance and the relationships between these constructs and their subcomponents as they apply to stroke survivors. First, it is necessary to define each construct and subcomponent in terms of how the construct contributes to the study design. Then, we will discuss the relationships between constructs and their relationships with, and implications for, cognitive rehabilitation in general.

Anxiety

Anxiety may be operationally defined in many ways. Literature examining the relationship between anxiety and stroke is scarce; therefore, "anxiety" must be operationally defined specifically for the purposes of this study. In the present study, the

term “anxiety” refers to affective, behavioral and cognitive components. The operational definition of “anxiety” for the present study is a feeling of worry, dread, and/or fear attached to a belief, thought, and/or perception that a person’s cognitive and/or emotional integrity will be negatively compromised. This definition is not wholly consistent with definitions found in available literature, but is appropriate for stroke survivors.

Anxiety literature that best supports the model proposed below for stroke survivors is found in non-specific trauma and cognitive theory literature. Antonak and Livneh (1995, p.11) explain that an anxiety response is the “phase of panic-stricken reaction upon initial recognition of the magnitude of the traumatic event.” However, this explanation appears to limit anxiety to an acute response and underestimates its pervasive, and often detrimental, effects on post-injury function. Patients who must be dependent on others for assistance may also experience anxiety. An anxious reaction may not result solely because of the damage to the brain as explained in Antonak and Livneh (1995). Instead, it is proposed that the anxious reaction may result from the change in personal status as the brain damaged patient becomes the passive recipient of the treatment plans of others (Lilliston, 1985). Subsequently, the patient may experience increased levels of anxiety, particularly performance anxiety, as the focus of rehabilitative efforts becomes what the patient can no longer do without assistance. Furthermore, rehabilitative efforts often overlook what preserved functions the patient may perform well, which may contribute to a fall in the patient’s self-esteem.

Bandura (1989, 1997) and Barlow et al., (1996) suggest cognitive components to anxiety. Both Bandura (1989, 1997) and Barlow et al., (1996) suggest that anxiety is an anticipatory apprehension to perceived potentially threatening situations, combined with

a perception that one lacks the appropriate coping mechanisms to adequately deal with the situation (Bandura, 1989; Bandura, 1997; Barlow et al., 1996). Barlow et al. (1996) suggest that feelings of anxiety are associated with attention that is turned inward. This internal focus of attention can facilitate performance to a point, as suggested by the Yerkes-Dodson model of arousal (Yerkes & Dodson, 1908). The Yerkes-Dodson model suggests that performance is facilitated when cognitive tasks are easy (with moderate arousal); however, when cognitive tasks are more difficult, thereby requiring more attention, the highly anxious (and highly aroused) individuals lack the attentional processing resources to devote to the cognitive task. Thus, performance is subsequently disrupted (Barlow et al., 1996; Wenzel & Holt, 1999).

Another facet of cognitive performance is in social interaction. Literature examining social interaction following stroke is scarce. Since the ability to interact socially is compromised in stroke survivors with chronic nonfluent aphasia, this component is likely to be particularly important in the proposed model. The best literature to offer support for inclusion of social interaction in the proposed model is found in literature examining social anxiety.

Social anxiety/phobia can have a significant impact on self-perception in the social sphere and associated cognitive performances. One hypothesis of social anxiety is that the socially anxious lack the requisite skills necessary to perform well in social situations (Thompson & Rapee, 2000). However, findings from Thompson and Rapee (2000) suggest that it is not the lack of social skills that disrupts performance; rather there appears to be a disruption in the person's ability to adequately use his/her social skills. Likewise, Norton and Hope (2001) suggest that there is a kernel of truth to the beliefs of

the socially anxious that they perform worse than non-anxious people on social tasks. However, the performance of the socially anxious is generally adequate, though they present as more anxious during the task than non-anxious people (Rapee & Lim, 1992; Strahan & Conger, 1999). Often, patients who have suffered physical and/or cognitive disability experience considerable social anxiety as they perceive themselves as less capable, or in the case of some cognitive impairments, are less capable, of social interaction. Newton and Johnson (1985) suggest that individuals who suffered a head injury exhibited higher levels of social anxiety associated with poor social adjustment resulting in withdrawal of social contact because of social interaction difficulties.

People who have suffered a traumatic brain injury (TBI), whether mild or severe in nature, complain of decreased social interactions, increased feelings of loneliness, inability to follow more than one person in a conversation, and social isolation (Newton & Johnson, 1985). Logically, it would seem that stroke survivors might experience similar feelings. In contrast to the socially anxious noted above (Thompson & Rapee, 2002), the TBI patients possess true deficits (vs. perceived deficits) in social situations, as they no longer have the requisite social skills necessary to perform well in social situations. Here again, the possession of true deficits in chronic nonfluent aphasics would seem to suggest that they also lack the necessary skills for positive social interactions. Subsequently, it has been suggested that the best form of treatment for social skills deficits with the TBI population is in the form of social skills training (Newton & Johnson, 1985).

It would seem consistent with cognitive theories of anxiety, as suggested by Barlow et al. (1996), that rehabilitation patients would experience an exponential increase in

internally focused attention. However, before discussing this further, it is important to separate rehabilitation patients who have suffered traumatic damage (TBI or stroke) from those diagnosed with chronic neurodegenerative illnesses, because the experiences of these two groups are vastly different. People who suffer from a chronic neurodegenerative illness such as multiple sclerosis (MS) face different fears of uncertain physical and mental stability than those who have suffered a TBI (Antonak & Livneh, 1995). It has been suggested that people who suffer a TBI, and likely those who suffer a stroke, reach a level of cognitive and physical stability that people with MS will never reach due to the fluctuation of the illness (Antonak & Livneh, 1995). The inclusion of this distinction between neurodegenerative diseases and TBI is important because it indicates that not all rehabilitation patients have the same resources (described below); therefore, the present model may have application for some rehabilitation patients and not others.

It is important to note that all populations maintain their own sets of liabilities and preserved resources. The following distinction between liabilities and resources for the neurodegenerative disease population versus the TBI/stroke populations is important because the contrast between the two sets up the proposed model for its application to rehabilitation efforts that will be discussed later.

Liabilities refer to components that predict a negative outcome. In contrast, resources are components that predict a positive outcome. For example, people who have suffered a TBI or stroke sustain more abrupt and acute damage (liability), often with persistent deficits (liability), and acute emotional responses such as anxiety and depression (liability). However, over time it is likely that the person with a TBI or stroke would

benefit, even minimally, from intervention (resource) and compensatory techniques (resource). In contrast, people with neurodegenerative disease tend to suffer gradual, but persistent, decline, such that they may initially be aware of their decline (liability), and tend to experience depression and anxiety (liability). Unfortunately, though the progression of some neurodegenerative diseases can be slowed (resource), for many there is no recovery.

Performance and test anxiety would usually be included as a subcomponent of anxiety; however as noted in the model below, performance and test anxiety are separated from general anxiety. This is an important distinction for the model and will be described further below.

There is no literature to date that examines the relationship between performance and test anxiety in stroke survivors. However, there is extensive literature examining performance and test anxiety in musicians and students. This literature provides support for inclusion of performance and test anxiety in the proposed model.

One of the best models of performance anxiety may be found in studies of musicians and “stage fright.” Steptoe and Fidler (1987) suggest that anxious performers report high levels of task-irrelevant thoughts that include worry about their performance, a preoccupation with feelings of inadequacy and an anticipation of a loss of status. These concerns, combined with a general distraction of perceived somatic arousal, contribute to the experience of “stage fright” (Steptoe & Fidler, 1987). Consequently, the potential for the aforementioned task-irrelevant thoughts to interfere with actual task performance is high. This model further suggests that anxiety may facilitate performance up to a moderate level, consistent with the Yerkes-Dodson model (Yerkes & Dodson, 1908);

however, it is believed that after this point, actual performance declines dramatically as anxiety level increases. It is important to note that both the Steptoe and Fidler (1987) model and the Yerkes-Dodson model have not been tested in the stroke population. The present study proposes that stroke survivors with persistent deficits are likely to exhibit an increased baseline level of anxiety such that the baseline level of anxiety for this population corresponds to a “moderate” level of anxiety in the neurologically intact population.

Feather (1966) suggests that subjects with high levels of performance anxiety are affected by failure to a greater degree than low-performance anxiety subjects. Feather (1966) further explains that failure may be facilitative for subjects with low levels of manifest anxiety, such that under failure conditions, subjects with low performance anxiety exhibit more superior performances than subjects with high performance anxiety. However, the opposite occurs in neutral or non-failure conditions. Thus, Feather (1966) suggests that initial experience of success or failure significantly impacts subsequent task performance. This appears to be an important consideration when designing assessment and treatment components in rehabilitation in order to avoid creating an initial failure experience that may negatively affect subsequent performance.

Models of test anxiety may also be useful in understanding the impact of stroke resulting in a nonfluent aphasia because these models suppose that a person with test anxiety begins with “an impairment” from the start, “impairment” referring to the debilitating effects of fear of failure. As will be discussed further below, fear of failure appears to be a significant qualitative component in self-perception.

Harleston (1962) proposed that the relationship between anxiety and performance is not a simple one. Findings from Harleston (1962) suggest that test anxiety interacts with task difficulty and failure stress (stress related to fear of failure) to impair performance. Hunsley (1985) also found similar results but included the negatively correlated relationship between self-efficacy and test anxiety as a factor in poor test performance. Hunsley (1985) further described state anxiety as the mechanism responsible for poor test performance because of its debilitating effect on information-processing and attentional cognitive processes.

In summation, models of “stage fright,” fear of failure, test anxiety, along with the Yerkes-Dodson model of arousal, suggest that the influence of anxiety on performance is complex. Thus, when examining the effects of anxiety on performance in a population of nonfluent aphasics, it seems prudent to consider state anxiety, fear of failure, perceived difficulty of the task and perceived ability to perform the task when examining the umbrella concept of “anxiety” and its impact on naming performance.

As explained in more detail below, the proposed model for the present study considers state anxiety (or general anxiety) separate from fear of failure, test and performance anxiety in nonfluent aphasics, with the former directly or indirectly influencing the latter.

Self-Perception

Self-Efficacy

There is no literature examining the relationship between self-efficacy and stroke. The best literature for purposes of building self-efficacy into the self-perception component of the model described below is found in social cognitive theory.

Self-efficacy, according to social cognitive theory, is not strictly derived from ability;

rather it is a person's perception of how capable they are in using their skills (Bandura, 1989; Bandura, 1997). Bandura (1989) further explained that self-efficacy beliefs affect cognitive functioning through the joint influence of motivational and information-processing operations, such that the stronger a person's beliefs in their capabilities, the greater and more persistent is the effort they expend. Self-efficacy is not necessarily consistent across situations and abilities. It is possible for a person to maintain higher self-efficacy beliefs for one task and lower beliefs for another. People with high self-efficacy beliefs will persist at a task regardless of level of difficulty. They will attribute failure to a lack of appropriate effort, rather than a lack of ability (Bandura, 1989; Bandura, 1997). In contrast, people with low self-efficacy beliefs tend to avoid, or prematurely give up during difficult tasks, and attribute failure to a lack of ability (Bandura, 1989; Bandura, 1997). People with low self-efficacy beliefs will often settle for mediocre solutions, whereas people with strong beliefs in their capabilities will put forth great effort to master a challenge (Bandura, 1989). Self-efficacy beliefs are especially relevant in a person's cognitive performance. Cognitive tasks that are performed successfully, but are relatively easy, do not affect either high or low self-efficacy beliefs (Bandura, 1989; Bandura, 1997). However, should one fail a cognitive task believed to be relatively easy, a high belief person is not typically detrimentally affected, however a low-belief person experiences an overwhelming sense of failure (Bandura, 1989; Bandura, 1997). In contrast, when a difficult cognitive task is successfully performed by a high belief person, a sense of mastery and accomplishment as well as thoughts of continuing with even more difficult tasks, are experienced (Bandura, 1989; Bandura, 1997). However, even when a difficult task is successfully

performed by a low belief person, their sense of efficacy is unchanged and they find it difficult to muster the stamina to pursue other difficult cognitive tasks and will subsequently make mediocre attempts at tasks, if they try at all (Bandura, 1989; Bandura, 1997).

