2010

# Assessment of early maladaptive schemas via a modified stroop task

Yelena Kholodenko

# ASSESSMENT OF EARLY MALADAPTIVE SCHEMAS VIA A MODIFIED STROOP TASK

---

A Thesis

Presented to the

Faculty of

California State University,

San Bernardino

---

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

in

Psychology:

General/Experimental

---

by

Yelena Kholodenko

December 2010

# ASSESSMENT OF EARLY MALADAPTIVE SCHEMAS VIA A MODIFIED STROOP TASK

---

A Thesis

Presented to the

Faculty of

California State University,

San Bernardino

---

by

Yelena Kholodenko

December 2010

Approved by:

[redacted]

Dr. Michael Lewin, Chair, Psychology — 11/22/10 Date

[redacted]

Dr. Robert Ricco, Psychology

[redacted]

Dr. Jason Reimer, Psychology

ABSTRACT

It has long been thought that core beliefs about self and others represent a vulnerability to various forms of mental disorders. Processing biases play a major role in the understanding of anxiety disorders. Several models of processing biases associated with vulnerability to anxiety have been proposed. The Schema theory hypothesizes that belief systems, early maladaptive schemas (EMS), cause selective processing of confirmatory information to the exclusion of disconfirmatory information. The current study was the first report attempting to provide empirical support for the measurement of Early Maladaptive Schemas (EMS) with a subtle cognitive processing assessment such as the Stoop task. A Schema Stroop task was constructed for the purposes of the current study. The hypotheses examining relationship between schema domains and latency/ interference on the Schema Stroop task were not supported in that no significant relationship was found between self-report of schema domain on the YSQ-SF and both response latency and interference scores on the Stroop color-naming task. Furthermore, no differences in the domain specific Stroop color naming latency/interference responses were detected between the participants who scored in the top and

the bottom 25 percent of each of the five YSQ-SF schema domains. The lack of significant findings could be due to a number of methodological limitations of the current study. Future research attempting to provide support of the EMS should address methodological limitations of the current study as well as utilize other paradigms (e.g., the dot probe task) with more direct ways of measuring attentional biases.

TABLE OF CONTENTS

# CHAPTER ONE

# INTRODUCTION

Cognitive-behavioral therapies have been very successful in treatment of a variety of psychological disorders, especially Axis I disorders such as anxiety disorders (e.g., social phobia, panic disorder, and obsessive-compulsive disorder) and depression. However, cognitive-behavioral treatments have been less successful for individuals with comorbid personality disorders who have additional characterological issues.

## Core Beliefs

It has long been thought that core beliefs about self and others represent a vulnerability to various forms of mental disorders (Beck, Rush, Shaw, & Emery, 1979). Young (1990) proposed that belief systems which he called early maladaptive schemas (EMS) cause selective processing of confirmatory information to the exclusion of disconfirmatory information. This selective processing maintains EMS and maladaptive behaviors based upon faulty

assumptions. Differences in how people process emotional information may be a causal factor in development and maintenance of emotional disorders. Young has developed a self-report instrument, the Schema Questionnaire (SQ) to measure 18 early maladaptive schemas that are grouped based upon five general developmental themes. This instrument has spawned considerable research on the cognitive model of emotional disorders and has provided additional evidence for the utility of the cognitive model. The current thesis is an attempt to create a cognitive processing test for schemas by means of a modified Stroop task which could provide additional support for the for the cognitive model as well as provide an additional, more subtle measure of EMS. Although there is a plethora of research examining cognitive processing in a variety of anxiety and depressive disorders, to date no researchers have developed a cognitive processing task for schemas, a core cognitive vulnerability factor in a variety of psychological disorders. Additionally, results of the current thesis research have important implications for the clinical assessment, prevention and treatment for

a number of Axis I (anxiety and mood disorders) and Axis II personality disorders.

## Cognitive Processing of Anxiety and Depression

Processing biases play a major role in the understanding of anxiety disorders. Several models of processing biases associated with vulnerability to anxiety have been proposed. The emotional bias perspective proposes that cognitive developmental deficits serve as vulnerability factor in the etiology of anxiety disorders (Kindt, Bierman, & Brosschot, 1997). A memory bias perspective suggests that patients with anxiety disorder better remember threatening information than non-threat information (Coles & Heimberg, 2002). Lastly, an attentional bias perspective proposes that patients with anxiety disorders are more hypervigilant to the threatening stimuli. In other words, they pay more attention to the threatening stimuli than other types of information (Eysenck, 1992).

## Measurement of Attentional Bias with the Emotional Stroop Task

The Stroop effect was discovered by John Ridley Stroop who discussed it in his paper "Studies of interference in serial verbal reaction" published in 1935. To date, this paper has been one of the most cited papers in experimental psychology. The Stroop test creates a conflict between an incongruent color and word. Participants are asked to name the color of each printed color name, for example, the word "red" written in blue color ink. Stroop found that it takes participants longer to name the color of the word when it was incongruent with the "word." It is believed that this interference is caused by the automation of reading which is when the mind automatically determines the semantic meaning of the word. This semantic meaning interference has to be overridden by the identification of the color of the word, a process which is not automatic.

The emotional Stroop task has been adapted from the standard Stroop test where instead of using color-words to create interference, emotional and neutral words are used. In other words, the emotional Stroop task does not involve

conflict between a word meaning and a color of word, but instead it seems to grab attention and slow response time due to the emotional relevance of the word for the individual. Therefore, it can be hypothesized that degree to which content of different words are selectively processed can be measured by the delay in the response time of naming the ink color. For example, depressed individuals are slower in naming the color of the negatively toned word, "sad" (Segal, Gemar, Truchon, Guiriguis, & Hrowitz, 1995; Williams & Nulty, 1986).

Mathews and MacLeod (1985) found that it took patients with generalized anxiety disorder longer to color name the threat words than the neutral words. Comparatively, there was almost no time difference in color naming of the threat and neutral words in control participants. The same findings that the color naming of threat words takes longer than the color naming of neutral words have been replicated in a number of other studies with a wide spectrum of anxiety disorders: specific phobias (Kindt & Brosschot, 1997; Chen, Lewin, & Craske, 1996; Lavy, van Oppen, & van den Hout, 1994; Martin, Horder, & Jones, 1992; Watts, Trezise, & Sharrock, 1986b),

social phobia (Amir, Freshman, & Foa, 2002; Becker, Rinck, Margraf, & Roth, 2001; Holle, Neely, & Heimberg, 1997; Hope, Rapee, Heimberg, & Dombeck, 1990), obsessive-compulsive disorder (Foa, Illai, McCarthy, & Shoyer, 1993; Lavy, van Oppen, & van den Hout, 1994; McNeil, Tucker, Miranda, Lewin, & Nordgren, 1999; Unoki, Kasuga, Matsushima, Ohta, & Doi, 2000), panic disorder (Buckley, Blanchard, & Hickling, 2002; Ehlers, Margraf, Davies, & Roth, 1988; McNally, Riemann, Louro, Lukach, & Kim, 1992; Quero, Banos, & Botella, 2000), and posttraumatic stress disorder(Beck, Freeman, Shipherd, Hamblen, & Lackner, 2001; Foa, Rothbaum, Riggs, & Murdock, 1991; McNally, Amir, & Lipke, 1996; McNally, Kaspi, Riemann, & Zeitlin, 1990a).

In the *Diagnostic and Statistical Manual for Mental Disorders*, fourth edition (DSM-IV), specific phobia is described as a ". . . marked and persistent fear that is excessive or unreasonable, cued by the presence of anticipation of a specific object or situation" (p. 449, American Psychiatric Association, 1994).

Kindt and Brosschot (1997) examined effect of threatening words versus threatening pictures in 31 female

patients meeting criteria for *the Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; DSM-IV; American Psychiatric Association, 1994) for specific phobia (i.e., spider phobia) and 33 non-phobic females. Patients were presented with 48 word and 48 picture stimuli. Word stimuli consisted of spider words (e.g., "spider, web, hairy, creep, cobweb, and itching," p. 645) and neutral words which were matched for length and number of syllables. The picture stimuli consisted of photographs of spiders and pictures of chairs (neutral stimuli). Each stimulus was presented in one of four colors: red, blue, yellow, and green. The Spider Stroop task was conducted on a computer. Participants were also asked to rate stimuli on a valence scale and an arousal scale of the Self-Assessment Manikin (SAM; Lang, 1980). Higher scores indicated more negative or arousing stimuli. Participants were asked to name the color of the word stimuli out laud. The response was recorded via a microphone which was connected to the computer. The response times were recorded with millisecond accuracy. Latency response to each individual stimuli was recorded. Latency was operationally defined as ". . . the interval

between stimulus presentation and the detection of the vocal response" (p. 645). Each testing session ended with a Behavioral Approach Test (BAT) which measures fear by placing participants into close proximity to a live spider kept in a closed glass jar. Participants are asked to approach the spider as close as possible and their behavior response is rated on a 10-point scale (Arntz, 1993). Participants also completed the Spider Phobia Questionnaire (SPQ; Klorman, Weerts, Hastings, Melamed, & Lang, 1974). SPQ is a self-report measure of fear which consists of 31 true-false statements with higher score indicating more fear. ANOVA on the response time data for repeated measures with one between-subject factor (group: spider phobic and control group) and two within-subjects factors (threat: spider vs. neutral stimuli; format: pictures, integrated words, and nonintegrated words) revealed no main effect of group. However, there was a main effect of threat and a main effect of format. There was a significant interaction between group and threat which indicated that spider-phobic participants showed more interference on the spider stimuli (M = 802) compared to the neutral stimuli (M = 745) than did the non-phobic

controls (M = 745 for the spider stimuli; M = 738 for the neutral stimuli). Furthermore, interaction between threat and format was significant. Moreover, on the SAM spider-phobic participants rated the spider stimuli more negatively than the neutral stimuli. This difference was especially evident in the picture stimuli. In summary, current study demonstrated that spider-phobic patients had a greater bias for spider-related words and pictures than did participants in the control condition. Furthermore, the spider-phobic participants evaluated spider pictures as more aversive on valence and arousal than spider words. Mainly, there was a significant main effect of threat and a main effect of format meaning that it took participants longer to name the color of spider stimuli than neutral stimuli. Kindt et al. (1997) findings provided support for cognitive processing tasks as a reliable measure of fear.

Chen et al. (1996) examined the effect of increased state anxiety on Stroop interference for threatening information relative to a spider fear. Out of the general pool of 300 undergraduate students 23 subjects with a strong fear (reported on an eight point visual analogue

scale) and 23 subjects with a low fear/no fear were recruited into the study. Subjects participated in a modified Stroop task in which they were asked to name the colors of the words presented on the computer screen. Word stimuli consisted of six spider words (i.e., "*spider, cobweb, crawl, hairy, creepy,* and *poisonous*"), six neutral words (i.e., "*lesson, gates, suntan, leafy, brews,* and *northwest*"), and six positive words (i.e., "*safety, serene, cared, relax, genial,* and *enjoying*") which were matched for length and number of syllables (p. 229). Each word was presented a total of four times in each of four colors: red, blue, yellow, and green for a total of 74 presentations. Voice-activated relay recorded response latencies in milliseconds. Additionally, participants were asked to rate emotionality of each word stimuli on a 6-point Likert scale ranging from -3 (very negative) to +3 (very positive). No significant differences in response times across all word types in approach (instructed that they would be asked to approach a spider) and neutral condition (instructed that they would not be asked to approach a spider) were detected in control subjects. It took fearful participants longer to name colors of the

spider words then neutral words across two conditions. In conclusion, as predicted spider fearful subjects showed increased response latencies then did non-phobic subjects. The results reported by Chen et al. (1996) support previous findings that threatening information in spider phobic produces interference. Chen et al. (1994) findings provide additional support for cognitive tasks as reliable measures of fear.

Lavy et al. (1994) examined the selective processing of information in obsessive-compulsive disorder. Thirty three patients who met the DSM-III (APA, 1987) criteria for obsessive-compulsive disorder and 29 normal control subjects were asked to name the colors of the words. For all of the subjects with obsessive-compulsive disorder (OCD) OCD was the main problem and persisted for at least one year. Thirteen of the subjects were classified as washers and 20 were classified as checkers based on their OCD fears. All of the subjects were outpatients. Subjects were presented with categories of neutral, negative, positive, OC positive washers, OC positive checkers, and OC negative checkers words: neutral (i.e., "*square, fork, coatpocket, potato, percent, month,*

*blanket,* and *key"*), negative (i.e., "*war, hate, treachery, torture, violence, deceit, abuse,* and *murder"*), positive (i.e., "*love, friend, happy, trust, felicity, humor, fun,* and *party"*), OC positive washers (i.e., "*tidy, clean, healthy, neat, cleanly, pure, protected,* and *safe"*), OC negative washers (i.e., "*filthy, dirty, fail, mess, doubt, uncertain, disease,* and *guilt"*), OC positive checkers (i.e., "*precise, assured, relaxed, precaution, perfect, scheme, protected,* and *safe"*), and OC negative checkers (i.e., "*fatal, disaster, fail, wrong, doubt, uncertain, guilty,* and *grief"*) (p. 244). Words were presented on a white card in red, blue, yellow, or green capital letters. The color naming times were audio recorded on U-matic tape. Subjects were instructed to ignore the meaning of the words and name the color in which the word was written in as accurately and as quickly as they could. In OCD patients, the quickest responses were made for neutral words and the most delayed responses was for OC-related negative words. Interference scores were calculated for four emotionally valenced word types. The interference scores were calculated by subtracting latencies for neutral words from latencies for each of the emotional

words. Interference scores for OCD patients and their normal controls did not differ significantly on any of the four word categories - only latencies but not interferences were found. In other words, Lavy et al. (1994) did not find attentional bias for positive OC words. These findings were contradictory to the findings of Mathews and Klug (1993) who showed that when compared to normal controls anxious subjects did not show an attentional bias for emotional words when they were not related to anxiety. However, they did selectively attend to both positive and negative anxiety-related stimuli. Lavy et al. (1994) findings provide additional support for cognitive tasks as reliable measures of fear.

Watts et al. (1986) examined performance of spider phobics and normal controls on the Spider Stroop task. During the testing session which included a variety of behavioral tests and assessments participants were also asked to take part in the Spider Stroop task. Thirty five spider phobics and 19 matching controls were asked to participate in the study. Words were presented on white cards and participants took part in six color naming tasks: simple color naming, conflicting color words,

McKenna Emotional Stroop, McKenna control words, Spider Stroop, and control words. In the Spider Stroop task words related to spider phobia were sued (i.e., "*creepy, hairy, crawl, legs,* and *spider,*" p. 99). Subjects were shown cards with words printed on them in red, blue, green, or yellow and asked to name the color in which words were written. Additionally, participants completed a spider phobia questionnaire to correlate responses on the spider Stroop task with responses on the questionnaire. In the Spider Stroop there was a main effect of word and a significant group by word type interaction. Spider phobics were significantly slower on the spider words than the control words. There was a significant interference in the Spider Stroop. Watts et al. (1986) findings provide additional support for cognitive tasks as reliable measures of fear.

In the *Diagnostic and Statistical Manual for Mental Disorders*, fourth edition (DSM-IV), social phobia is described as a ". . . marked and persistent fear that is excessive or unreasonable, cued by the presence of anticipation of a specific object or situation" (p. 456, American Psychiatric Association, 1994).

Amir et al. (2002) examined effect of enhanced Stroop task interference for threat in social phobia. In the Emotional Stroop task participants are asked to name the color in which emotional words are written, while ignoring the meaning of the words. Previous studies showed that socially anxious individuals were slower at color-naming threat-related words then neutral words. These findings suggest that individuals with social phobia pay more attention to threat meaning. However, Amir et al. (1996) found that individuals with social phobia were faster at color-naming threat words when they were made anxious compared to when they were not made anxious compared to the neutral words (i.e., response latencies for threat words were faster). Bases on these previous research findings, Amir and colleagues (2002) tried to increase Stroop interference by increasing the frequency of words to nonwords. For example, there will be a greater Stroop interference if more words (e.g., "anxiety, speech") are presented during the Stroop task trail compared to when nonwords (e.g., XXXXX) are presented. Amir et al. (2002) hypothesized that patients with social phobia will show increased Stroop interference to the words related to the

social threat but not to the neutral words. Twenty patients meeting the DMS-IV (American Psychiatric Association, 1994) criteria for Generalized Social Phobia (GSP) and 20 non-anxious subjects were examined. Social phobia was a primary diagnosis for all of the subjects in the experimental group. Participants completed a variety of scales to assess their anxiety and fear (i.e., the State-Trait Anxiety Inventory (STAI), the Beck Depression Inventory (BDI), the Anxiety Sensitivity Index (ASI), and the Fear of Negative Evaluation scale (FNE)) and an Emotional Stroop task. Compared to the control group, subjects with SP were more depressed, more anxious, more anxiety-sensitive, and more fearful of negative evaluations. Since the goal of the experiment was to attempt to increase Stroop interference in SP subjects, two conditions - the high ratio condition (66% words and 33% XXXXs) and the low word ratio condition (33% words and 66% XXXXs) were used. During the high word ratio Emotional Stroop task participants were presented with 72 social threat words (six words presented in four different colors three times each), 72 positive words, and 48 nonwords (XXXX). The low-ratio condition consisted of 24

social threat words (six words in four colors), 24 positive words, and 144 nonwords. Each participant was presented with a total of 384 stimuli in the experiment. Words were presented in red, blue, green, or yellow. Participants were asked to ignore the meaning of the word and to answer as quickly and as accurately as they could. The mean response latency was calculated for each subject and each word type for both the high- and the low-ratio conditions. The interference scores were calculated by subtracting subjects' response latency to color-name XXXXs from their response latency to color-name words. There was a significant main effect of word type and interactions of group and word type, word type and frequency, and group and word type and frequency. For the social threat words there was a significant main effect of frequency. It took subjects with GSP longer to color-name threat words in low-ratio condition than in social threat words in high-ratio condition. In summary subjects with GSP had higher interference in the Stroop task when the ratio of words to nonwords was low compared to when this ratio was high. Subjects in the control condition did not show increase in interference. This effect was specific to

the social threat words. Amir et al. (2002) demonstrated that subjects with social phobia exhibit attentional bias to threat. Furthermore, Stroop interference for social threat words in socially anxious individuals can be manipulated by varying the ratio of words to nonwords: reducing the ratio of words to nonwords increases Stroop interference for social threat words in subjects with SP. Amir et al. (2002) findings provide additional support for cognitive tasks as reliable measures of fear.

Holle et al. (1997) in "The Effects of Blocked Versus Random Presentation and Semantic Relatedness of Stimulus Words on Response to a Modified Stroop Task Among Social Phobics" examined reasons for increased latencies for the color-naming of social threat words in relationship to neutral or physical words in subjects with social phobia. Twenty four subjects who met the DSM-III-R (American Psychiatric Association, 1987) criteria for principal diagnosis of social phobia were included into the study. During the Stroop task participants were presented with three types of stimulus words: social threat words (i.e., "*boring, stupid, foolish,* and *failure*"), semantically related neutral words (animal names, i.e., "*monkey,*

*cheetah, squirrel,* and *raccoon"*), and unrelated neutral words (i.e., *"insert, metric, portion,* and *network"*) (p. 687). All of the words were matched for number of syllables and frequency of use in the English language according to Carrol, Davies, and Richman (1971). Words were presented on a white computer screen in blue, green, red, and white colors. Subjects were asked to color-name the words as quickly and as accurately as possible while ignoring meaning of the words. In addition to the Stroop task subjects were asked to complete a battery of questionnaires such as the Social Interaction Anxiety Scale, the Social Phobia Scale, the Fear of Negative Evaluation Scale, the Social Phobia Subscale of the Fear Questionnaire, the State-Trait Anxiety Inventory-Trait Form, the Beck Depression Inventory, and the Shipley-Institute of Living verbal scale. Results revealed a significant main effect for group by word interaction. Later social phobics showed increased latencies for word type. There were significant differences in color-naming latencies between social threat words and unrelated neutral words as well as related and unrelated neutral words. In summary, consistent with the findings from

other research studies individuals with social phobia showed increased latencies for the color-naming of social threat words in comparison to neutral words. Holle et al. (1997) findings provide additional support for cognitive tasks as reliable measures of fear.