A person's attitude towards a task is also largely influenced by their self-efficacy beliefs. People's beliefs in their capabilities affect how much stress they experience in threatening or taxing situations, as well as their level of motivation to persevere through the situation (Bandura, 1989). People who believe that they can exercise control over potential threats are not easily thwarted by them, and do not tend to conjure up apprehensive cognitions that perturb them, but, people who believe that they cannot manage potential threats tend to experience high levels of stress and anxiety (Bandura, 1989). Consequently, self-efficacy is included as a component of self-perception proposed to modulate the effect of anxiety on task performance in the model described below.

Fear of Failure, Social Desirability and Need for Achievement

It is important to include fear of failure, social desirability and need for achievement in the present model since these components have been included in other models of anxiety and self-perception. These components have not been evaluated in stroke patients in the literature. Consequently, these components were built into the present model based on their inclusion in models of anxiety and self-perception in non-stroke populations, specifically found in rehabilitation literature.

Rehabilitation patients appear to experience a general fear of negative emotions (Plehn et al., 1998). Of negative emotions that patients experience, fear of failure appears to be

prominent. Thus, patient motivation for success and motivation to avoid failure must be considered. Tseng (1972a) suggested that motivation to approach success and motivation to avoid failure are independent and represent different psychological constructs. Tseng (1972b) further suggested that stemming from an individual's need for achievement, self-perception of reality constitutes a more powerful determinant of an individual's evaluation of his or her own personal attributes and work behaviors. When an individual's self-perception of reality suggests that they are no longer capable of functions that they had previously viewed themselves as competent and accomplished at, then their perceived reality may be that they can no longer accomplish goals, or be viewed as successful. Thus, perceived reality may have deleterious effects on views of social effectiveness. The self-perception described above appears relevant to the stroke population, therefore it is included in the present model. However, as suggested by Tseng (1972b), employability, or in the present model, social effectiveness, can be increased if the gap between the individual's perception of reality and objective-reality is bridged. This can be accomplished by intermittent periods of self-reevaluation in order to achieve a high correlation between perception of reality and objective-reality (Tseng, 1972b), subsequently increasing both self-esteem and social effectiveness. Tseng's findings seem invaluable to the rehabilitation community as a model for improving self-esteem in the population of interest in this study. If all aspects of functioning, both preserved and impaired, are periodically re-evaluated, then the brain damaged patient may be able to more closely correlate their self-perception of their abilities and their actual abilities. Since the members of the population of interest in this study do not suffer from

anosagnosia, or lack of deficit awareness, it is likely that Tseng's model of self-reevaluation may be helpful to them.

This study examines the impact of these variables on object naming in patients with chronic nonfluent aphasia following left hemisphere ischemic cerebral vascular accidents. The model shown below in Figure 1-1 will be explored. Prior to exploring this model more fully, a review of the current rehabilitation literature is relevant.

Implications for Rehabilitative Efforts

Typically, rehabilitation literature has focused on treatment design and efficacy of rehabilitative treatments without an obvious appreciation of the impact of more psychologically relevant variables on recovery. The goals of these treatments, and the associated research, have been to help injured patients recover lost or impaired function, or if complete recovery is not possible, to maximize the functional abilities of the individual. Thus, in the past, the focus of rehabilitation literature has been on the physical and/or cognitive deficit of the individual. However, over the past twenty years, rehabilitation literature has begun including another component of injury as a focal point. Studies examining the psychological effects of traumatic injury and chronic disease have captured the attention of rehabilitation patients and their families, and also that of rehabilitation professionals.

As noted above, cognitive performance in brain-damaged populations seems to be affected in an exponentially detrimental manner as perceived and actual ability have diminished, and tasks that were once easily mastered require more effort for even minimal success, and are often times failed, regardless of effort. Thus, it is probable that anxiety increases in these patients, and as it does, attention becomes more internally

focused thereby, further depleting resources available for the cognitive task, and thus, performance further decreases. This is likely to be especially severe in patients with limited resources, such as those in the brain-damaged populations.

It appears that an important component to include in treatment of cognitive deficits would be the inclusion of an expected success task (i.e. a task that the patient is expected to perform well). Cognitive rehabilitation, as described in the rehabilitation literature, is designed to focus on retraining, substituting, and compensating for impaired functions. Thus, the focus of cognitive rehabilitation is on what the patient can no longer do. Moreover, the patient is asked to complete a task they are expected to perform poorly at in order for rehabilitation to occur, which would seem to promote increased anxiety and negative self-perception. It seems that if an expected success task is included in the assessment and treatment sessions, then the patient's self-perception may not be as negatively affected and the patient may not experience as dramatic an increase in anxiety. Subsequently, inclusion of an expected success task prior to initiation of treatment might facilitate less inward focused attention, thereby, freeing-up limited attentional processing resources to perform the cognitive task. One example of an expected success task is "errorless learning." "Errorless learning," or providing the correct answer to a patient before the patient responds to the task, is a Hebbian associative learning concept not based in psychosocial reaction. However, "errorless learning" appears to have psychosocial applications and would suffice as an expected success task since it is likely to free-up attentional processing resources.

Self-enhancement and self-consistency theory also appear to support the inclusion of an expected success task as part of the rehabilitative strategy. Self-enhancement theory

assumes that there is a general need to increase a person's feelings of self-satisfaction and worth (Wells & Sweeney, 1986). This need is believed to manifest in a variety of reactions to everyday experiences, including cognitive processes, affective reactions and behavioral processes (Wells & Sweeney, 1986). Self-consistency theory assumes that maintaining consistency is the chief motivator of cognitions, affect and behavior (Wells & Sweeney, 1986). This theory suggests that individuals attempt to avoid inconsistency with their self-image because it is psychologically uncomfortable; thus, self-assessments should be consistent with self-esteem. Self-enhancement effects seem to operate when considering reactions to performance evaluations, especially affective reactions (Wells & Sweeney, 1986). Stability of self-esteem is an important determinant of self-enhancement (Wells & Sweeney, 1986). Stability refers to the degree to which self-esteem is constant and characteristic across attributes, occasions and situations (Wells & Sweeney, 1986). Instability is believed to increase the need for self-esteem and to prompt attempts towards self-enhancement (Wells & Sweeney, 1986). Each of these theories offers unique contributions to the understanding of motivational processes behind human behavior. However, only self-consistency theory has gained significant support. Findings from self-consistency literature appear to suggest that including a task that patients are expected to perform well at, as part of rehabilitative assessment and/or intervention, is likely to promote increased self-satisfaction and self-worth, as well as to maintain self-consistency.

An advantage of modifying existing cognitive assessment and treatment tasks by including an expected success task would be an increased likelihood of decreasing performance anxiety and increasing self-esteem. As noted above, by decreasing anxiety

the expected success task would also likely free-up attentional resources and facilitate increased performance on the task. The disadvantage to including another task into already lengthy cognitive assessment and treatment batteries is the potential for patient fatigue and a potential decrease in performance attributable to fatigue effects. However, frequent testing and treatment breaks would seem to decrease the possibility of fatigue.

It seems appropriate to include Vygotsky's work in "zone of proximal development" (ZPD) because of the potential impact of this concept and its applicability to cognitive rehabilitation patients. The "zone of proximal development" comes from developmental literature and is defined as "the distance between the actual developmental level as determined by independent problem solving and the level of potential problem solving as determined through problem solving under adult guidance or in collaboration with *more able peers*" (p. 86, Vygotsky, 1978, as found in Fernandez et al., 2001). "Scaffolding," which refers to supportive behaviors by which an expert can help a novice achieve higher levels of knowledge, also became associated with ZPD and was introduced by Vygotsky and Luria (Fernandez et al., 2001; and Guerrero & Villamil, 2000). Fernandez et al., (2001) found that the child's peers could be just as influential in higher achievement as a teacher or parent. The "ZPD" and "scaffolding" are seemingly important concepts of development that appear relevant to rehabilitation efforts. The ZPD for the stroke survivor could be redefined as the distance between post-damage functioning and pre-morbid functioning and/or maximum functionality that is mediated by a "more abled peer" (i.e. another stroke survivor). Scaffolding could also be applied as a tool for higher achievement in rehabilitation. The concept of scaffolding suggests that other rehabilitation patients may be just as influential in assisting stroke survivors with

reaching rehabilitation goals as rehabilitation therapists.

In sum, as patients move from acute stages of brain damage where the focus is on survival, towards post-injury recovery, the focus changes toward coping with this change in functioning. As rehabilitative efforts commence, the patient's self-perception of their capabilities and their place in their environment appears in flux as they are forced to examine their functional limitations in daily physical, occupational, speech, and/or cognitive rehabilitation. While the patient's strengths are utilized to assist therapeutic efforts to rehabilitate their weaknesses, the focus of therapy remains on the weaknesses. Subsequently, patients are not often afforded the opportunity to demonstrate their preserved mastery of tasks, limited though they may be. This, in combination with a possible fear of failure, fear of future physical and emotional pain, as well as the patient's new role as a passive recipient of treatment at the hands of others, may contribute to the experience of anxiety; in particular, social and performance anxiety. The proposed study attempts to address self-perception and the experience of performance anxiety in one patient population of stroke survivors.

The research questions of interest are 1) do stroke survivors with nonfluent aphasia experience an increase in anxiety, particularly performance anxiety, when faced with an object naming task that they perceive to be very difficult? 2) If an increase in performance anxiety occurs, does it negatively impact ability to name objects in patients with nonfluent aphasia? 3) Does performance anxiety impact self-perception, and consequently, actual performance on an object-naming task? These questions will be addressed by the study described below. One aim of this study is to determine if stroke survivors with nonfluent aphasia experience anxiety when faced with an object-naming

task, and report greater anxiety when the naming task is perceived as being difficult. The other aim of this study is to determine if anxiety influences self-perception, which in turn affects actual object-naming task performance in stroke survivors with nonfluent aphasia.

A model based on the above considerations is illustrated in Figure 1-1 and is proposed to guide hypotheses for the current study. The model begins with two anxiety variables:

1) state anxiety and 2) naming specific performance anxiety for nonfluent aphasic patients. The anxiety variables are proposed to influence the modulating variable of performance expectation and self-perception of performance. This part of the model proposes that this variable is influenced by both general state anxiety as well as performance anxiety about the upcoming naming task. It is then proposed that the nonfluent aphasic patient's self-perception of their ability to perform successfully on the object-naming task influences their actual performance. However, self-perception is manipulated by inducing perceptions about task difficulty (i.e. "easy" or "hard").

Therefore, although self-perception is a modulating variable, the model proposes that this variable can be successfully manipulated thereby affecting actual task performance. The dependent variable is referred to as actual performance on an experimental object-naming task. This model is illustrated below in Figure 1-1.