Hope et al. (1990) in "Representations of the Self in Social Phobia: Vulnerability to Social Threat" examined color-naming latencies for social and physical threat words in both individuals with social phobia and panic disorder. Beck's cognitive theory proposes that individuals with anxiety disorders are hypersensitive to stimuli which can indicate/signal threat. Social phobia is characterized by fear of negative evaluation and embarrassment. Therefore, based on Beck's cognitive theory individuals with social phobia will be hypervigilant to cues which indicate social interaction. Based upon previous research findings that individuals with social anxiety tend to make negative statements about themselves (Cacioppo, Merluzzi, & Glass, 1979; Dodge, Hope, Heimberg, & Becker, 1988; Glass, Merluzzi, Biever, & Larsen, 1982) in the realms of: (1) thoughts of general social inadequacy, (2) concerns with other's awareness of

distress, (3) fear of negative evaluation, and (4) preoccupation with arousal and performance (Hartman, 1984), Hope et al (1990) hypothesized that it will take individuals with social phobia longer to color-name social threat words. Similarly, it will take individuals with panic disorder longer to color-name physical threat words. Sixteen individuals with social phobia and 15 with panic disorder exhibiting severe impairment in daily functioning as measured by the Anxiety Disorders Interview Schedule - Revised (ADIS-R; DiNardo & Barlow, 1988) and the Phobic Severity Rating Scale (PSR; Watson & Marks, 1971) were examined in the study. Subjects were asked to color-name neutral, social and physical threat words as quickly and as accurately as they could. One group of words was presented in pink, green, black, orange, blue, and yellow. A second group of words was presented in yellow, brown, gray, red, and purple. Social words in group one were: "*embarrassed, stupid, failure, inferior,* and *boring*" (p. 182). Control words used in this group were "*specialized, insert, network, obsidian,* and *metric*" (p. 182). Physical threat words were: "*ambulance, fatal, illness, doctor,* and *insane*" (p. 182). Physical threat control words were:

"*firelight, rayon, leaning, upward,* and *defined*" (p. 182). Social threat words in group two were "*foolish, criticized, shameful, inadequate,* and *ridiculous*" (p. 182). Control words used in this group were "*portion, narratives, softened, imperative,* and *dramatic*" (p. 182). Physical threat words were: "*hospital, disease, stroke, coffin,* and *deadly*" (p. 182). Physical threat control words were: "*reported, lighted, sports, purely,* and *parent*" (p. 182). Additionally, subjects were presented with XXXXX stimuli in each color. Words were presented on a white poster board. Subjects were asked to color-name words as quickly and as accurately as they could. In addition to a modified Stroop task participants were asked to complete several scales rating their social phobia and panic. Findings of Hope et al. (1990) indicated that participants with social phobia took longer to color-name social threat words than matched control words. Subjects with panic disorder did not have longer latencies for social threat words and control words. However, the opposite effect was found for the physical threat words. Subjects with panic disorder had longer latencies for physical threat words compared to matched control words.

However, subjects with social phobia did not show a difference in response latencies to physical threat words versus matched control words. Hope et al. (1990) findings provide additional support for cognitive tasks as fear specific reliable measures of fear.

In the *Diagnostic and Statistical Manual for Mental Disorders*, fourth edition (DSM-IV), obsessive-compulsive disorder (OCD) is characterized by ". . . obsessions or compulsions that cause marked distress, are time consuming (take more than 1 hour a day), or significantly interfere with the person's normal routine, occupational (or academic) functioning, or usual social activities or relationships" (p. 456, American Psychiatric Association, 1994). Obsessions are defined as ". . . recurrent and persistent thoughts, impulses, or images that are experienced, at some time during the disturbance, as intrusive and inappropriate and that cause marked anxiety or distress" (p. 457). Compulsions are defined as ". . . repetitive behaviors (e.g., hand washing, ordering, checking) or mental acts (e.g., praying, counting, repeating words silently) that the person feels driven to perform in response to an obsession, or according to the

must be applied rigidly" (p. 457). The behaviors or mental acts are designed to prevent or reduce discomfort and the likelihood of a dreaded events occurring, but the compulsions are either unrealistic or clearly excessive. Foa et al. (1993) in "*Information Processing in Obsessive-Compulsive Disorder*" examined whether individuals with Obsessive-Compulsive Disorder (OCD) would show the Stroop effect similar to those exhibited by other individuals with anxiety disorders. Furthermore, Foa and colleagues assessed if there was a difference in the modified Stroop task performance between obsessive compulsive (OC) subjects with different OCD fears (e.g., OC washers versus OC nonwashers). Moreover, Foa et al. (1993) looked at the clinical relevance of the modified Stroop task by correlating the magnitude of the effect for the contamination words and ratings of clinical severity of OC symptoms for washers and nonwashers. Thirty three subjects who met DSM-III-R (American Psychiatric Association, 1987) criteria for OCD and 14 normal controls participated in the study. OC subjects were divided into two groups: twenty-three OC subjects with washing rituals (washers) and 10 OC subjects without washing rituals

(nonwashers). Participants were presented four different types of words (i.e., contamination words (i.e., "*AIDS, contaminate, dirt, poison, rat, shit, toilet, trash, unclean*, and *germs*"); general threat words (i.e., "*anxiety, cancer, coffin, death, funeral, guilt, nervous, panic, stress*, and *tumor*"); neutral words (i.e., "*apple, banana, cherry, grape, melon, peach, pear, prune, raising*, and *strawberry*"); nonwords were generated by changing one vowel in each of five common English words (i.e., "*gosp, bord, fices, foint*, and *nervous*") preceded by one of four priming stimuli (i.e., "*XXXXX, danger, disturb*, and *fruit*") on a computer screen and asked to color-name the words as quickly and accurately as they could (p. 178). Latency of response and interference scores were measured. Latency was defined as a difference between the onset of the stimuli to the detection of the color-naming response. Interference score was defined as difference between latencies for neutral words and latencies for contamination words and from latencies for general threat words. In addition to the modified Stroop task, subjects were asked to complete the Beck Depression Inventory (BDI; Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961), the State-

Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970), and the Vocabulary subtest of the WAIS-R (Wechsler, 1981). OC washers had longer response latencies to contamination words than to neutral words. Moreover, these latencies to contamination words were significantly longer than the latencies of normal controls. However, response latencies to contamination words were not significantly different from those of OC nonwashers. OC nonwashers had longer response latencies to general threat words than to nonwords. Normal controls were slower in color-naming neutral words than contamination and general threat words. There were significant group differences in the interference scores for contamination words. Specifically, washers had significantly higher interference scores than normal subjects, while nonwashers did not significantly differ from the other two groups. Moreover, there were significant group differences in the interference scores for general threat words such that nonwashers had significantly slower interference scores than normal subjects, while washers did not differ significantly from the other two groups. To assess the effect of severity of

psychopathology on interference in color naming, the interference scores from the modified Stroop task and OC symptom severity were correlated. Foa et al. (1993) hypothesis that washers will have a higher correlation than nonwashers for contamination words was not supported by the findings. Further investigation showed that color-naming latencies for contamination words and OC symptoms in washers were significantly correlated. None of the correlations for nonwashers were significant. In summary, Foa et al. (1993) demonstrated selective processing of threat information in OC patients. Foa et al. (1993) findings provide partial support for cognitive tasks as reliable measures of fear.

Lavy et al. (1994) examined selective processing of emotional information in subjects with OCD. Thirty three OC subjects who met the DSM-III-R (American Psychiatric Association, 1987) criteria for OCD and 29 normal controls participated in the modified Stroop task. All the participants completed the standardized Anxiety Disorder Interview Schedule translated into Dutch (ADIS; Bouman, Scholing, Emmelkamp, & Dijkstra, 1987) and the modified Stroop task. As part of the modified Stroop task all the

participants were asked to color-name seven different word types presented on a card as quickly and accurately as possible while ignoring the meaning of the words. Seven different word types included neutral (i.e., "*square, fork, coatpocket, potato, percent, month, blanket,* and *key*"), negative (i.e., "*war, hate, treachery, torture, violence, deceit, abuse,* and *murder*"), positive (i.e., "*love, friend, happy, trust, felicity, humor, fun,* and *party*"), OC positive washers (i.e., "*tidy, clean, healthy, neat, cleanly, pure, protected,* and *safe*"), OC negative washers (i.e., "*filthy, dirty, fail, mess, doubt, uncertain, disease,* and *guilt*"), OC positive checkers (i.e., "*precise, assured, relaxed, precaution, perfect, scheme, protected,* and *safe*"), and OC negative checkers (i.e., "*fatal, disaster, fail, wrong, doubt, uncertain, guilty,* and *grief*") word categories (p. 244). The color-naming times were recorded with an audio recorder. The interference scores were calculated for the four emotionally valenced word types. The interference scores were computed by subtracting the latencies for neutral words from the latencies for each of the emotional words. Congruent with previous findings Lavy et al. (1994) found

that OC subjects selectively attended to negative OC-related cues, which supports the threat-relatedness hypothesis. However, the OC subjects did not show an attentional bias for positive OC-related words. In other words, the interference scores for the OC and control subjects did not differ on the four emotionally valenced group types except for the OC Negative. In summary, Lavy et al. (1994) findings support previous findings that anxious subjects selectively attend to threatening stimuli which are associated with their fears. There was no evidence for the support of the concern-relatedness hypothesis since the OC subjects did not show an attentional bias for positive words related to OCD. Lavy et al. (1994) findings provide additional support for cognitive tasks as reliable measures of fear.