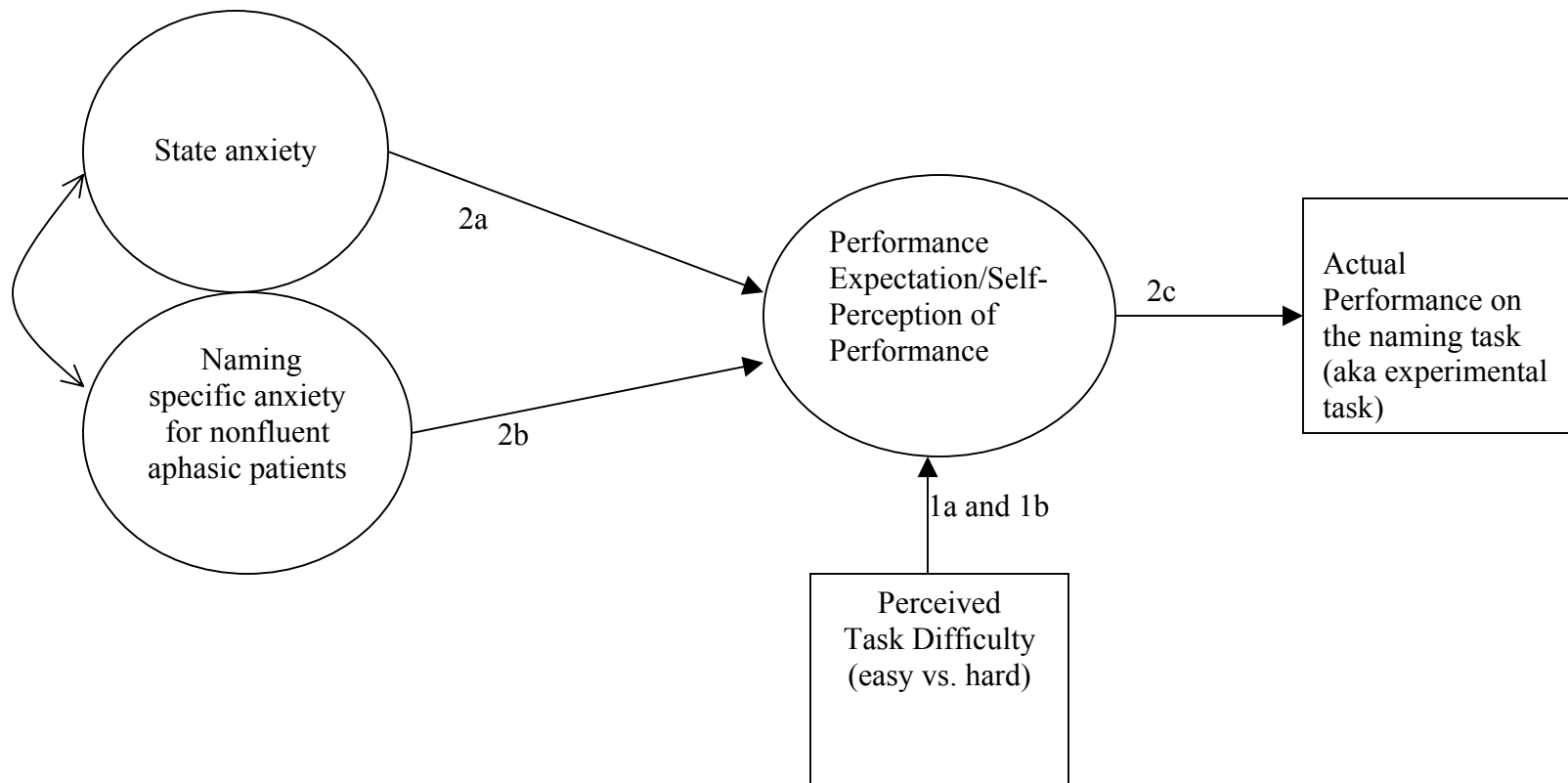


Figure 1-1. Model of influence of anxiety and self-perception on actual performance.

To address these issues, the study (outlined below) will speak to the aforementioned issues of performance anxiety, self-perception, and actual performance on the experimental object-naming task. This study used paper-and-pencil measures to assess baseline levels of anxiety and self-perception, as well as anxiety and self-perception before and after the experimental object-naming task. The object-naming task described in detail below consists of three lists of objects (two 60-item lists and one 5-item practice list; see Appendix C). This was a stratified random sample. Participants at the beginning of the study were initially randomized, whereas participants enrolled later in the study were assigned in order to control for confrontation naming abilities and gender, to one of two conditions: a condition in which the task is perceived as “hard,” and a condition in which the task is perceived as “easy.” Participants completed a baseline object-naming task using one of the 60-item object lists. During this baseline task, all participants were instructed to name the objects aloud. The lists for both conditions were identical, however participants in the “hard” condition were told that the items they were going to name would be “very difficult to name.” A practice list of 5-items depicting objects that were not common, or “low frequency” items, was used to induce the “hard” task. In contrast, participants in the “easy” condition were told that the items they were going to name would be “very easy to name.” A practice list of 5-items depicting very common objects, or “high frequency” items, was used to induce the “easy” task. Following the induction tasks, participants were told that the objects in the next task, the 60-item experimental naming task, would be of the same level of difficulty as those they had just seen in the practice task.

CHAPTER 2 HYPOTHESES

As noted earlier, there have been no studies examining the impact of self-perception and performance anxiety on cognitive task performance following stroke. It follows that implications of these components in stroke rehabilitation have not been examined in research literature. Available research in this area focuses on rehabilitative interventions that target the problem behavior without adequately addressing associated psychological milieu including expectation of performance and anxiety level.

The proposed model (Figure 2-1) attempts to address the psychosocial effects of chronic nonfluent aphasia on object-naming tasks. The model begins with a general baseline level of state anxiety. After level of difficulty has been induced for the experimental task (i.e. “easy” or “hard” 60-item object-naming task), a level of performance anxiety is obtained from measures described below. According to the proposed model, general state anxiety and performance anxiety will influence the participant’s self-perception. Self-perception is proposed as a modulating variable in the model, such that positive and negative self-perception will impact actual performance on the experimental object-naming task. The final component, perceived task difficulty (“easy” or “hard”), is also expected to influence the modulating variable of self-perception.

Hypothesis 1

It is proposed that perceived level of object-naming task difficulty (“easy” or “hard”), as measured by participant difficulty ratings, will impact the performance of patients with

aphasia in the following ways: A) Participants will perform the same or better on the experimental object-naming task perceived as being “easy,” compared to their performance on the baseline object-naming task, B) Participants will be particularly negatively affected by the perceived level of difficulty on the experimental object-naming task perceived as being “hard,” and will perform worse on this task than they performed on the baseline object-naming task.

Hypothesis 2

By definition, patients with aphasia will experience difficulties with accuracy on language tasks. It is believed that anxiety and expectation of performance will impact the actual performance of patients with aphasia on a naming task. Given this hypothesis, the following outcomes are expected: A) Participants who rate themselves as being more anxious following the level of difficulty induction practice task will expect their performance to be worse on the experimental object-naming task than patients who rate themselves as less anxious, B) Participants with more severe aphasia (as measured by Western Aphasia Battery Aphasia Quotient and Boston Naming Test scores) will expect their performance, as measured by pre-experimental object-naming task self-perception of expected performance ratings, to be worse than that of patients with less severe aphasia irrespective of actual experimental object-naming performance, C) Participants who expect their performance to be worse, as measured by pre-experimental object-naming task self-perception of expected performance ratings, will actually perform worse on the experimental object-naming task than those who do not expect their performance to be as poor.

The measures associated with each variable have been superimposed on the model and are depicted below in Figure 2-1.

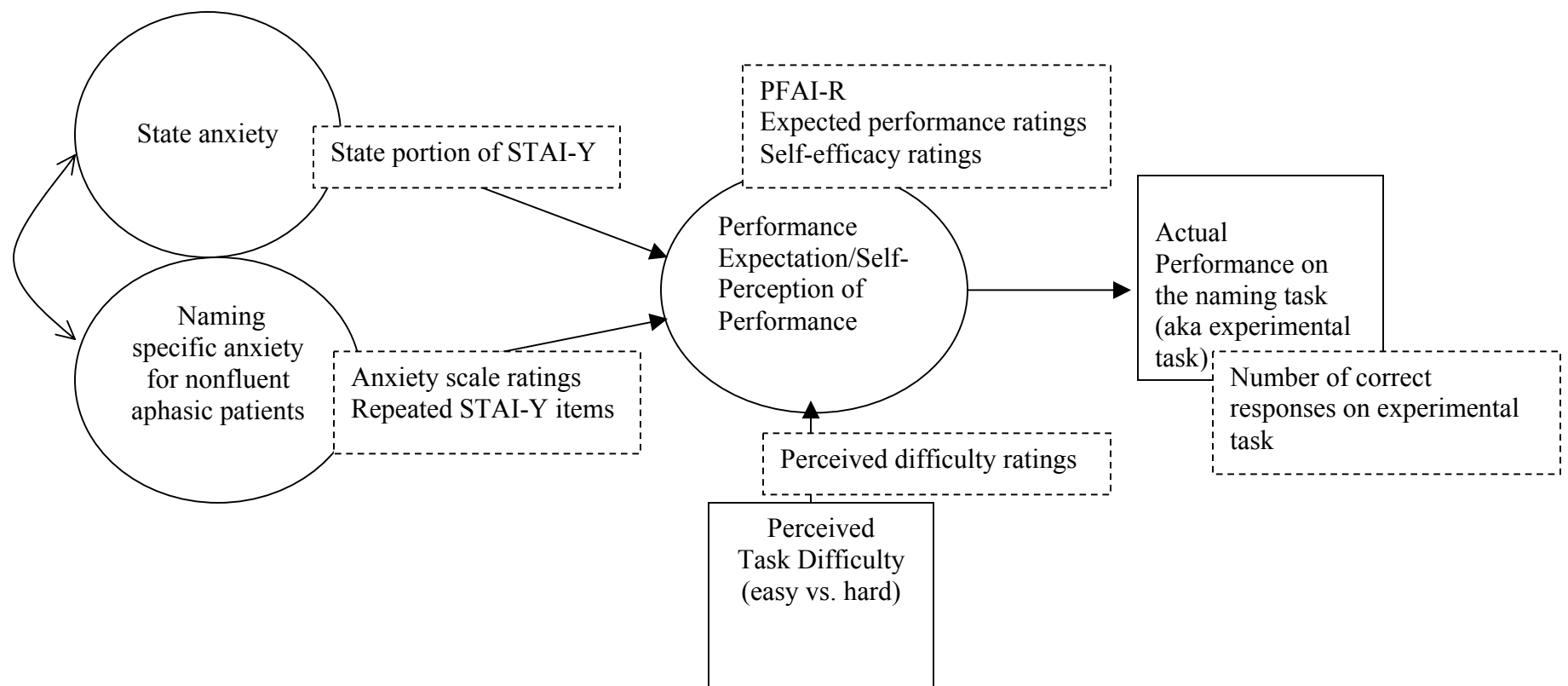


Figure 2-1. Model of influence of anxiety and self-perception on actual performance with associated measures.

CHAPTER 3 METHOD

Participants

Twenty-one chronic (six or more months post stroke) nonfluent aphasic patients (12 men, 9 women) with left-hemisphere middle cerebral artery ischemic cerebral vascular accidents (CVAs) completed this study (see Table 3-1). Participants were recruited from the Brain Rehabilitation Research Center of Excellence (BRRC) at the Malcom Randall Veterans Affairs Medical Center in Gainesville, Florida. All participants received object-naming and performance rating tasks.

All participants met the following inclusion criteria: documented left hemisphere middle cerebral artery (MCA) ischemic cerebral vascular accident (CVA), nonfluent aphasia with Western Aphasia Battery (WAB) Aphasia Quotient (Kertesz & Poole, 1974; WAB AQ) ≥ 60 , no greater than mild comprehension deficit scores as measured by the comprehension component of the WAB (comprehension greater than raw score of 160), premorbidly right-handed, English as a first language, and ≥ 18 years old. Participants were excluded if they met any of the following exclusion criteria: premorbid diagnosis of a learning disability, diagnosis of psychiatric disorder or previous psychiatric hospitalization, seizures or fainting spells not associated with stroke, history of right hemisphere damage and neurologic disorder other than stroke.

Table 3-1. Participant demographics by group (mean and standard deviation)

Group	Age	Education	Gender M:F	Mo. Post- stroke	WAB AQ %	BNT of 60
Easy N = 10	63.2 y +/- 7.4	13.8y +/- 2.4	5M:5F	81.3 mo +/- 36.9	80.3% +/- 5.9	42.1 +/- 10.6
Hard N = 11	70.7 y +/-12.3	13.9y +/- 2.4	7M:4F	65 mo +/- 35.3	78.2% +/- 7.2	40.2 +/- 11.3

The goal of this study to test the proposed model is to better understand the influence of psychosocial variables associated with chronic nonfluent aphasia. Since there is no previous literature examining the effects of performance anxiety and self-perception on object-naming in this population, the proposed model was developed based on literature in these areas in non-stroke populations. Understanding the influence of the psychosocial variables studied here may facilitate a better appreciation of these variables in rehabilitative efforts.

Procedure

The following tasks and procedures were administered after obtaining written informed consent from study participants.

Screening tasks

All participants were screened for inclusion and exclusion criteria. Two participants completed the Western Aphasia Battery (WAB) and the Boston Naming Test (BNT) prior to recruitment for this study as part of the IRB approved BRRC screening protocol (#457-1999). For the remaining nineteen participants, the WAB and BNT were administered during the same BRRC screening protocol, but were obtained more than 4 weeks prior to recruitment for the present study. Therefore, the WAB and BNT were readministered

during screening for this study. Participants scoring below the natural median split of 43 on the BNT were considered to be “low functioning.” Participants scoring 43 or greater on the BNT were considered to be “high functioning.” Screening tasks also included procedures to assess for exclusion criteria such as a history of psychiatric disorder and neurologic dysfunction other than stroke.