McNeil et al. (1999) examined how subjects meeting the *Diagnostic and Statistical manual*, third edition, revised (DSM-III-R; American Psychiatric Association, 1987) criteria for posttraumatic stress disorder (PTSD), obsessive-compulsive disorder (OCD), and Major Depressive disorder (MDD) responded to depression and anxiety Stroop stimuli. All patients were administered a General Anxiety

Stroop Test, a Depression Stroop Test, and a standard color-word Stroop Test. A General Anxiety Stroop test used 20 anxiety words (10 social threat (e.g., "*criticized*") and 10 physical threat (e.g., "*cancer*") words) and matched neutral controlled words (e.g., "thermostat, metric, respectively). The Depression Stroop test used 20 depression-related words (e.g., "*hopeless*") and matched neutral controls (e.g., "*pavement*") (p. 513). The stimuli and the control words were matched based on letters, syllables, and frequency of use in the English language. A standard color-word Stroop consisted of five color words (i.e., "*blue, green, red, white,* and *yellow*") presented in antagonistic colors (i.e., every color except itself). The control words for this Stroop test were groups of five XXXXXs, which were also presented in five different colors. Only the PTSD group showed a significant difference, responding with greater latency to emotional than neutral Stroop stimuli. The MDD and OCD groups showed a similar effect, however, the differences were not significant. There was also a main effect of type of Stroop stimuli such that emotional Stroop stimuli required more time to color-name than neutral stimuli.

There was also a main effect of the type of Stroop stimuli such that regardless of diagnostic group, response time for the color-words was longer than that of the neutral XXXXXs. In summary, all three groups of patients with PTSD, OCD, and MDD showed cognitive and response slowing to general anxiety stimuli, depression stimuli, and color-words compared with neutral words. These results are consistent with the previous findings. McNeil et al. (1999) findings provide additional support for cognitive tasks as reliable measures of fear.

In the *Diagnostic and Statistical Manual for Mental Disorders*, fourth edition (DSM-IV), panic disorder is characterized by recurrent, unexpected panic attacks and a concomitant fear of or concern about having additional attacks (American Psychiatric Association, 1994).

Buckley et al. (2002) examined processing of threatening information in subjects with posttraumatic disorder (PTSD) and panic disorder. Thirty subjects who met the DSM-IV (American Psychiatric Association, 1994) criteria for PTSD after witnessing a motor vehicle accident, 30 subjects who met the DSM-IV (American Psychiatric Association, 1994) criteria for panic disorder

and 30 normal controls without any current anxiety disorder diagnosis participated in the modified Stroop task. Additionally, all the subjects completed the Beck Depression Inventory (BDI; Beck et al., 1961), the State Anxiety Inventory (STAI; Spielberger et al., 1970), and the Brief Symptom Inventory (BSI; Derigatis & Melisaratos, 1983). As part of the modified Stroop task all the subjects were presented with three types of word stimuli: PTSD-specific (i.e., "*highway, accident, smash, scream, accelerate, mutilated, emergency,* and *trapped*"), panic-specific (i.e., "*heart attack, faintness, breathless, shaky, dizzy, collapse, insane,* and *heartbeat*"), and neutral (i.e., two sets of semantically related words: tools [i.e., "*screwdriver, hammer, wrench, toolbox, pliers, saw, crowbar,* and *nail*"] and musical instruments [i.e., "*rattle, cornet, bagpipe, piano, harp, banjo, clarinet,* and *guitar*"])(pp. 103-104). All the words were presented on the computer screen eight times, twice in each of four colors: green, blue, white, and red. Vocal response latencies were measured. Buckley et al. (2002) hypothesized that subjects with PTSD and panic disorders will show ". . . delayed vocal response latencies for all

stimuli with negative valence ratings relative to neutral stimuli" (p. 101) and that control subjects who do not have anxiety disorder diagnosis would not show delayed latencies to negative stimuli. There was a main effect of word type and a main effect of group. Subjects with PTSD showed a delayed vocal response times for disorder-specific threat words compared to neutral words. Similarly, subjects with panic disorder showed a delayed response times for disorder-specific threat words compared to neutral words. In summary, consistent with previous findings Buckley and colleagues (2002) found that subjects with PTSD and panic disorder showed delayed responses to disorder-specific threat stimuli. Buckley et al. (2002) findings provide additional support for cognitive tasks as reliable fear specific measures of fear.

Ehlers et al. (1988) examined processing of threat cues in subjects with panic disorder via a modified Stroop task. In the first study 24 subjects who met DSM-III (American Psychiatric Association, 1980) criteria for panic disorder or agoraphobia with panic attacks and 24 controls without any current anxiety disorder diagnosis were included into the study. In a modified Stroop task

subjects were instructed to color-name out loud as quickly and as accurately as possible words printed on a board in red, blue, green, and yellow ink. Five word categories of words were presented: physical threat words (i.e., "*disease, fatal*"), separation words (i.e., "*separation, lonely*"), embarrassment words (i.e., "*stupid, humiliation*"), positive words (i.e., "*leisure, alert, faithful,* and *optimism*"), and neutral words (i.e., "*apple, house*") (p.204). The time it took subjects to color name each of the words was measured. Ehlers et al. (1988) hypothesized that subjects with panic disorder will be slower at color-naming physical threat words than separation, embarrassment, positive and neutral words compared to controls. Results revealed that subjects with panic disorder were slower at color-naming threat words compared to the control subjects, which is consistent with the hypothesis made by Ehlers et al. (1988).

In the second study 18 subjects who met DSM-III (American Psychiatric Association, 1980) criteria for panic disorder or agoraphobia with panic attacks and 18 controls without any current anxiety disorder diagnosis were included into the study. In a modified Stroop task

subjects were instructed to color-name out loud as quickly and as accurately as possible words printed on a board in red, blue, green, and yellow ink. Three word categories of words were presented: physical threat words (i.e., *"disease, fatal"*), neutral words (i.e., *"apple, house"*), and color words (i.e., *"red, blue"*)(p. 212). The time it took subjects to color name each of the words was measured. Ehlers et al. (1988) hypothesized that subjects with panic disorder will be slower at color-naming threat related words than neutral and color words compared to controls. The results showed that subjects with panic disorder showed greater Stroop interference for color-naming threat words compared to controls. The results of both study one and two are consistent with previous findings of attentional bias for threat-related words in subjects with panic attacks. Ehlers et al. (1988) findings provide additional support for cognitive tasks as reliable measures of fear.

McNally et al. (1992) examined cognitive processing of information in subjects with panic disorder, obsessive-compulsive disorder (OCD), and normal controls via an Emotional Stroop task. The group of subjects with panic

disorder consisted of 24 subjects who met DSM-III-R (American Psychiatric Association, 1987) criteria for panic disorder. The OCD group consisted of 24 subjects who met DSM-III-R (American Psychiatric Association, 1987) criteria for obsessive-compulsive disorder. The normal control group consisted of 24 subjects without current diagnosis for any of the anxiety disorders. During the Emotional Stroop task subjects were presented neutral nonlexical stimuli (i.e., *XXXXXX*), positive words (i.e., "*happiness, cheerful, joy, elation, carefree,* and *pleasant*"), and threat words associated with fear (i.e., "*fearful, panic attack, anxiety, nervous, terror,* and *scared*"), bodily sensation (i.e., "*dizzy, breathless, faintness, palpitation, chest pain,* and *choking*"), and catastrophes (i.e., "*heart attack, collapse, dying, insane, brain tumor,* and *crazy*")(p. 144). Words were shown on a computer screen and appeared in one of the three colors: green, blue, and red. Subjects were asked to color-name out loud the words as quickly and as accurately as possible while ignoring the meaning of the words. Subjects with panic disorder showed a longer latency in response for all word types relative to nonlexical

stimuli. Moreover, subjects with panic disorder showed the largest latency in response to catastrophe words than fear and positive words. Subjects with panic disorder took longer to color-name the threat words than positive words. Furthermore, subjects with panic disorder took as long to color-name positive words as to color-name fear and bodily sensation words. Subjects with OCD showed the same pattern of interference. In summary, these results demonstrate that subjects with panic disorder selectively process information showing an attentional bias for threat cues. McNally et al. (1992) findings provide additional support for cognitive tasks as reliable measures of fear.

In the *Diagnostic and Statistical Manual for Mental Disorders*, fourth edition (DSM-IV), posttraumatic stress disorder (PTSD) is characterized by

> Development of characteristic symptoms following exposure to an extreme traumatic stressor involving direct personal experience of an event that involves actual or threatened death or serious injury, or other threat to one's physical integrity; witnessing an event that involves death injury, or a threat to the physical integrity of another person; or learning

about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close associates.(p. 467)

Furthermore, the DSM-IV specifies that the diagnosis of PTSD requires that ". . . the person's response to the event must involve intense fear, helplessness, or horror" (p. 467, American Psychiatric Association, 1994).

Beck et al. (2001) examined processing of threat words in motor vehicle accident survivors via a modified Stroop task. Three groups of subjects were used: 28 subjects with comorbid posttraumatic stress disorder (PTSD) and pain, 26 subjects with pain and without PTSD, and 21 subjects without pain or any psychiatric disorder. Subjects with PTSD were identified as those who met the DSM-IV (American Psychiatric Association, 1994) criteria for a principal diagnosis of posttraumatic stress disorder. Subjects were included into one of the two pain groups if their pain symptoms were the result of injury suffered during a motor vehicle accident and did not respond to medical treatment after one month. Pain had to cause significant lifestyle limitations, impairment, or significant distress. All of the subjects participated in

the modified Stroop task during which they were asked as quickly and as accurately as possible to color-name out lout words presented on a computer screen in one of five colors: white, red, blue, yellow, and green. Four categories of words presented were accident words (i.e., "*totaled, trauma, accident, trapped, siren, wreck, helpless, scared, crash,* and *terrified*"), pain words (i.e., "*throbbing, cringe, sore, hurting, suffer, discomfort, pain, injury, ache,* and *agony*"), positive words (i.e., "*enjoyment, nice, smile, laughing, glad, lovely, cheer, delight, friendly,* and *amusing*"), and neutral words (i.e., "*cabinet, kitchen, table, blender, fork, spoon, chair, toaster, bowl,* and *dishwasher*") (p. 539). Response latencies were recorded. The latency was defined by Beck et al. (2001) as ". . . time elapsed between presentation of the stimulus and color-naming response" (p. 540). After the completion of the Stoop task all the participants were asked to complete the psychopathology and pain measures such as the Beck Depression Inventory (BDI; Beck et al., 1961), the State-Trait Anxiety Inventory - State and Trait subscales (STAI-S and STAI-T; Spielberger et al., 1970), the PTSD Symptom

Scale - Self Report (PSS-SR; Foa, Riggs, Dancu, & Rothbaum, 1993), and the Impact of Event Scale-Avoidance and Intrusion subscales (IES-A and IES-I; Zilberg, Weiss, & Horowitz, 1982). Additionally, subjects were asked to complete several self-report pain measures such as the Pain Distress Scale (PDS; Jensen, Karoly, & Harris, 1991), the Oswestry Disability Index (ODI; Fairbank, Couper, Davies, & O'Brien, 1980), and the Multidimensional Pain Inventory (Kerns, Turk, & Rudy, 1985). Subjects with comorbid PTSD and pain showed significant response delays in both accident and pain-related words. Additionally, for this group of subjects response latency was significantly slower for pain words compared to both the neutral and positive categories. Patients with no PTSD and with pain showed significant delayed response only to pain stimuli compared to all other stimuli. In summary, results of Beck et al. (2001) show interference effect with respect to trauma and pain on a modified Stroop task. Subjects with comorbid PTSD and pain showed a longer latency in color-naming both accident and pain-related words, however, participants only with pain and no PTSD showed a delayed response only to pain stimuli. Beck et

al. (2001) findings provide additional support for cognitive tasks as reliable measures of fear.

Foa et al. (1991) examined processing of threat-related information via a modified Stroop task in rape victims. Forty-five female subjects participated in the study. Fifteen of the subjects were rape victims who met *Diagnostic and Statistical Manual of Mental Disorders* (3 edition, revised; DSM-III-R; American Psychiatric Association, 1987) criteria for PTSD, 14 rape victims without PTSD, and 16 normal control subjects. All of the subjects participated in the modified Stroop task in which they were asked to color-name out loud words presented on a computer screen as quickly and as accurately while ignoring the meaning of the words. Four types of words were presented: specific threat words - rape related (i.e., "*rape, assault, stalker, scream, struggle, trapped, v.d., penetrate, nightmare,* and *attack*"), general threat words related to physical harm and death (i.e., "*anxiety, death, cancer, tumor, stress, funeral, panic, coffin, guilt,* and *nervous*"), neutral words (i.e., "*banana, cherry, grape, raisin, apple, prune, peach, strawberry, melon,* and *pear*"), and nonwords which were 10 English

words with one letter changed (i.e., "*gosp, narvos, shet, rupe, punic, chorry, peuch, scroam, mulon,* and *gailt*") (p. 159). Response latencies were measured. Foa et al. (1991) defined latency as ". . . the time elapsed between stimulus presentation and color-naming response" (p. 158). In addition to the modified Stroop task subjects completed several psychopathology measures including the Rape Aftermath Symptom Test (Kilpatrick, 1988), the Revised Impact of Event Scale (Horowitz, Wilner, & Alvares, 1979), the State-Trait Anxiety Inventory (STAI; Spielberger et al., 1970), and the Beck Depression Inventory (BDI; Beck et al., 1961). Foa et al. (1991) hypothesized that rape victims with PTSD would have longer color-naming latencies for trauma-related words than for any of the other three word type categories. Rape victims with no PTSD and normal controls were expected not to show any differences in response latencies to all four word types. Rape victims with PTSD showed longer response latency in color-naming of rape-related words than words from all other categories. Response latencies of rape victims without PTSD and normal controls did not differ across word types. In summary, the results of Foa et al. (1991) supported the

hypothesis that rape victims with PTSD but not those without PTSD would exhibit selective processing for rape-related cues. The hypothesis that there would be no Stroop interference for rape victims without PTSD and for normal control subjects was also supported by Foa et al. (1991) findings. The findings of Foa et al. (1991) are congruent with the previous research findings with a modified Stroop tasks. Foa et al. (1991) findings provide additional support for cognitive tasks as reliable measures of fear.

McNally et al. (1996) examined processing of threat cues in Vietnam combat veterans with and without PTSD via a modified Stroop task. McNally et al. (1996) hypothesized that veterans with PTSD would be slower at color-naming trauma words than all other word types. Twenty-eight male Vietnam combat veterans participated in the study out of which 14 met the DSM-III-R (American Psychiatric Association, 1987) criteria for PTSD and 14 did not (normal controls). During a modified Stroop task four word types were presented on a computer screen: trauma words (i.e., "*bodybags, kill, firefight, Charlie, ambush, jungle, medevac, gook, bullets, death, sapper,* and

*hooch*"), positive words (i.e., "*paradise, beauty, celebrate, caring, sincere, trust, love, loyalty, blissful, affection, elated,* and *ecstasy*"), neutral household-item words (i.e., "*microwave, curtain, refrigerator, desk, chair, mirror, dishwasher, freezer, table, sink, carpet,* and *lamp*") and color words (i.e., "*red, blue, green, orange, yellow, pink, purple, brown, white, black, scarlet,* and *gray*") (pp. 117-118). Subjects were instructed to color-name the words appearing on the screen as quickly and as accurately as possible while ignoring the meaning of the words. Response latency was recorded. In addition to a modified Stroop task subjects were asked to complete the Mississippi Scale for Combat-Related Posttraumatic Stress Disorder (M-PTSD; Keane, Caddell, & Taylor, 1988), the Combat Exposure Scale (CES; Keane et al., 1989), the Beck Depression Inventory (BDI; Beck et al., 1961), and the State-Trait Anxiety Inventory (STAI; Spielberger et al., 1983). Results revealed that subjects with PTSD showed longer latencies than control subjects for trauma words, positive words, and neutral words. There was no difference in response latencies between groups to color words. PTSD subjects exhibited a

significantly larger latency in response to trauma words than normal controls. In summary, results of McNally et al. (1996) are consistent with previous research findings. McNally et al. (1996) findings provide additional support for cognitive tasks as reliable measures of fear.

McNally et al. (1990) examined selective processing of threat cues in subjects with posttraumatic stress disorder (PTSD) via a modified Stroop task. Thirty Vietnam combat veterans with and without PTSD participated in the study. Fifteen of the combat veterans met the Diagnostic and Statistical Manual of Mental Disorders (third edition, revised; DMS-III-R; American Psychiatric Association, 1987) criteria for PTSD and other 15 subjects did not meet these criteria and were considered to be normal controls. During a modified Stroop task subjects were presented four different word categories on a poster board and asked to color-name the words out loud while ignoring the meaning of the words. The four word categories included neutral words (i.e., "*mix, millionaire, fingertips, concrete,* and *input*"), positive words (i.e., "*love, pleasant, loyal, happy,* and *friendship*"), obsessive-compulsive disorder (OCD) words

(i.e., "*germs filthy, feces, urine,* and *dirty*"), and PTSD words (i.e., "*bodybags, 'nam, firefight, medevac,* and *Charlie*") and appeared in red, blue, green, orange, and black ink colors (p. 399). Time it took each subject to complete the Stroop task was measured. Interference scores were calculated by subtracting the time to complete the control card form the time to complete each of the remaining cards. In addition a modified Stroop task subjects completed the Mississippi Scale for Combat-Related Posttraumatic Stress Disorder (Keane, Caddell, & Taylor, 1988) and the Combat Exposure Scale (CES; Keane et al., 1989). McNally et al. (1990) hypothesized that subjects with PTSD will take longer to color-name PTSD words than to color-name neutral words or OCD words. In addition, normal controls (combat veterans without PTSD) will not exhibit this interference for PTSD words. McNally et al. (1990) results were consistent with the hypotheses made by the investigators and showed that PTSD subjects compared to controls took significantly longer to color-name PTSD words than neutral, OCD, and positive words. McNally et al. (1990) findings provide additional support for cognitive tasks as reliable measures of fear.

Cognitive processing studies with depressed individuals has been mixed with some individuals with depressive disorder showing slower color naming of the generally negative words (Williams & Nulty, 1986; Segal et al., 1995). However, other researchers have not found this slowing in color-naming of negative words (Carter, Maddock, & Magliozzi, 1992; Hill & Knowles, 1991; Doost, Taghavi, Moradi, Yule, & Dalgleish, 1997; Mogg et al., 1993).

In the *Diagnostic and Statistical Manual for Mental Disorders*, fourth edition (DSM-IV), major depression is characterized by depressed mood, sleep and appetite problems, fatigue, cognitive and behavioral lethargy, anhedonia and possibly thoughts of death or suicide (American Psychiatric Association, 1994).

Williams and Nulty (1986) examined how depression was associated with response on a modified Stroop task. Forty-two depressed women participated in the study. Depressed subjects were further separated into "high" or "low" depressed group based on their scores on the Beck Depression Inventory - Short From (BDI-SF; Beck, 1967). All the subjects participated in the Emotional Stroop task

were presented with two categories of words presented in red, blue, green, orange, and brown color ink. The word categories used included neutral words (i.e., "*folded, structure, pile, statue,* and *rusty*"), negative words (i.e., "*hopeless, lonely, immature, tense,* and *pain*") (p. 487). The neutral and emotionally negative words were matched on frequency and length. Subjects in the "high" depression group showed greater inference in color-naming of negative words compared to neutral words. In summary, depressive subjects showed interference on an Emotional Stroop task. Williams et al. (1986) findings provided support for cognitive processing tasks as reliable measures of depression.

Segal et al. (1995) examined processing of self-descriptive emotional information in depression via a modified Stroop task. Segal and colleagues (1995) hypothesized that depressed patients will show the longest color-naming latencies in naming self-referent stimuli. Fifty-eight depressed subjects and 44 non-depressed controls participated in the study. All the subjects participated in an Emotional Stroop task in which they were asked to color-name two different word categories:

positive words (i.e., "*trustworthy, sincere*"), negative words (i.e., "*quarrelsome, selfish*") and short phrases: positive phrases (e.g., "*able to feel close, I can take criticism*") and negative phrases (e.g., "*hard to trust others, I often feel judged*") (p. 207). Words were presented in red, green, yellow, and blue colors on a computer screen. Participants were asked to color-name words out loud while ignoring the meaning. Results showed that depressed subjected showed slower color-naming latencies for self-descriptive negative information. Segal et al. (1995) findings provide additional support for cognitive tasks as reliable measures of depression.