Study Tasks

Study tasks are outlined below in Figure 3-1 and are explained in detail below.

Object-naming tasks

All participants were administered three object-naming tasks. The first object-naming task consisted of 60-items and is referred to as the baseline naming task. The only direction that participants were provided for this task was to name the depicted items aloud as quickly as possible. The second object-naming task consisted of five items and is referred to as the practice task. Instructions and items for the practice task differed by group. This is explained in greater detail below. The last object-naming task is referred to as the experimental object-naming task. This task consisted of 60-items.

In sum, the object-naming tasks consisted of 130 line drawings of real objects divided into two sets of 60 items each (Set 1 and Set 2), balanced for frequency of occurrence in the English Language, and an additional five “easy” and five “hard” practice items. Item frequencies were obtained from Francis and Kucera’s “Frequency Analysis of the English Language” (Francis & Kucera, 1982). Item drawings were selected from a pool of drawings and only items that had a frequency of occurrence in the English language as measured by Francis and Kucera (1982) were included. Two-thirds of the items selected were considered “low frequency” items. These items had a frequency rating of 1-3 occurrences per million items. One-third of the items selected were considered “high

frequency” items. These items had a frequency rating of 20-524 occurrences per million. Both Set 1 and Set 2 were equated for item difficulty, so that no set was more difficult than the other (Set 1: total frequency = 1629, average frequency = 27.15; Set 2: total frequency = 1600, average frequency = 26.7). Additionally, participants received one of two practice sets of five items each. One set of practice items consisted of five high frequency items (i.e., easy to name; frequency range = 139-662), and one set consisted of five low frequency objects (i.e. harder to name; frequency range = 1-2). Line drawings were presented via laptop computer using E-Prime™ software. Participants were asked to name items aloud as quickly as they could. Line drawings were presented for a maximum time of 20 seconds. The examiner made a button response following the participant’s verbal response to indicate accuracy of response. The right mouse button was pressed for a correct response and the left mouse button was pressed for an incorrect response.

As noted above, participants enrolled early in the study were randomly assigned to one of two groups, however participants enrolled later in the study were assigned to groups in order to balance for naming ability, as determined by the BNT, and for gender. Thus, participants were randomly assigned to groups with the exception that groups were equated for BNT score and gender. The first group constituted the “High Frequency or Easy” group. Participants in the “High Frequency/Easy” group received a 60- item Baseline task, a five-item “High Frequency/Easy” induction task, and a 60-item experimental naming task. The second group was the “Low Frequency or Hard” group. Participants assigned to this group received a 60-item Baseline task, a five-item “Low Frequency/Hard” induction task, and a 60-item experimental naming task. (see Appendix

C for a list of the 130 objects to be named). Except for the practice tasks, participants in both groups received the same 60-item object-naming tasks. The groups differed only in the types of instructions they received prior to beginning the experimental object-naming task.

The tasks were introduced to the participants as object-naming tasks. The first object-naming task served as the Baseline, or control task, in which participants were only instructed to name the object out loud as quickly as possible.

High frequency “easy” group

Following the Baseline task, participants in the High Frequency group were asked to name items in the five-item “high frequency/ easy” practice set. This task was verbally described to participants as being “easy.” “Easy” objects were defined to the participant as objects the participant was likely to be familiar with and might see everyday. “Easy” practice items were truly easy, high frequency, items to name (i.e. house, bed, door, church, and book). Participants then received the second 60-item experimental object-naming task, and were also told that the set of items was “easy.” In reality, however, it was the same list that the low frequency/ “hard” group received.

Low frequency “hard” group

Participants in the “Low Frequency/Hard” group also received the Baseline task first, and were then asked to name items in the five-item “low frequency/hard” practice set. This practice set was described to participants as being “hard.” “Hard” objects were defined to the participant as objects that the participant did not see everyday, and which the participant was not expected to name quickly. “Hard” practice items were truly difficult, low frequency, items to name (i.e. pitchfork, calculator, plume, pestle, and tine). Finally, the third 60-item experimental object-naming task was presented to participants

and they were asked to name the depicted items. This task was also described to participants as being “hard.” In reality, however, it was the same list that the high frequency/ “easy” group received.

Task Presentation

Naming tasks

Other than the Baseline task, which was simply introduced as a naming task, participants were told the “level of difficulty” prior to beginning each object-naming task in accordance with the group to which they were assigned (i.e. “easy” or “hard”). The order of test administration was always the same: baseline object-naming task, practice set (“easy” or “hard”), and experimental object-naming task (“easy” or “hard” depending on group assignment). However, assignment of 60-item object naming task (Set 1 or Set 2) to either the baseline or experimental object-naming tasks was random and balanced across all participants. All participants received both Set 1 and Set 2. All participants received the same instructions introducing the baseline object-naming task. Participants assigned to the “easy” group received the “easy” practice induction and the identical experimental object-naming items as the other group, although they were told these items were easy. Participants assigned to the “hard” group received the “hard” practice induction and the same experimental object-naming task as the “easy” group. Within the groups, the level of difficulty of the tasks was described with the same emphasis and description across participants. The examiner was videotaped administering the instructions to each participant and the videotapes were rated for consistency across participants, impact of instruction delivery, and persuasiveness that the task would be “easy” or “hard,” by three independent raters. Participants were not videotaped.

Rating tasks

All rating tasks were read aloud to participants by the examiner. Participants had a copy of all measures to look at as the examiner read the items aloud. Participants were instructed to point to their responses where appropriate; and were otherwise asked to indicate “yes” or “no” either verbally, or by shaking their head.

Self-Presentation and Performance Anxiety Measures

All participants were administered the trait and state portions of the State-Trait Anxiety Inventory, Form Y (STAI-Y: Spielberger, 1985). The trait portion of the STAI-Y was administered immediately following informed consent. The state portion of the STAI-Y was administered after participants completed the trait portion. Reliability data for the STAI-Y were based on high school and college student samples. The median reliability coefficients for the t-scores for college and high school students were .765 and .695 respectively (Spielberger, 1985). In addition to the STAI-Y, participants were also administered the Performance Failure Appraisal Inventory- Revised Version (Conroy, Willow, & Metzler, 2002; PFAI-R; see Appendix A) prior to beginning the baseline object-naming task. This 25-item questionnaire asks participants to rate how much they believe in a statement using a five point Likert-type scale (e.g. “When I am not succeeding, I am less valuable than when I succeed,” “When I am failing, I blame my lack of talent”). The PFAI-R was used to examine the feelings of undergraduate students enrolled in a Kinesiology and activities course at a large northern university. No reliability data were provided for this measure. Participants were then informed of the level of difficulty (“easy” or “hard”) of the practice object-naming task. Participants completed the practice task and were told that the experimental object-naming task would be of a similar level of difficulty as the practice task they had just completed. Next,

participants were asked to rate their anxiety about having to perform the upcoming experimental object-naming task on a 0-5 Likert-type scale with the following explanation: 0 = not anxious, 1 = a little bit anxious, 2 = somewhat anxious, 3 = moderately anxious, 4 = a lot anxious, 5 = the worst anxious I could be. Participants were provided with a written scale to facilitate communication of their level of anxiety. The five items from the state portion of the STAI-Y with the greatest factor loadings (as noted in the STAI-Y manual) for state anxiety were administered a second time to reassess state anxiety prior to beginning the “easy” or “hard” tasks (e.g. “I feel upset”, “I feel frightened”, “I feel nervous”, “I am jittery”, “I am worried”).

Self-efficacy was measured using a 0-100% rating scale for the request that participants rate how confident they felt that they could manage the upcoming task. Perceived task difficulty was measured using a 0-5 scale where “0” indicated “not difficult”, “1” indicated “a little bit difficult”, “2” indicated “somewhat difficult”, “3” indicated “difficult”, “4” indicated “very difficult”, and “5” indicated extremely difficult. Finally, participants were asked to rate how well they believed they were going to do on the task using a 0-5 scale where “0” indicated “no performance/will not be able to name any objects”, “1” indicated “poor”, “2” indicated “below average”, “3” indicated “average”, “4” indicated “above average”, and “5” indicated “excellent.” Participants then completed the experimental object-naming task. At the conclusion of this task, participants were asked to rate the actual difficulty of each task. They were also asked to rate their perception of how well they performed on the experimental task using the same performance scale described above. (See Appendix B for task rating scales).

All participants, except one (constant coughing prevented this participant from

comfortably wearing the device), had their heart rate monitored throughout their participation in the study tasks as a physiological measure of anxiety. Heart rate was measured using a Polar Precision Performance™ heart rate monitoring device. This device is used primarily with people who run to keep track of their heart rate. The apparatus consists of a flexible belt worn underneath the clothing. Attached to the belt is a two-inch by one-inch skin electrode monitor (similar to electrodes used in an EKG). The monitor is placed directly over the sternum. The monitor transmits the heart rate to a specially designed watch worn on the participant's left wrist. Heart rate is measured and recorded by the apparatus every five seconds. Heart rate recordings may be downloaded to a computer in a spreadsheet format. Smith, Bradley, and Lang (2005) found that exposure to unpleasant stimuli was associated with increased heart rate and that this relationship was modulated by level of state anxiety. Thus, heart rate results were not given to participants since knowledge of their heart rate could have detrimentally influenced both subsequent performance, as well as subsequent heart rate results. No heart rate data collected as a part of this study warranted concern. However, should there have been heart rates that warranted concern, participants would have been referred to Brenda Stidham RN, MSPH (BRRC Nurse Coordinator) to have their heart rate measured one additional time. Participants would have been given the results and encouraged to take them to their primary care physicians.

Upon completion of all tasks, participants were administered a brief awareness interview to determine their level of insight into their deficit(s). The structure of each individual interview was determined by the individual's presenting deficit(s); however, awareness interview questions were based upon an Awareness Interview as described in

Anderson and Tranel (1989; see Appendix D). For example, a participant with aphasia may also present with mild motor deficits. Consequently, a question directed towards the participant's difficulty in reaching to shake the examiner's hand at the beginning of the session may be appropriate. All questions were phrased such that a "yes/no" response would suffice. Reliability data were not provided for the Awareness Interview in Anderson and Tranel (1989); however, the sample tested consisted of 100 brain-damaged patients. All participants were asked about personal fatigue at the completion of the study. Finally participants were asked a few questions that related to demand characteristics in order to determine whether the expectations of the examiner influenced the participant's performance in any way.

In summary, all participants received the same two 60-item object-naming tasks and different practice sets depending on their group assignment. Prior to beginning the task, participants were administered the STAI-Y and the PFAI-R. Participants were administered the baseline object-naming task and were only provided instruction to name the item aloud as quickly as possible. Participants were then told that the next object-naming task would be easy ("easy" group) or "hard" (hard group). Participants then completed either a very easy, or very difficult, induction practice task. After being told that the experimental object-naming task would be of the same level of difficulty as the practice task they had just completed, each participant was asked to rate his or her level of anxiety, perceived level of task difficulty, and how well he or she believed they would perform on the experimental task. Upon completion of the experimental task, participants were asked to rate the level of the difficulty of the task that they had just completed, in addition to their perception of how well they performed the task. Finally, participants

completed a short awareness interview to determine level of insight into their deficits, as well as a fatigue and demand characteristics interviews. All measures were completed within a single session for each participant.