The emotional Stroop task has been used to study attentional bias and selective processing of emotional information. Selective attention might underlie the symptoms of psychological dysfunction; hence, understanding it might explain a wide array of emotional pathology.

## Early Maladaptive Schemas

The cognitive model of psychopathology suggests that core beliefs about self and others represent a

vulnerability to various forms of mental disorders (Beck, 1979). Specifically, the model asserts that maladaptive schemas bias the manner in which environmental information is processed leading to various forms of psychopathology. For example, individuals with anxiety disorders, due to their schemas, process everyday situations as more dangerous which in turn exacerbates and maintains their symptoms (Beck, Emery, & Greenberg, 1985). Young (1990) suggests that most early maladaptive schemas (EMS) are caused by early failure of parents to meet key developmental needs for safety, consistency, nurturing, and limit setting. He proposes that selective processing of schema-confirmatory information at the exclusion of schema disconfirmatory information maintains the EMS.

Young (1990) proposed a model that included 18 core beliefs that he called early maladaptive schemas (EMS) which fall into five domains based upon shared developmental themes (e.g., attachment or connection; individuation/separation; self-control and goal directedness; self or other focus; and openness to spontaneity and emotions). EMS were defined as "broad pervasive dysfunctional themes or patterns typically

related to interpersonal relationships or self comprised of memories, bodily sensations, cognitions, and emotions."

The five domains include *Disconnection and Rejection, Impaired Autonomy and Performance, Impaired Limits, Other-Directedness, and Overvigilance and Inhibition.* Young defined Disconnection and Rejection domain as

> Expectation that one's needs for security, safety, stability, nurturance, empathy, sharing of feelings, acceptance, and respect will not be met in a predictable manner. The typical family origin is described as detached, cold, rejecting, withholding, lonely, explosive, unpredictable, or abusive. (p. 13)

The Disconnection and Rejection domain includes the EMS of *Abandonment/ Instability* (the feeling that the close ones will not be able to emotionally support us, or to protect us and they will abandon us in favor of someone better), *Mistrust/ Abuse* (the belief that in the end, the others will intentionally hurt, abuse, humiliate, cheat, lie, manipulate, or take advantage of us), *Emotional Deprivation* (the others don't offer us the nurturance, empathy and protection we need), *Defectiveness/ Shame* (the feeling that one is bad, unwanted, inferior, in important

respects; or that one would be unlovable to significant others), and *Social isolation/ Alienation* (the sense that someone is different from others and is not part of any group).

Young (1990) defined Impaired Autonomy and Performance domain as

> Expectations about oneself and the environment that interfere with one's perceived ability to separate, survive, function independently, or perform successfully. The typical family origin is described as enmeshed, undermining of child's confidence, overprotective, or failing to reinforce child for performing competently outside the family. (p. 18)

The Impaired Autonomy and Performance domain includes the EMS of *Dependence/ Incompetence* (the belief that one needs considerable help from others to handle one's everyday responsibilities in a competent manner), *Vulnerability to harm or illness* (exaggerated fear that imminent illness, emotional or external catastrophe will strike at any time and that one will be unable to prevent it), *Enmeshment/ Undeveloped Self* (excessive emotional involvement and closeness with one or more significant

others (often parents), at the expense of independence and normal social development), and *Failure* (the belief that one has failed and will inevitable fail in areas of achievement, so he or she is stupid, lower status, or less successful than others).

Young defined Impaired Limits domain as ". . . deficiency in internal limits, responsibility to others, or long-term goal-orientation" (p. 18). Impaired Limits domain leads to difficulty respecting the rights of others, cooperating with others, making commitments, or setting and meeting realistic personal goals. The typical family origin is characterized by permissiveness, overindulgence, lack of direction, or a sense of superiority -- rather than appropriate confrontation, discipline, and limits in relation to taking responsibility, cooperating in a reciprocal manner, and setting goals. In some cases, child may not have been pushed to tolerate normal levels of discomfort, or may not have been given adequate supervision, direction, or guidance. The Impaired Limits domain contains the EMS of *Entitlement/ Grandiosity* (the belief that one is superior to others people, that claim the right to do or have

whatever want, regardless of what is realistic, or the cost to others, all this in order to get control and power) and *Insufficient Self-Control/ Self-Discipline* (the difficulty to practice self-control and discipline to achieve one's personal goals, or to restrain the excessive expression of one's emotions and impulses, the excessive desire to maintain the comfort and to avoid unpleasant situations).

Young defined Other-Directedness domain as ". . . an excessive focus on the desires, feelings, and responses of others, at the expense of one's own needs in order to gain love and approval, maintain one's sense of connection, or avoid retaliation" (p. 19). This usually involves suppression and lack of awareness regarding one's own anger and natural inclinations. The typical family origin is based on conditional acceptance: children must suppress important aspects of themselves in order to gain love, attention, and approval. In many such families, the parents' emotional needs and desires or social acceptance and status are valued more than the unique needs and feelings of each child. The domain of Other-Directedness includes the EMS of *Subjugation* (suppression of one's

preferences, decisions, desires, and suppression of emotional expression, especially anger usually to avoid the abandonment items), *Self-sacrifice* (excessive focus on voluntarily meeting the needs of others in daily situations, at the expense of one's own gratification), and *Approval-Seeking/ Recognition-Seeking* (excessive emphasis on gaining approval, recognition, attention from other people, the one's sense of esteem is dependent on the reactions of others).

Young defined the Overvigilance and Inhibition domain as ". . . excessive emphasis on suppressing one's spontaneous feelings, impulses, and choices or on meeting rigid, internalized rules and expectations about performance and ethical behavior often at the expense of happiness, self-expression, relaxation, close relationships, or health" (p. 20). The typical family origin is described as grim, demanding, and sometimes punitive: performance, duty, perfectionism, following rules, hiding emotions, and avoiding mistakes predominates over pleasure, joy, and relaxation. There is usually an undercurrent of pessimism and worry that things could fall apart if one fails to be vigilant and careful at all

times. Overvigilance and Inhibition domain includes the EMS of *Negativity/ Pessimism* (an excessive focus on the negative aspects of life and minimizing or neglecting the positive aspects), *Punitiveness* (the belief that people should be punished for making mistakes), *Emotional inhibition* (inhibition of anger, inhibition of positive impulses, difficulty expressing vulnerability or communicating freely about one's feelings, needs and excessive emphasis on rationality while on emotionality while disregarding emotions), and *Unrelenting standards/ Hypercriticalness* (the belief that one must strive to meet very high internalized standards, usually to avoid criticism. Its forms are the perfectionism, the excessive attention to detail, the rigid rules and the "shoulds").

Young developed the Early Maladaptive Schema Questionnaire-Short Form (YSQ-SF) to assess EMS (Young, 1998). The YSQ-SF has been shown to have adequate internal consistency with Cronbach's alpha coefficients ranging from 0.76 to 0.93 (Wellburn et al., 2002) and 0.71 to 0.93 (Glaser et al., 2002; Wellburn et al., 2002). Furthermore, the construct validity of this measure has been supported by findings of Wellburn et al. (2002) and

Glaser et al. (2002) which showed that 70 out of the 75 items loaded as designed and all 15 EMS subscales accounted for significant amount of variance in the other measures of symptomatology.

## Early Maladaptive Schemas and Psychological Distress

Schmidt, Joiner, Young, and Telch (1995) tested convergent validity between the Schema Questionnaire and eight variables assessing self-esteem, psychological distress, depression, and anxiety. A total of 181 undergraduate college students (96 male and 85 female) participated in the study with the average age of 19.2 (SD = 3.7). The majority of the study participants were Caucasian and single (77 and 98 percent, respectively). The relationship between 160-item Schema Questionnaire (SQ) and convergent variables was assessed via the following measures: Beck Depression Inventory, Dysfunctional Attitudes Scale, Personality Diagnostic Questionnaire-Revised, Positive Affectivity/Negative Affectivity Scale, Rosenberg Self-Esteem Questionnaire, Symptom Checklist-90-Revised, and Global Severity Index.

There was a significant positive relationship between the total score on the SQ and measures of anxiety, depression, and the overall distress ($r = .47$, $r = .59/.63$, $r = .67$). A total of 55% of the variance in the GSI was accounted for by the three schema domains: *vulnerability* (38% variance), *dependency* (10% variance) and *insufficient self-control* (6% variance). In the stepwise regression analyses with the BDI as the dependant variable, 27% of the variance was accounted for by *dependency*, with additional 6% of the variance being accounted for by *defectiveness*. A total of 34% of the variance in the anxiety subscale of the SCL-90-R was accounted for by *vulnerability* (28%), *incompetence/ inferiority* (3%) and *emotional inhibition* (3%). The findings of this study demonstrate that EMS accounted for significant portions of the variance in the constructs of psychological distress, depression, and anxiety, and, therefore, are supportive of the Schema Theory hypotheses.

Expanding on the study conducted by Schmidt et al. (1995), Glaser, Campbell, Calhoun, Bates and Petrocelli (2002) examined the construct validity of the Early Maladaptive Schema Questionnaire-Short Form (EMSQ-SF;

Young, 1994) in a clinical population. A total of 141 individuals (99 women and 42 men) receiving psychological treatment at a counseling center participated in the study and ranged in age between 18 and 52 years old, with the average age of 28.95 (SD = 7.80). The relationship between EMS, measured via Early Maladaptive Schema Questionnaire-Short Form (EMSQ-SF; Young, 1994), and general measures of psychopathology such as Symptom checklist-90-Revised (SCL-90-R; Derogatis, 1983; measures nine clusters of symptoms such as anxiety and depression), Beck Depression Inventory (BDI; measures severity of symptoms of depression), Positive and Negative Affect Schedule (PANAS; measures positive and negative affect), and Millon Clinical Multiaxial Inventory-II (MCMI-II; measures personality, emotional adjustment, and attitude) was examined. Analyses revealed that EMS accounted 54% of the total variance in BDI scores, 50% of the total variance in anxiety and 49% of the total variance in depression symptoms(measured by the SCL-90-R), 38% of the total variance in PANAS-NA and major depression (measured by MCMI-II). In summary, the findings of the current

study are in line with the previous research that the EMS predict symptoms of anxiety and depression.