- Step 1: Informed Consent
- Step 2: Screening for inclusion and exclusion criteria, Western Aphasia Battery*, and Boston Naming Test*
- Step 3: Trait portion of STAI-Y
- Step 4: Participants were told that they would first complete an object-naming task
- Step 5: State portion of STAI-Y (Time 1)
- Step 6: Performance Failure Appraisal Inventory –Revised
- Step 7: Baseline object-naming task⁺
- Step 8: “Easy” or “Hard” practice object-naming task
- Step 9: Rating scales (see Appendix B)
 - 9a. Self-report anxiety (Time 2)
 - 9b. Self-report self-efficacy
 - 9c. Self-report perceived performance
 - 9d. Self-report perceived difficulty
 - 9e. Repeated selected STAI-Y state items (Time 2)
- Step 10: “Easy” or “Hard” object-naming task
- Step 11: Rating Scales repeated
- Step 12: Awareness Interview

⁺Heart rate monitoring began at Step 7 and continued through Step 11

* indicates that if these measures were completed within the past 4 weeks, then they were not repeated here

Figure 3-1. Outline of procedures

CHAPTER 4

ANALYSES AND RESULTS

The model proposed in this study was a preliminary model, designed to examine psychosocial variables in stroke survivors that had never before been examined. As such, we were more lenient with analyses and set-up analyses to maximize sensitivity. All alpha values were set at 0.05. Independent and paired samples t-tests, as well as correlations and hierarchical regression, were used for apriori analyses. T-tests, correlations, and a mixed-model (repeated measures) ANOVA were used for aposteri analyses. Manipulation check analyses also used t-test and correlational analyses. A large number of t-tests were used to examine these data. T-tests were the analyses of choice given the low number of subjects and the desire to maximize sensitivity in evaluation of the proposed model, given that this represents the first foray into this line of inquiry.

It is important to note that prior to the examination of the data in terms of the hypotheses, it was determined that the groups “easy” vs. “hard,” did not differ at baseline on the baseline naming task ($t = 1.386$, $df = 19$, $p = 0.182$) or on any of the PFAI-R scales (shame/embarrassment $t = 1.732$, $df = 19$, $p = 0.09$, devaluing of self-esteem $t = 1.247$, $df = 19$, $p = 0.227$, fear of uncertain future $t = 1.432$, $df = 19$, $p = 0.168$, fear of important others losing interest $t = 1.167$, $df = 19$, $p = 0.258$, fear of upsetting important others $t = 1.982$, $df = 19$, $p = 0.062$, and PFAI-R total composite score $t = 1.780$, $df = 19$, $p = 0.091$). An independent samples t-test revealed that “easy” and “hard” groups were balanced on naming ability and that there was no significant difference between levels of naming ability between groups as measured by the BNT ($t = 0.400$, $df = 19$, $p = 0.694$).

There were also no significant differences between the “easy” and “hard” groups on self-report of initial state anxiety levels (Time 1; $t = 0.165$, $df = 19$, $p = 0.870$). There were no significant differences between low (BNT < 43; $M = 28.9$, $SD = 8.9$) and high (BNT > 43; $M = 29.5$, $SD = 10.1$) functioning participants on initial state anxiety (Time 1; $t = -0.154$, $df = 19$, $p = 0.879$).

Table 4-1. Baseline means and standard deviations by group (“easy” vs. “hard”)

Group	Easy N=10	Hard N = 11
Baseline Object Naming	44.5 +/- 7.4	39.0 +/- 10.3
PFAI-R Shame/embarassment	0.61 +/- 0.23	0.46 +/- 11.3
PFAI-R Devalue self-esteem	0.49 +/- 0.18	0.40 +/- 0.17
PFAI-R fear of uncertain future	0.49 +/- 0.19	0.39 +/- 0.15
PFAI-R fear of important others losing interest	0.59 +/- 0.13	0.51 +/- 0.19
PFAI-R fear of upsetting important others	0.59 +/- 0.23	0.43 +/- 0.16
PFAI-R total composite	70.9 +/- 19.2	56.3 +/- 18.4
Initial State Anxiety	29.6 +/- 10.5	28.9 +/- 8.7

Results indicate that there was a significant difference between participants in the “easy” and “hard” groups for rating of pre-performance perceived task difficulty ($t = -5.41$, $df = 19$, $p < .001$). The mean task difficulty rating for the “easy” group was $M = 0.9$, $SD = 0.79$. The mean task difficulty rating for the “hard” group was $M = 3.27$, $SD = 1.19$. In sum, these results demonstrate that the “easy” and “hard” inductions were successful. The following results will show that the model was reliably tested.

Hypothesis 1

A paired samples t-test was used to examine hypothesis 1a (participants will perform the same or better on the experimental object-naming task perceived as being “easy,” compared to their performance on the baseline object-naming task) and 1b (participants will be particularly negatively affected by the perceived level of difficulty on the experimental object-naming task perceived as being “hard,” and will perform worse on this task than they performed on the baseline object-naming task). Change in performance was determined by subtracting baseline performance from naming performance for both the “easy” and “hard” groups. Descriptive statistics were determined for both groups. For the “easy” group ($N = 10$), the average change in naming accuracy between the baseline and “easy” experimental conditions was negative ($M = -1.9$, $SD = 4.56$), indicating that participants in the “easy” group performed worse on the experimental naming task than on the baseline task. For the “hard” group ($N = 11$), the average change in naming accuracy between baseline and “hard” experimental conditions was also negative ($M = -0.55$, $SD = 4.59$). An independent samples t-test was used to compare overall change between group performances from baseline to experimental tasks ($t = -0.68$, $df = 19$, $p = 0.51$). These results indicated that the groups did not significantly differ from each other in their change from baseline. T-tests were used to further examine the data. Baseline naming performance (i.e. number correct out of 60) was compared to experimental naming performance (i.e. number correct out of 60). Both groups showed that there were no significant within group differences between baseline and experimental naming performance: “easy” group ($t = -1.318$, $df = 9$, $p > 0.05$) and “hard” group ($t = -0.394$, $df = 10$, $p > 0.05$). Thus, hypotheses 1a and 1b were not confirmed.

Further examination of the model revealed that the “easy” and “hard” groups differed significantly on some self-report scales, but not others (see Table 4-3). There was no significant difference between the “easy” and “hard” groups following their respective inductions on anxiety rating ($t = -1.462$, $df = 19$, $p = 0.160$). Participants in the “hard” group rated themselves as significantly lower in self-efficacy than participants in the “easy” group ($t = 2.822$, $df = 19$, $p = 0.011$). Participants in the “hard” group rated their pre-performance perceived difficulty of the “hard” task as significantly more difficult than participants in the “easy” group rated the perceived difficulty of the “easy” task ($t = -5.419$, $df = 19$, $p < 0.01$). Participants in the “hard” group rated their perceived self-perception of how well they would perform on the “hard” task as performing significantly lower than participants in the “easy” group ($t = 5.318$, $df = 19$, $p < 0.01$). There was no significant difference between the “easy” and “hard” groups on experimental task performance ($t = 0.820$, $df = 19$, $p = 0.422$).

Hypothesis 2

Correlational analyses were used to examine hypothesis 2a (participants who rate themselves as being more anxious following the level of difficulty induction practice task will expect their performance to be worse on the experimental object-naming task than patients who rate themselves as less anxious). A total state anxiety (Time 2) score was computed by adding self-report anxiety ratings to responses on the repeated STAI-state items (Time 2, following the practice induction). The correlation between total state anxiety (Time 2) and participant pre-performance expectation rating was significant ($r = -.490$, $p = .024$). This finding suggests that as ratings of anxiety at Time 2 increase, participants predict that they will perform more poorly on the experimental object-naming task. These findings support hypothesis 2a.

Paired sample t-tests were used to further evaluate within group change in state anxiety from Time 1 to Time 2. For participants in the “easy” group, paired samples t-tests revealed no significant changes in state anxiety from Time 1 to Time 2 ($t = 0.19$, $df = 9$, $p = 0.85$). However, for participants in the “hard” group, paired sample t-tests revealed a statistically significant change in state anxiety from Time 1 to Time 2 (Mean change = 1.64, $SD = 2.06$, $t = -2.631$, $df = 10$, $p = .025$). From the first administration of the 5 state items prior to the baseline naming task (Time 1), to the second administration after the “hard” instructions were given and the “hard” practice trial was completed (Time 2), participants in this group rated their state anxiety as significantly higher.

It is important to note that the “easy” and “hard” groups did not differ significantly on either the 20-item state portion of the STAI-Y (Time 1) or the 5-item state portion of the STAI- Y at Time 1. T-tests found $t = 0.165$, $df = 19$, $p = .870$ for the 20-item state portion, and $t = 1.19$, $df = 19$, $p = .248$ for the 5-item state portion, both at Time 1.

An independent samples t-test was used to examine hypothesis 2b (participants with more severe aphasia (as measured by WAB AQ and BNT scores) will expect their performance, as measured by pre-experimental object-naming task self-perception of expected performance ratings, to be worse than that of patients with less severe aphasia irrespective of actual experimental object-naming performance). BNT scores were transformed to percentages and then added to WAB AQ percent scores in order to create a “severity” of aphasia score. Higher scores indicate better functioning. The natural median split (BNT + WAB AQ = 150) in severity scores was used to determine the “low functioning” (BNT + WAB AQ \leq 150) or severe aphasic group, and the “high functioning” (BNT + WAB AQ $>$ 150) or mild/moderate aphasic group. Analyses for

severity indicated that there were no significant differences between expectation of performance for the low and high functioning participants ($t = 0.087$, $df = 19$, $p = 0.932$). Consequently, hypothesis 2b was not supported. Severity of aphasia did not predict participant expectation of performance on the experimental object-naming task.

Correlational analyses were used to examine hypothesis 2c (participants who expect their performance to be worse, as measured by pre-experimental object-naming task self-perception of expected performance ratings, will actually perform worse on the experimental object-naming task than those who do not expect their performance to be as poor). Results indicate that self-perception of performance does not correlate well with decreased performance on the experimental object-naming task ($r = 0.152$, $p = 0.511$).

Hierarchical regression was used to further examine the data entered into the model. Variables were entered into the regression in the following order 1) pre self-perception performance rating, 2) pre- experimental task anxiety rating, and 3) practice group (“easy” vs. “hard”). The dependent variable was the number of correct responses on the experimental task. Hierarchical regression revealed that pre-experimental task (“easy” or “hard”) anxiety rating accounted for a significant amount of variance in actual performance ($F(1, 18) = 5.179$; $p = .035$). Results indicate that pre-test self-perception ratings accounted for only 2.3% ($R^2 = .023$, $\beta = -0.194$) of the variance in correct responding to the experimental task. However, when pre-anxiety ratings were added into the model with pre self-perception, an additional 21.8% of the variance was accounted for, totaling 24.1% of the variance ($R^2 = .241$, $\beta = -0.514$) of the dependent variable. When group membership is added into the model, only an additional 1.2% of variance is accounted for ($R^2 = .253$, $\beta = -0.171$). Total variance accounted for by the present model

is 25.3%. The interaction term between anxiety and self-perception is also important to note. The interaction term is not significant, but shows a trend that would likely become significant if the sample size was increased ($F(2, 18) = 2.864, p = 0.083$). In reference to the hypothesized model, it appears that anxiety and not self-perception of expected performance may modulate actual performance on the experimental task.

Post Hoc Analyses

After completing the analyses associated with the hypotheses, it was clear that the initial hypotheses were not specific enough. A considerable amount of data was obtained during the course of this study and testing of the model. It became clear that there were analyses to be done post hoc to further test the model. These analyses and results are presented here. The first post-hoc group of analyses presented here investigates group differences on measures of self-perception that were not included in the hypotheses, but were believed to be valuable additional tests of the model. The second group of analyses serves as manipulation checks for different variables included in the model.

Group Differences

A comparison of self-efficacy ratings, measured after the practice induction and prior to completion of the experimental task, between the “easy” and “hard” groups was performed. There was a significant group effect for self-efficacy. Participants assigned to the “easy” group rated their self-efficacy as significantly higher ($M = 0.85, SD = 0.17$) than participants assigned to the “hard” group ($M = 0.64, SD = 0.17; t = 2.82, df = 19, p = .011$). When groups were collapsed and examined using level of functioning (based on BNT scores), there was no significant difference between level of functioning and self-efficacy rating.

The 60-item experimental naming set was divided into four 15-item quarters. A mixed-model ANOVA was used to examine the change from baseline naming in percent accuracy across each quarter. Results indicate a main effect of quarter ($F(3, 17) = 3.411$, $p = .023$). Follow-up testing revealed that there was a significant difference of change in percent accuracy between the third and fourth quarters. There was no significant between-groups interaction. These findings indicate that the change from baseline in percent accuracy on experimental naming task was not equally distributed across each of the quarters.

Correlational analyses suggest that the Performance Failure Appraisal Inventory-Revised (PFAI-R) appears useful in understanding changes in self-perception of language performance experienced by participants with aphasia. All five subscales of the PFAI-R correlated well with each other and the instrument maintained internal consistency with this population (See Table 4-6). Correlational analyses were performed to examine the relationship between level of functioning (based on BNT score) and feelings of failure. This was based on the post hoc hypothesis that participants with lower confrontation naming abilities might endorse less intense feelings of failure regarding language performance. However, as shown in Table 4-7, there were no correlations between the PFAI-R and level of functioning (based on BNT scores). These findings suggest that there is no relationship between level of functioning and feelings of failure. Perhaps feelings of failure exist regardless of level of functioning.

Anxiety was further examined by comparing participants whose anxiety ratings increased the most from Time 1 to Time 2 to participants whose anxiety increased the least from Time 1 to Time 2 on overall accuracy on the experimental naming task. An

independent samples t-test revealed that there was no difference between the two groups on experimental naming performance despite the reported increase in anxiety from Time 1 to Time 2 for one group ($t = 0.014$, $df = 13$, $p = 0.989$).

Correlational analyses were used to examine the relationship between pre-experimental task ratings of perceived difficulty, expected performance ratings based on perceived level of difficulty, and post-experimental task performance ratings of difficulty and actual performance. The first correlational analysis collapsed across groups. Pre-experimental task ratings of perceived difficulty and pre expected performance ratings were significantly negatively correlated ($r = -0.782$, $p < 0.01$). Post-experimental task ratings of difficulty and actual performance were also significantly negatively correlated ($r = -0.713$, $p < 0.01$). These findings suggest that the higher the perceived difficulty of the experimental task, the worse participants expected to perform. The interesting finding here though, is that after the experimental task, the higher participants rated the level of difficulty of the task, the worse they believed they had actually performed.

A second hierarchical regression was performed based on findings from the initial hierarchical regression. In the first model, anxiety captured a large amount of the variance. Subsequently, anxiety was entered first into the second model because to examine whether it captures more variance than when entered into the model after self-perception. Variables were entered into the regression in the following order 1) pre-experimental task anxiety rating, 2) pre self-perception performance rating, and 3) practice group (“easy” vs. “hard”). The dependent variable was the number of correct responses on the experimental task. Hierarchical regression revealed that pre-experimental task (“easy” or “hard”) anxiety rating accounted for more variance in actual

performance when entered into the model first ($F(1, 19) = 5.945$; $p = .025$; $R^2 = .238$, $\beta = -0.514$). Results indicate that pre-test self-perception ratings accounted for only 0.3% ($R^2 = .241$, $\beta = -0.194$) of the variance in correct responding to the experimental task. When group membership is added into the model, only an additional 1.2% of variance is accounted for ($R^2 = .253$, $\beta = -0.171$). Total variance accounted for by the revised model remained the same (25.3%). As noted above, it appears that anxiety and not self-perception of expected performance may modulate actual performance on the experimental task. The difference between the two models is illustrated in Table 4-2.

Table 4-2. Comparison of hypothesized and revised models for order

Variable	Self- Perception	Anxiety	Practice Group
Order 1 % r^2	1 2.3	2 21.8	3 1.2
Order 2 % r^2	2 0.3	1 23.8	3 1.2
Beta weights	-.194	-.514	-.171

Manipulation Checks

Correlation analyses were used to examine the internal consistency of the self-report rating scales that were designed specifically for this study. Participant ratings in the “easy” group correlated well amongst one another for the following: pre-anxiety rating and pre-induction perceived difficulty rating, pre-anxiety rating and number correct out of 60 on the experimental naming task, pre-induction perceived difficulty rating and pre-induction self-perception of performance rating, pre-induction perceived difficulty rating and number correct out of 60 on the experimental naming task, and pre-induction self-perception of performance rating and number correct out of 60 on the experimental

naming task (See Table 4-4). There were no significant correlations between ratings of self-report scales for participants in the “hard” group (See Table 4-5).

As a manipulation check, anxiety was also evaluated from a physiological perspective. A heart rate monitor was used to examine the relationship between self-report of change in anxiety level and change in heart rate. It is important to note that on both the baseline and experimental tasks, the lower functioning participants (as measured by BNT score) had significantly higher heart rates than the high functioning participants ($t = 2.34$, $df = 19$, $p = .033$; $t = 2.24$, $df = 19$, $p = .040$, respectively). There were no significant or appreciable changes in heart rate at the individual level, meaning that heart rate was consistent across the baseline and experimental tasks for all individuals. These findings are consistent with findings noted in Laures et al., (2003) which measured blood pressure and cortisol level changes in aphasic participants across baseline and experimental linguistic and nonlinguistic vigilance tasks. Laures et al., (2003) found no significant or appreciable changes in blood pressure or cortisol level in individual participants.

Two independent samples t-tests were used to examine awareness of deficits at different levels of functioning. The first independent samples t-test found no significant differences between level of functioning (as measured by BNT scores alone) and awareness of deficits ($t = 0.432$, $df = 19$, $p = 0.671$). The second independent samples t-test also found no significant differences between level of functioning (as measured by severity of aphasia score) and awareness of deficits ($t = 1.304$, $df = 19$, $p = 0.208$). These results suggest that severity of aphasia is not related to level of deficit awareness. Also, though participants stated that they were slightly fatigued at the conclusion of their participation, all participants qualitatively reported that their fatigue was no different than

their normal everyday fatigue. Consequently, according to participant report participant fatigue does not appear to be a confound in this study.

Reliability of Instructions Across Participants

Three raters (CI, AH, LS) volunteered to rate tapes of the investigator providing task descriptions and instructions to each of the participants. Using 6-point Likert-type scales, the investigator was rated for conveyance of how difficult the upcoming task would be, how believable the investigator's task description was, and how convinced the raters were that the task was easy or hard. Inter-rater reliability was excellent for conveyance of task difficulty across raters. Raters two and three showed significant inter-rater reliability for believability and how convinced they were that the task would be easy or hard. The first rater's ratings did not correlate as well with raters two and three for these scales (See Table 4-8).

A series of independent samples t-tests were performed to evaluate ratings of level of perceived difficulty based on examiner instructions for the "easy" group and the "hard" group. Ratings of level of difficulty by group were significant for each rater. For rater 1, average rating for tapes of perceived "easy" tasks indicated that the task was not difficult ($M = 0.00$, $SD = 0.00$). Average ratings for tapes of perceived "hard" tasks indicated that the task was difficult ($M = 3.91$, $SD = 0.30$). The difference between perceived level of difficulty for the two groups was significant ($t = -40.90$, $df = 19$, $p < 0.01$). For rater 2, average rating for tapes of perceived "easy" tasks indicated that the task was a little bit difficult ($M = 1.00$, $SD = 0.32$). Average ratings for tapes of perceived "hard" tasks indicated that the task was very difficult ($M = 4.27$, $SD = 0.65$). The difference between perceived level of difficulty for the two groups was significant ($t = -18.47$, $df = 19$, $p < 0.01$). For rater 3, average rating for tapes of perceived "easy" tasks indicated that the

task was not difficult ($M = 0.00$, $SD = 0.00$). Average ratings for tapes of perceived “hard” tasks indicated that the task was very difficult ($M = 4.64$, $SD = 0.50$). The difference between perceived level of difficulty for the two groups was significant ($t = -28.99$, $df = 19$, $p < 0.01$).

A series of independent samples t-tests were performed to evaluate ratings of believability of instructions based on examiner instructions for the “easy” group and the “hard” group. Ratings of believability by group were mixed. For rater 1, average rating for tapes of perceived “easy” tasks indicated that the instructions were believable ($M = 3.6$, $SD = 0.52$). Average ratings for tapes of perceived “hard” tasks indicated that the instructions were similarly believable ($M = 3.73$, $SD = 0.65$). The difference between believability for the two groups was not significant ($t = -0.495$, $df = 19$, $p = 0.626$). For rater 2, average rating for tapes of perceived “easy” tasks indicated that the instructions were very believable ($M = 4.90$, $SD = 0.32$). Average ratings for tapes of perceived “hard” tasks indicated that the instructions were very believable ($M = 4.45$, $SD = 0.52$). The difference between believability for the two groups was significant ($t = 2.156$, $df = 19$, $p = 0.045$). It is important to note that rater 2 neglected to rate one participant on believability in the “easy” group. This caused the “easy” group to have only 9 ratings (compared to the N of 10) and the “hard” group to have 11. For rater 3, average rating for tapes of perceived “easy” tasks indicated that the instructions were very believable ($M = 4.80$, $SD = 0.42$). Average ratings for tapes of perceived “hard” tasks indicated that the instructions were believable ($M = 4.82$, $SD = 0.40$). The difference between believability for the two groups was not significant ($t = -0.101$, $df = 19$, $p = 0.921$).

Table 4-3. Performance on test measures for the “easy” and “hard” groups

Easy group (N = 10)

Hard group (N = 11)

	Mean	SD		Mean	SD	t- value	p-value
Pre-anxiety rating	1.3	2.06	Pre-anxiety rating	2.4	1.21	-1.462	0.160
Pre self-efficacy rating (%)	0.85	0.17	Pre self-efficacy rating (%)	0.64	0.17	2.822	0.011*
Pre perceived difficulty rating	0.9	1.19	Pre perceived difficulty rating	3.27	0.79	-5.419	<0.01*
Pre self-perception rating	4.4	0.69	Pre self-perception rating	2.64	0.81	5.318	<0.01*
Experimental task (number correct out of 60)	42.6	10.28	Experimental task (number correct out of 60)	38.45	12.62	0.820	0.422

*Indicates a significant p-value ($p < 0.05$)

Table 4-4 Correlations of rating scales for the “easy” group (N = 10)

	Pre-anxiety rating	Pre self-efficacy rating %	Pre perceived difficulty rating	Pre self-perception performance rating	Experimental task (number correct of 60)
Pre-anxiety rating	$r = 1$	$r = -.093$ $p = .799$	$r = .690^*$ $p = .027$	$r = -.556$ $p = .095$	$r = -.714^*$ $p = .020$
Pre self-efficacy rating		$r = 1$	$r = -.212$ $p = .556$	$r = .545$ $p = .103$	$r = .288$ $p = .420$
Pre perceived difficulty rating			$r = 1$	$r = -.743^*$ $p = .014$	$r = -.844^{**}$ $p = .002$
Pre self-performance rating				$r = 1$	$r = .721^*$ $p = .019$
Experimental task (number correct of 60)					$r = 1$

** Correlation is significant at the 0.01 level (two-tailed)

* Correlation is significant at the 0.05 level (two-tailed)

Table 4-5. Correlations of rating scales for the “hard” group (N = 11)

	Pre-anxiety rating	Pre self-efficacy rating %	Pre perceived difficulty rating	Pre self-perception performance rating	Experimental task (number correct of 60)
Pre-anxiety rating	$r = 1$	$r = .219$ $p = .517$	$r = -.010$ $p = .978$	$r = .047$ $p = .892$	$r = -.216$ $p = .524$
Pre self-efficacy rating		$r = 1$	$r = .252$ $p = .454$	$r = -.147$ $p = .666$	$r = -.204$ $p = .547$
Pre perceived difficulty rating			$r = 1$	$r = -.143$ $p = .675$	$r = .299$ $p = .372$
Pre self-performance rating				$r = 1$	$r = -.433$ $p = .184$
Experimental task (number correct of 60)					$r = 1$

Table 4-6. Correlations Among PFAI-R Scales for Nonfluent Aphasics (N = 21)

	Fear of experiencing shame and embarrassment	Fear of devaluing one's self esteem	Fear of having an uncertain future	Fear of important others losing interest	Fear of upsetting important others
Fear of experiencing shame and embarrassment	$r = 1$	$r = 0.605^{**}$ $p = .004$	$r = 0.682^{**}$ $p = .001$	$r = 0.439^{*}$ $p = .046$	$r = 0.763^{**}$ $p = .000$
Fear of devaluing one's self esteem		$r = 1$	$r = 0.717^{**}$ $p = .000$	$r = 0.456^{*}$ $p = .038$	$r = 0.418$ $p = .059$
Fear of having an uncertain future			$r = 1$	$r = 0.502^{*}$ $p = .020$	$r = 0.630^{**}$ $p = .002$
Fear of important others losing interest				$r = 1$	$r = 0.653^{**}$ $p = .001$
Fear of upsetting important others					$r = 1$

** Correlation is significant at the 0.01 level (two-tailed)

* Correlation is significant at the 0.05 level (two-tailed)

Table 4-7. Correlations Between High BNT, Low BNT scorers and the PFAI-R.