Wellburn, Coristine, Dagg, Pontefract, and Jordan (2002) examined the relationship between the SQ-SF and psychological distress measured by Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983; shorter version of the SCL-90-R) in a clinical sample. A total of 196 individuals (131 women and 65 men) receiving psychological treatment participated in the study and ranged in age between 18 and 63 years old, with the average age of 36.9 (SD = 9.3). Most of the participants in the sample met DSM-IV diagnostic criteria for one and almost half (46%) met diagnostic criteria for more than one Axis I diagnosis. Factor analysis revealed that all 15-factors accounted for 73.1% of the total variance. Analyses revealed that EMS accounted 52% of the total variance in anxiety and 47% of the total variance in depression (measured by BSI). In summary, the findings of the current study were consistent with the previous research findings and support ability of the EMS to predict symptoms of anxiety and depression.

# CHAPTER TWO

# DEVELOPMENT OF THE SCHEMA STROOP TASK

The current study was designed to provide empirical support for the measurement of Early Maladaptive Schemas (EMS) with a more subtle cognitive processing assessment strategy than self-report.

## Hypotheses

### Schema Domain and Stroop Latency/ Interference Hypotheses

It is hypothesized that self-report of schema domain on the YSQ-SF will correlate positively with both response latency and interference score on the Stroop color-naming task. Specifically, it is expected that there will be a significant positive correlation between the self-report score on the DR domain of the YSQ and response latency and interference on the DR Stroop color-naming task. Likewise, it is expected that there will be a significant positive relationship between the self-report score on the IAP domain of the YSQ and response latency and interference on the IAP Stroop color-naming task.

Additionally, it is expected that there will be a significant positive relationship between the self-report score on the IL domain of the YSQ and response latency and interference on the IL Stroop color-naming task. Likewise, it is expected that there will be a significant positive relationship between the self-report score on the OD domain of the YSQ and response latency and interference on the OD Stroop color-naming task. Lastly, it is hypothesized that it there will be a significant positive relationship between the self-report score on the OI domain of the YSQ and response latency and interference on the OI Stroop color-naming task.

Schema Domain Group Hypotheses

Participants will be divided into two quartile groups (upper quartile versus lower quartile) based upon score on each of the five YSQ-SF schema domains. Participants scoring in the top 25% of each of the five YSQ-SF schema domains will be compared to those in the bottom 25% on the corresponding domain specific Stroop color naming latency/interference score. Specifically it is hypothesized that participants in the upper quartile groups (DR, IAP, OD, IAP, and OI) will exhibit greater

response latencies and interference scores on the respective DR, IAP, OD, IAP, and OI Stroop color-naming tasks.

# CHAPTER THREE

## STUDY ONE

Study 1 was designed to provide support to the measurement of Early Maladaptive Schemas (EMS) by identifying words correlated with EMS which were used in a future study to conduct a cognitive processing test for schemas by means of a modified Stroop task (the Schema Stroop) for schemas. In other words, the Schema Stroop was testing measurement of the EMS by means of a non-self report measure. A Schema Stroop task was a modification of the original Stroop task and similar to emotional Stroop task, however, compared to emotional Stroop task where negative emotional words are used, the Schema Stroop task utilized schema related words (e.g., "abandonment" for Abandonment/ Instability schema) which have been identified in the current study.

## Methods

### Participants

The sample consisted of 101 (83 females and 18 males) undergraduate students from California State University, San Bernardino. Mean age of participants was 23.43 (SD = 7.73). The ethnic composition of the sample was as follows: Latino 40.6%, Caucasian 29.7%, African Americans 13.9%, Asian Americans 6.9%, Native American 1%, and other ethnicity 6.9%. All participants were treated in accordance with the Ethical Principles of the American Psychological Association (American Psychological Association, 2002).

### Stimulus Materials

Word Stimuli. A list of 160 nouns and adjectives was developed for each of the fifteen EMS (Emotional Deprivation, Abandonment/ Instability, Mistrust/ Abuse, Social isolation/ Alienation, Defectiveness/ Shame, Failure, Dependence/ Incompetence, Vulnerability to harm or illness, Enmeshment/ Undeveloped Self, Subjugation, Self-sacrifice, Emotional inhibition, Unrelenting standards/ Hypercriticalness, Entitlement/ Grandiosity, and Insufficient Self-Control/ Self-Discipline).

Participants rated these schema related words on the dimensions of relatedness and emotionality. *Relatedness* was defined as the degree to which words generally apply to the participant's relationships with others (0 = Applies Very Little, 1 = Applies a Little, 2 = Applies Moderately, 3 = Applies Much, 4 = Applies Very Much). *Emotionality* rating was defined as the degree to which the words were generally positive or negative emotionality (0 = Very Negative, 1 = Somewhat Negative, 2 = Neutral, 3 = Somewhat Positive, 4 = Very Positive).

Other Materials

*Young Schema Questionnaire-Short Form (YSQ-SF; Young, 1998).* This 75-item self-report questionnaire is designed to measure presence and severity of Early Maladaptive Schemas (EMS). Each item is rated on a 6-point Likert-type scale indicating degree to which participant agrees with the statement (1 = *completely untrue of me;* 2 = *mostly untrue of me;* 3 = *slightly more true than untrue;* 4 = *moderately true of me;* 5 = *mostly true of me;* 6 = *describes me perfectly*). Sample question: "I worry that people I feel close to will leave me or abandon me." Higher scores indicate greater presence and/or severity of

EMS. The YSQ-SF yields five domains and 15 schemas (see introduction for further elaboration regarding schemas and domains). Three of the 18 schemas that failed to emerge in factor analysis (Schmidt et al., 1995) have been omitted. These include Approval /Recognition Seeking, Negativism/Pessimism, and Punitiveness. Adequate internal consistency of the schema subscales has been reported with Cronbach's alpha coefficients ranging from 0.76 to 0.93 (Welburn et al., 2002) and 0.71 to 0.93 (Glaser et al., 2002). Construct validity of this measure is supported where 70 of the 75 items loaded as designed (Wellburn et al., 2002) and where all 15 of the EMS subscales compared well to other symptoms measures and accounted for statistically significant variance in several measures of symptomatology (Glaser et al., 2002).

Furthermore, schema words for the particular schemas in each domain were correlated with domain scores on the Young Schema Questionnaire - Short Form.

## Results

The schema related words were correlated with participants' scores on the YSQ-SF. Correlations between

the schema words and the scores on the corresponding domains of the YSQ-SF ranged from 0.027 and 0.608. Within each schema domain, nine words with the highest correlations were selected (see Table 2).

Each schema word was matched with a neutral word on the dimensions of length (number of letters in the word), syllables (number of syllables in the word), and frequency (frequency norms based on the HAL corpus, Lund & Burgess, 1996) according to the English Lexicon Project. The English Lexicon Project is a web-based repository of descriptive and behavioral measures for 40,481 English words and non-words (Balota et al., 2002). The final schema & neutral words selected for the experiment are listed in Table 1.

## Discussion

Conducting a Schema Stroop can provide new insights into whether patients are slower in color naming emotionally threatening words because of personal relevance of stimuli or in terms of subjective emotional valence. It will also provide support of the measurement

of EMS by measuring latency of response of schema words compared to neutral words.

# CHAPTER FOUR

# STUDY TWO

## Methods

### Participants

The sample consisted of 77 (67 females and 10 males) undergraduate students from California State University, San Bernardino. Mean age of participants was 25.09 (SD = 7.66). The ethnic composition of the sample was as follows: *Latino/Hispanic* 28.6%, *Caucasian* 24.7%, *African American* 19.5%, *Asian/Asian American* 13%, *Native American/American Indian* 2.6%, *bi-cultural* 10.4% and *other* ethnicity 1.3%. None of the participants reported having color blindness or *synesthesia*. Participants reported that the primary language spoken by their parents was as follows: English 66.7%, Spanish 19.5%, Chinese 2.6%, and other languages 11.7%. More than half of the study participants reported earning less than $15,000 annually (51.3%). All participants were treated in accordance with APA ethical principles regarding the conduct of research with human participants. Participants were asked to sign up for a 1 hour experiment and completed 2 questionnaires

and a demographic form as well as completed a brief Schema Stroop color naming task. Participants were given 6 units of extra credit for their participation. All participants were treated in accordance with APA ethical principles regarding the conduct of research with human participants.

## Stimulus Materials

Word stimuli. The present study used three stimuli categories: a category of nine words for each schema domain (e.g., abandonment), a category of nine neutral words (e.g., backpack), and a category of nine non-words (e.g., XXXXX). The schema words were chosen from a study 1 as described previously.

## Other Materials

*Young Schema Questionnaire-Short Form (YSQ-SF; Young, 1998).* Detailed description of this measure is included in the materials section in study 1.

## Design

The design formed a 3 x 5 factorial model with type of stimuli (schema word/incongruent, neutral word, neutral non-word) and schema domain (Disconnection and Rejection, Impaired Autonomy and Performance, Impaired Limits, Other Directedness, and Overvigilance and Inhibition) as within-

subjects factors. For each domain, the nine of the schema words, neutral words, and neutral non-words were grouped together in a block. Five blocks, one for each domain, with 27 words in each block, were counterbalanced such that each domain appeared in every order. Each schema word, neutral word, and non-word was presented equally often in each of the three colors across all the participants.

Procedure

Upon arrival to the experiment session, all the participants were provided with a consent form with a brief description of the procedures for them to read and sign. Afterwards, half of the participants were asked to complete the demographics form, the Young Schema Questionnaire-Short Form (YSQ-SF; Young, 1998) and the Brief Symptom Inventory (BSI; Deragatis & Melisaratos, 1983) prior to the Schema Stroop task and half of the participants were asked to complete these measures after the Schema Stroop. The Schema Stroop will be presented through an *E-Prime* platform.