Boston Naming Test score	Fear of experiencing shame and embarrassment	Fear of devaluing one's self esteem	Fear of having an uncertain future	Fear of important others losing interest	Fear of upsetting important others
High BNT scorers N = 11	r = .221 p = .513	r = .129 p = .706	r = -.227 p = .502	r = .087 p = .798	r = .098 p = .775
Low BNT scorers N = 10	r = .163 p = .654	r = -.325 p = .359	r = -.012 p = .974	r = -.050 p = .891	r = .095 p = .793

Table 4-8. Inter-rater reliability for tape task descriptions (N = 21)

	Rater 1 difficulty	Rater 2 difficulty	Rater 3 difficulty	Rater 1 believability	Rater 2 believability	Rater 3 believability	Rater 1 convinced	Rater 2 convinced	Rater 3 convinced
Rater 1 difficulty	r = 1	r = .971** p = .000	r = .980** p = .000						
Rater 2 difficulty		r = 1	r = .963** p = .000						
Rater 3 difficulty			r = 1						
Rater 1 believability				r = 1	r = -.126 p = .585	r = -.072 p = .757			
Rater 2 believability					r = 1	r = .466* p = .033			
Rater 3 believability						r = 1			
Rater 1 convinced							r = 1	r = -.039 p = .866	r = .228 p = .320
Rater 2 convinced								r = 1	r = .554** p = .009
Rater 3 convinced									r = 1

** Correlation is significant at the 0.01 level (two-tailed)

* Correlation is significant at the 0.05 level (two-tailed)

CHAPTER 5 DISCUSSION

The purpose of this study was to examine the relationship between self-perception, performance anxiety, and object-naming ability in participants with non-fluent aphasia. The goal was to test the proposed model developed from non-stroke literature to examine psychosocial variables that had not been studied in stroke survivors, particularly those with nonfluent aphasia.

There were no initial differences between the “easy” and “hard” groups on baseline object-naming and the PFAI-R. There were also no group differences on initial state anxiety (STAI-Y) at Time 1. In sum, the “easy” and “hard” groups were balanced on naming ability and initial state anxiety.

Participants in the “easy” group rated the experimental task as significantly less difficult than the participants in the “hard” group, who rated the experimental task as significantly more difficult, prior to performing the task. This analysis provides support that the “easy” and “hard” inductions were successful.

Hypothesis 1a proposed that participants would perform the same or better when they perceived that the upcoming experimental object-naming task would be “easy” compared to the baseline object-naming task. Results failed to find support for hypothesis 1a.

Hypothesis 1b proposed that participants would be negatively affected by the perception that the upcoming experimental object-naming task would be hard and would perform worse compared to the baseline naming task. When change in performance between groups was examined, there was no significant difference in the amount of change in

correct responses on the baseline naming task to the experimental object-naming task for either group. Participants in the “easy” group performed worse on the experimental task than they did at baseline. It is notable that two participants in the “easy” group performed considerably worse on the experimental task and were outliers in this data set. Perhaps for these two participants, this worsening of performance was related to the expectation that the task was going to be easy. Participants in the “hard” group performed only slightly worse on the experimental task when compared to the baseline task. In sum, results failed to support hypothesis 1a and 1b.

Results were mixed in regard to the self-report rating scales designed specifically for this study. There were no significant differences between the “easy” and “hard” groups on anxiety ratings at Time 2. Participants in the “hard” group rated their self-efficacy significantly lower than participants in the “easy” group. Participants in the “hard” group rated their perception of the level of difficulty of the upcoming experimental object-naming task as significantly more difficult than participants in the “easy” group. In addition, participants in the “hard” group expected their performance on the experimental naming task to be significantly worse than participants in the “easy” group expected their performance to be.

Mixed results and mixed support was found for hypothesis 2. As noted above, participants in the “hard” group rated their perceived difficulty of the upcoming experimental task as significantly more difficult than participants in the “easy” group who perceived the upcoming experimental task as being easy. Consequently, the “easy” and “hard” inductions appear to have been successful.

In regard to hypothesis 2a, which proposed that participants who rated themselves as more anxious following the practice induction would expect their performance to be worse on the experimental task than participants who rated themselves as less anxious. Results supported hypothesis 2a. As anxiety increased following the practice induction, participants expected to perform more poorly on the experimental object-naming task. In terms of group differences, there were no changes in level of anxiety from Time 1 to Time 2 in the “easy” group. Participants in the hard group rated themselves as more anxious at Time 2 than at Time 1.

Hypothesis 2b proposed that participants with more severe aphasia would expect their performance on the experimental task to be worse than participants with less severe aphasia. There was no support for hypothesis 2b.

Hypothesis 2c proposed that participants who expected their performance on the experimental task to be poor would perform worse on the experimental naming task. There was no support for hypothesis 2c. However, further analyses indicated that anxiety accounted for more variance in the model than self-perception such that it might be anxiety that modulated actual performance on the experimental task. These findings suggest that the proposed model was not the best fit for the data and that the alternative model described in detail below is a better fit for the present data.

Post-hoc analyses examined additional group differences that were important to address. There was a significant group effect for self-efficacy. Participants in the “easy” group rated their self-efficacy as higher than participants in the “hard” group. However, there were no significant differences between low and high functioning participants on

self-efficacy ratings. This suggests that group assignment, but not aphasia severity, influenced self-efficacy.

The experimental naming task was divided into four 15-item quarters to examine change in percent accuracy across each of the quarters. A significant main effect for quarter was found. Specifically there was a significant difference between change in performance for participants in both groups on the third and fourth quarters. This suggests that change in accuracy of performance was not equally distributed across all of the quarters. Moreover, participant change in accuracy increased on the third quarter and decreased significantly in the fourth quarter. This further suggests that actual performance dropped in the third quarter, thereby leading to an increase in change in percent accuracy from baseline, and increased significantly in the fourth quarter, thereby leading to a decrease in the change in percent accuracy from baseline.

Additional analyses indicated that the PFAI-R maintained its internal consistency with this group of nonfluent aphasics. No significant group differences were found using this measure, however, nearly all participants stated that the measure tapped psychosocial issues that they struggled with. Therefore, the usefulness of this measure as a tool to better understand the fear of failure in stroke survivors with nonfluent aphasia should be further explored.

When groups were collapsed, perceived experimental object-naming task difficulty negatively correlated well with expected performance ratings. This suggests that as participants perceived the experimental task as being more difficult, participants expected their performance to be worse. After completing the experimental task, participants who

rated the actual experimental task as being more difficult, believed that their performance was actually worse.

Post-hoc analyses also examined manipulation checks built into the model testing procedure. It is important to address the correlations among the self-report rating scales designed specifically for this study for both groups. The pre-experimental task performance rating scales (anxiety, self-efficacy, perceived task difficulty and expectation of performance) were significantly correlated for the “easy” group. However, the same was not true for the same scales for the “hard” group. No scales were correlated for the “hard” group. These findings appear consistent with findings in hypothesis 1a. Since there was no change in anxiety level from Time 1 to Time 2 for participants in the “easy” group, they did not believe that the experimental task would be difficult, and maintained higher levels of self-efficacy for experimental task performance, the strong correlations between the scales is expected. Participants in the “hard” group, were negatively affected by the “hard” induction, rated themselves as less efficacious, and expected their performance to be worse; thus, the lack of correlation among the scales is consistent with these findings.

The intention for using the heart rate monitor was as a physiological manipulation check for arousal/anxiety. It is important to note that heart rate level did not change within individuals across the baseline and experimental tasks. However, it is also important to note that participants with lower BNT scores maintained significantly higher heart rates than participants with higher BNT scores across the baseline and experimental tasks. Since “easy” and “hard” groups are balanced for level of functioning, these results washout across experimental condition. All participants in both groups were on anti-

hypertensive medications that likely kept their heart rates within normal limits. (This statement is supported by recent anti-hypertensive drug research by Palatini, Benetos and Julius, 2006). Taken together, these results explain why the heart rate monitoring in this study was not an adequate manipulation check for anxiety, and why physiological arousal was discordant with self-report of anxiety at Time 2. As noted previously, these findings are consistent with findings reported by Laures et al., (2003). In sum, the heart rate monitoring was not a useful measure.

Analyses of the awareness interview indicate that all participants were fully aware of their deficits and qualitative report of participant fatigue suggests that fatigue was not an issue for participants.

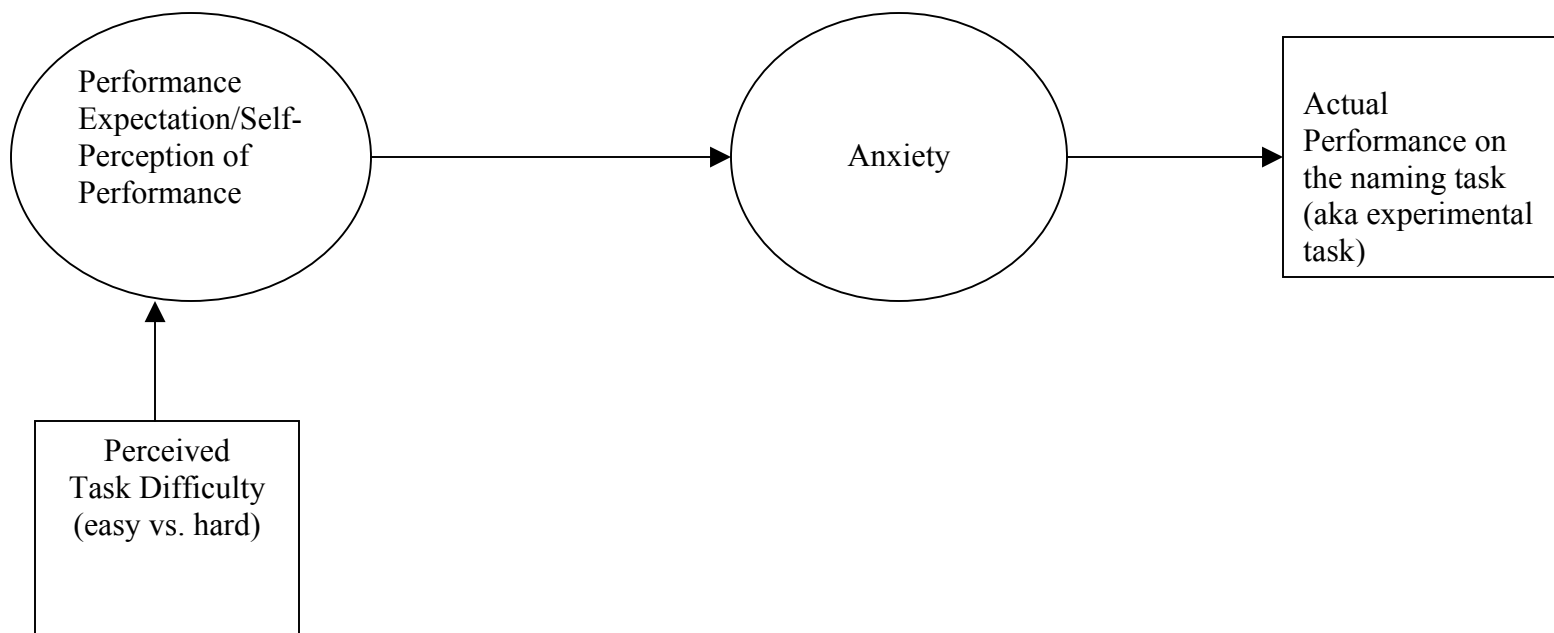
Analyses of inter-rater reliability for tapes suggest that ratings from rater 2 and rater 3 correlated well. Raters indicated that the instructions for the “easy” task were perceived as not difficult to a little bit difficult. Instructions for the hard task were perceived as difficult to very difficult. Raters 1 and 3 indicated strong believability for experimenter instructions and “easy”/”hard” inducement. However, rater 2’s believability ratings were problematic, probably due to neglecting to rate believability for one subject in the “easy” group.

In sum, findings suggest that the perceived difficulty/self-perception of expected performance/actual performance model proposed for this study may be more complex than originally thought. Results indicated that participant anxiety accounted for considerably more variance in the model than self-perception alone. It seems that the experimental task performances by participants in the “easy” group vs. the “hard” group may be modulated by perceived level of difficulty which had no effect on anxiety in the

“easy” group, but increased anxiety in the “hard” group, which together influences expectation of performance on the experimental task, and finally actual performance on the experimental object-naming task. The model proposed for this study appears too simple to fully explain the cognitive and affective self-appraisal processes at work in this study. However, the proposed model for this study was moderately successful in investigating the psychosocial factors that influence object-naming in nonfluent aphasics.

It appears that anxiety and self-perception as they appear in the proposed model are backwards. Results suggest that the alternative model shown in Figure 5-1 below illustrates the order of the variables that better fits the data. The next step for this study would be to test the revised model and examine the effects of self-perception on the modulating variable of performance anxiety on experimental object naming performance.

Figure 5-1. Revised model of influence of self-perception and anxiety on actual performance.



Since anxiety was found to account for the greatest variance in experimental object-naming, it appears that this study was successful in making a case for the future study of anxiety in stroke survivors, particularly nonfluent aphasics. Both quantitatively and qualitatively, anxiety appears to be an important and possibly detrimental aspect to nonfluent aphasia. Anxiety was not directly manipulated in this study. It was indirectly manipulated by influencing perceived level of task difficulty, but it was perceived task difficulty that was directly manipulated. Future examination of the revised model should include a direct manipulation of anxiety as the next step to examining the effects of chronic aphasia and chronic responding on performance anxiety. Similarly, participants indicated that the PFAI-R tapped fears of failure that had never before been addressed. The revised model proposed above could be tested in much the same way that the present model was tested. The present study was hampered by some important limitations. The most important limitation was the low number of participants. Twenty-one participants was too small a sample for some of the measures (i.e. change from baseline naming task to experimental naming task and group differences between performance on the experimental naming task). To best test the revised model, the total number of participants would need to be approximately 100. The “easy” and “hard” inductions were successful, therefore that procedure could remain the same. The number of items in both the baseline naming and experimental naming tasks would need to be increased to 100 items each in order to minimize the effects of skewness found in the present dataset due to two “easy” outliers. Since the data from the present study appear to fit the revised model much better, it is likely that repeating the same procedures, would be the best way to test the revised model, while making some changes to the procedures to minimize the

limitations noted below. The “easy” and “hard” inductions were successful in this study, however, it may have been that they “wore off” over time during the experimental tasks. Thus, in testing the revised model, it seems important to weight the first 35 items on the experimental task in the same direction as the induction with the hopes of maintaining the induction throughout the experimental task. To further explain, for the “easy” group the first 35 items of the experimental naming task would consist of only high frequency items, with the remaining 65 items including both high and low frequency items. In the same manner, for the “hard” group, the first 35 items of the experimental naming task would consist of only low frequency items, with the remaining 65 items including the same 65 high and low frequency items as shown in the “easy” group.

The importance of repeating the present study and examining the revised model cannot be overstated. Both models have implications for rehabilitative efforts by addressing previously unexplored psychosocial aspects of nonfluent aphasia supported by the present study. Performance anxiety, self-efficacy, fear of failure and self-perception of future performance are relevant constructs that the present study demonstrated are important to consider with this population, particularly in an environment of language rehabilitation. This will be further addressed below.

As noted above the low number of participants was problematic in this study, particularly as “easy” outliers appeared to considerably skew the data for some variables. Heart rate monitoring as a manipulation check to physiological arousal/anxiety was problematic as well.

Despite its limitations and mixed findings, this study and the model tested ventured into an area of stroke that has not been investigated. While the present model appears to

be somewhat backwards, it appears that the study included appropriate psychosocial variables that are clinically significant, and where appropriate, statistically significant in the stroke population. The revised model described above should be further explored. The implications of the findings of this study on rehabilitative efforts are important.

Addressing anxiety and patient self-perception, perhaps in an errorless learning environment, or an environment where the likelihood of success is high, may improve rehabilitation results. The implications of improved rehabilitation results for quality of life are limitless and priceless for the survivor.

APPENDIX A
THE PERFORMANCE FAILURE APPRAISAL INVENTORY-REVISED (CONROY
ET AL., 2002)

1	2	3	4	5
Do Not Believe all		Believe 50% of the time		Believe 100% at of the time
<hr/> 1. When I am failing, it is often because I am not smart enough to perform successfully. 2. When I am failing, my future seems uncertain. 3. When I am failing, it upsets important others. 4. When I am failing, I blame my lack of talent. 5. When I am failing, I believe that my future plans will change. 6. When I am failing, I expect to be criticized by important others. 7. When I am failing, I am afraid that I might not have enough talent. 8. When I am failing, it upsets my “plan” for the future. 9. When I am failing, I lose the trust of people who are important to me. 10. When I am not succeeding, I am less valuable than when I succeed. 11. When I am not succeeding, people are less interested in me. 12. When I am failing, I am not worried about it affecting my future plans. 13. When I am not succeeding, people seem to want to help me less. 14. When I am failing, important others are disappointed. 15. When I am not succeeding, I get down on myself easily. 16. When I am failing, I hate the fact that I am not in control of the outcome. 17. When I am not succeeding, people tend to leave me alone. 18. When I am failing, it is embarrassing if others are there to see it. 19. When I am failing, important others are disappointed. 20. When I am failing, I believe that everybody knows I am failing. 21. When I am not succeeding, some people are not interested in me anymore. 22. When I am failing, I believe that my doubters feel that they were right about me.				

- 23. When I am not succeeding, my value decreases for some people.
- 24. When I am failing, I worry about what others think of me.
- 25. When I am failing, I worry that others may think I am not trying.

APPENDIX B TASK RATING SCALES

Anxiety rating:

“Please rate how anxious you feel about having to perform the object-naming task just described to you using the following scale:

0 = not anxious, 1 = a little bit anxious, 2 = somewhat anxious, 3 = moderately anxious, 4 = a lot anxious, 5 = the worst anxious I can be”

Self-Efficacy rating:

“Please rate how confident you feel that you can manage this next task”

0%	25%	50%	75%	100%
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Perceived difficulty rating:

“Please rate how difficult the object-naming task I just described will be for you using the following scale:

0 = not difficult, 1 = a little bit difficult, 2 = somewhat difficult, 3 = difficult, 4 = very difficult, and 5 = extremely difficult”

Self-Perception performance ratings:

“Please rate how well you believe you are going to do on the object-naming task just described using the following scale:

0 = no performance/will not be able to name any objects, 1 = poor, 2 = below average, 3 = average, 4 = above average, and 5 = excellent”

Actual difficulty ratings:

“Now I would like for you to rate how difficult the object-naming task you just finished was for you using the following scale:

0 = not difficult, 1 = a little bit difficult, 2 = somewhat difficult, 3 = difficult, 4 = very difficult, and 5 = extremely difficult”

Actual performance ratings:

“Now I would like for you to rate how well that you think you did on the object-naming task you just finished using the following scale:

0 = no performance/was not able to name any objects, 1 = poor, 2 = below average, 3 = average, 4 = above average, and 5 = excellent”

Anxiety Rating Scale



0

Not Anxious

1

**A Little Bit
Anxious**



2

**Somewhat
Anxious**

3

**Moderately
Anxious**



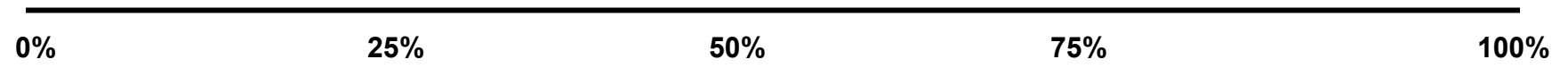
4

A Lot Anxious

5

**The Worst
Anxious I
could be**

Self-Efficacy Rating Scale



Difficulty Ratings



0

1



2

3



4

5

Not Difficult

A Little Bit
Difficult

Somewhat
Difficult

Difficult

Very Difficult

Extremely
Difficult

Performance Rating Scale



0



2



5

No Performance/
Will not be able to
name objects

Poor

Below
Average

Average

Above Average

Excellent

APPENDIX C
STIMULI FOR LINE DRAWINGS

Set 1

piano	clarinet
dining room	flippers
chair	hive
faucet	knee
goggles	road
hat	stirrup
yolk	mitten
handcuff	bowl
bison	raindrops
stepladder	mosquito
freezer	queen
tongue	anchor
bread	curl
dollar	screw
newspaper	wheel
kite	cigarette
pestle	coattails
boomerang	air conditioner
truck	snowflake
drapes	pacifier
lighthouse	ship
dumbbell	plug
squirrel	bakery
race track	hobo
skunk	lamp
silo	beetle
poodle	arrowhead
bikini	thermos
wrench	arm
nail	
syringe	

Set 2

cornucopia	rain
sling	cobweb
moustache	candle
cameo	dishwasher
billiards	television

elk
mermaid
anteater
hot dog
shell
submarine
toothbrush
woodpecker
ram
wig
top
arrow
roof
marshmallow
astronaut
snorkel
nose
vampire
cheerleader
campsite
mummy
life preserver
tractor
bear
ear
ball
eel
bagpipe
bell
windmill
lobster
aqueduct
bib
paintbrush
wagon
banjo
fan
briefcase
milk

daisy
braid
plate
doorknob
tambourine
ladle
bag
mannequin
mop
zebra
eye

Easy items

House
Bed
Door
Church

Book

Hard items

Pitchfork

Calculator

Plume

Pestle

Tine

APPENDIX D

AWARENESS INTERVIEW

1. *Awareness of reason for visit*

“Why are you at the VA today? What are you having difficulty with? “ If participant does not explicitly describe the primary reason for their visit, ask “Did you have a stroke?”

SCORING

- 3 Participant explicitly denies the primary reason for visit
- 2 Participant admits to, but does not initially state the primary reason for visit
- 1 Participant describes the primary reason for visit

2. *Awareness of motor impairments*

Question the participant regarding movement of his or her arms and legs; paying particular attention to deficits noted in the neurological report. “How do your arms work? Can you move them normally? Both of them?”

SCORING

- 3 Participant denies any motor impairments
- 2 Participant describes minimal impairment of motor function
- 1 Participant complains of a significant motor impairment or participant correctly acknowledges level of motor impairment

3. *Awareness of speech or language problems*

Ask “How is your speech? Has it been affected at all? Do you have any difficulty understanding what other people say?”

SCORING

- 3 Participant denies any speech or language problems
- 2 Participant describes mild speech or language problems (e.g. word finding problems, slurring).
- 1 Participant complains of impaired comprehension, aphasic speech or severe dysarthria

4. *Awareness of quality of test performance and ability to return to normal activities*

Ask “How do you think that you did on these tests today?” “Based on how you are doing now, do you think that you will be able to return to your normal activities in the next several weeks?” (Specify activities based on the participant’s current circumstances)

SCORING

- 3 Participant indicates that test performances were normal and that there will be no problem returning to normal activities

2 Participant indicates that either a) test performance was defective, or b) that there will be difficulty returning to normal activities, but not both

1 Participant indicates that test performance was defective and that there will be difficulty returning to normal activities in the next several weeks

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BIOGRAPHICAL SKETCH

Megan Elizabeth Gaiefsky was born in La Mirada, California, in 1978. She graduated from Alta Loma High School in 1996 and received her Bachelor of Arts degree in psychology from Trinity University, San Antonio, Texas, in May 2000. From May 2000 through September 2000, Megan Gaiefsky was employed as a research associate in the Department of Neurology at Harbor-UCLA Medical Center Research and Education Institute in Torrance, California. In September 2000, she was asked to pursue a research assistant position in the Medical Department at Brookhaven National Laboratory in Upton, New York. She was employed in the Medical Department at Brookhaven National Laboratory from September 2000 through July 2001. In August 2001, Megan Gaiefsky enrolled in the doctoral program in the Department of Clinical and Health Psychology at the University of Florida. Her clinical and research interests are in the area of clinical neuropsychology. She received her Master of Science degree in clinical and health psychology from the University of Florida in May 2003. In July 2004, Megan was selected as a Pre-Doctoral Fellow in health rehabilitation and was awarded a grant by the Department of Veterans Affairs to fund her dissertation research. Megan was married to Thomas Sherod on November 6, 2004. She is happily married and presently living in Gainesville with her husband.