The participants were told that the task was a color perception task in which they would be presented with a

word in one of three ink colors: red, blue, green. Participants were shown 20 letter strings to familiarize them with the ink colors. They were instructed to ignore the meaning of the words themselves and make a key-press response to the color of the ink as quickly and as accurately as possible. If any errors were made they were asked not to correct themselves. Responses were made with three buttons. Participants positioned index, middle, and ring ringers of their dominant hand on the top of the buttons, which were labeled with red, blue, or green stickers. The Schema Stroop task involved presenting a single color word at the center of a white colored screen using a personal desktop computer. Each stimulus remained on the screen until a response was made or 1500 milliseconds elapsed. Following the participants' response or non-response, the next stimulus was presented immediately. Each of the forty five schema/incongruent words, neutral words, and non-words were presented for the total of 135 trials.

## Results

Prior to beginning data analysis, the variables were examined for univariate and multivariate outliers, skewness and kurtosis. The variables of interest in this prescreening assignment were: gender, age, annual income, BSI scores, YSQ-SF scores, and response times (latency and interference) on the Stroop task. Data was collected from 77 research participants.

There were no cases with missing data. Assumptions of normality, linearity, and homoscedasticity of residuals were evaluated through scatterplot of regression standardized residuals. Thirteen variables were significantly skewed (age, annual income, response times for Disconnection and Rejection (DR) neutral and incongruent words, Impaired Autonomy and Performance (IAP) neutral and incongruent words, Impaired Limits (IL) incongruent word, and Overvigilance and Inhibition (OI) incongruent word). None of the variables were significantly kurtoic. Skewed variables violate assumption of normality of distribution of residuals and also might feign variables as outliers. There was a straight line relationship with residuals equally

distributed around the regression line. Hence assumptions of linearity and homoscedasticity were confirmed.

Data was transformed into z-scores and reevaluated for skewness. Using criterion of $z = 3.3$, $p<0.001$ one univariate and two multivariate outliers were detected. With the use of a critical value of 37.697, $p<0.001$ ($\chi(15) = 37.697$), criterion for Mahalanobis distance, two multivariate outlier among the cases were identified (z-score = 6.75 (58.28) and z-score = 4.84 (59.97). Univariate and multivariate outliers were deleted from the sample. Simple linear regression analysis was performed on the remaining 74 cases using SPSS.

The data was examined for response times below 200 milliseconds and above 1500 milliseconds. No such cases were found in the dataset, and, therefore, no variables were excluded. Additionally, as a manipulation check, the relationship between accuracy response and latency and interference response times was examined and no significant correlations were found (see Tables 3 and 4).

There were no significant positive correlation between each domain on YSQ-SF and latency response times to the corresponding domains on the Stroop Task (see Table 5).

There were also no significant positive correlation between each domain on YSQ-SF and interference response times to the corresponding domains on the Stroop Task (see Table 6).

An independent samples t test compared the mean interference response for the first quartile of DR domain on YSQ-SF (M = 10.365, SD = 233.259) with the mean interference response for the third quartile of DR domain on YSQ-SF (M = 30.859, SD = 152.694). This comparison was not statistically significant, $t(39) = -.327$, $p>.001$. This result indicates that there were no statistically significant mean differences in interference response between the first and third quartile scores on DR domain of YSQ-SF.

An independent samples t test compared the mean interference response for the first quartile of IAP domain on YSQ-SF (M = -2.148, SD = 131.889) with the mean interference response for the third quartile of IAP domain on YSQ-SF (M = -31.408, SD = 101.417). This comparison was not statistically significant, $t(36) = .760$, $p>.001$. This result indicates that there were no statistically significant mean differences in interference response

between the first and third quartile scores on IAP domain of YSQ-SF.

An independent samples t test compared the mean interference response for the first quartile of IL domain on YSQ-SF (M = -.342, SD = 266.260) with the mean interference response for the third quartile of IL domain on YSQ-SF (M = 3.396, SD = 104.264). This comparison was not statistically significant, $t(37) = -.134$, $p>.001$. This result indicates that there were no statistically significant mean differences in interference response between the first and third quartile scores on IL domain of YSQ-SF.

An independent samples t test compared the mean interference response for the first quartile of OD domain on YSQ-SF (M = 32.013, SD = 107.613) with the mean interference response for the third quartile of OD domain on YSQ-SF (M = -2.144, SD = 88.697). This comparison was not statistically significant, $t(39) = 1.098$, $p>.001$. This result indicates that there were no statistically significant mean differences in interference response between the first and third quartile scores on OD domain of YSQ-SF.

An independent samples t test compared the mean interference response for the first quartile of OI domain on YSQ-SF (M = 13.407, SD = 191.539) with the mean interference response for the third quartile of OI domain on YSQ-SF (M = -5.505, SD = 108.255). This comparison was not statistically significant, $t(38) = .384$, $p>.001$. This result indicates that there were no statistically significant mean differences in interference response between the first and third quartile scores on OI domain of YSQ-SF.

# CHAPTER FIVE

# DISCUSSION

The current study was the first to attempt to provide empirical support for the measurement of Early Maladaptive Schemas (EMS) with a subtle cognitive processing assessment such as the Stoop task. The hypotheses examining the relationship between schema domains and latency/ interference on the Stroop task were not supported in that no significant relationship was found between self-reported schema domains on the YSQ-SF and both response latency and interference scores on the Stroop color-naming task. Furthermore, no differences in the domain specific Stroop color naming latency/interference responses were detected between the participants who scored in the top and the bottom 25 percent of each of the five YSQ-SF schema domains.

The Stroop task and its adaptations (e.g., emotional Stroop task) have been extensively used in psychological research and have shown to be powerful predictive instruments. A number of studies have shown that the color naming of threat words takes longer than the color

naming of neutral words. These findings have been replicated in a number of studies with a wide spectrum of anxiety disorders such as specific phobia, social phobia, obsessive-compulsive disorder, panic disorder, and post-traumatic stress disorder (Amir et al., 2002; Beck et al., 2001; Becker et al., 2001; Buckley et al., 2002; Chen et al., 1996; Ehlers et al., 1988; Foa et al., 1993; Foa et al., 1991; Holle et al., 1997; Hope et al., 1990; Kindt & Brosschot, 1997; Lavy et al., 1994; Martin et al., 1992; Mathews & MacLeod, 1985; McNally et al., 1996; McNally et al., 1992; McNally et al., 1990a; McNeil et al., 1999; Segal et al., 1995; Stroop, 1935; Quero et al., 2000; Unoki et al., 2000; Watts et al., 1986b; Williams & Nulty, 1986).

## Limitations

The lack of significant results in the current study could be due to methodological and design limitations. First, the examination was performed on a homogenous sample (an unselected convenience sample of college students). This unselected sample may have lacked the severity of symptoms needed to detect group differences,

as indicated by the low mean scores on each of the domains (mean scores fell in 20-30 range, maximum score of 90 on most of the domains). Future research should test this newly designed Stroop task in a clinical population. Second, the results could be due to the form of participant response our Stroop task required (e.g., verbal response versus motor response of pressing a button). Studies have shown that the effect of manual responding is smaller compared to studies where vocal responding was used (Keele, 1972; MacLeod, 1991). Third, the current study was not able to examine the emotional valence of each word within the schema domains. It might be the case that some of the words evoked enough emotion to result in a delay in response, while other words did not. The evaluation of the latencies and interferences for the overall domains could have masked significant valences of individual words.

Another potential explanation for the result of this study is that the Stroop paradigm might be a poor measure of attentional bias in EMS. Some researchers have voiced reservations about the Stroop paradigm's ability to adequately measure attentional bias. First, studies have

shown that anxious participants are able to more accurately detect fear-relevant words. Burgess and colleagues (1981) have shown that participants from a clinical phobic group recognized significantly more phobic-relevant words than neutral words in a dichotic listening task. The significantly higher attention to the phobic-relevant words was due to the clinical phobic group attending to the phobic-relevant words in both attended and rejected messages. This indicates that differences in responding may be mood dependent. Second, other studies have shown that anxious participants performed worse on a timed task when threat-related words were used as distracters (Mathews & MacLeod, 1985). Mathews and MacLeod (1985) found that it took patients with generalized anxiety disorder longer to color name threat words than neutral words. Comparatively, there was almost no time difference in color naming of the threat and neutral words in control participants. While these findings are often provided as evidence that anxious participants displayed a higher attentional bias to the threat-related words, another possible explanation of these findings is that both threatening and neutral

information were processed by the anxious participants in the same way. Those in favor of the latter explanation propose that the latencies in the response times result from the intensified negative affective state resulting from the mere presence of threatening information in the task.

## Future Directions

Future research might use another cognitive method (e.g., the dot probe) to measure attentional bias in EMS. The dot-probe task is a testing paradigm that has been used to measure attentional biases and has been assumed to be a more direct measure of distribution of visual attention than the Stroop task (MacLeaod, Mathews, & Tata, 1986). In the dot-probe task a pair of stimuli, one threatening and one neutral, is briefly presented at two different locations on a screen. From each pair, participants are instructed to read aloud the word that appears at the top of the screen. After the pair of words disappears from the screen, a dot probe appears in place of one of the words. The participants are instructed to press a button as quickly as possible when the dot appears

on the screen. The allocation of attention is measured by the time between the onset of the dot probe and participants' response of pressing a button. The dot probe task hypothesizes that there will be a shorter response time when individuals' attention is already centered in the place where the probe is presented. Studies have shown that anxious individuals have a faster response time when the dot probe appears in the spot where the threat word was just presented.

## Conclusions

In conclusion, the current study attempted to provide support for early maladaptive schemas via the use of a modified Stroop task. Although no differences in response times were detected, the current study's methodological limitations could have prevented the identification of group differences. The modified Stroop paradigm has been used in a large number of studies and has yielded evidence for attentional bias towards threat-related words. Other paradigms with purer ways to measure attentional biases (e.g., the dot probe task) should be utilized in the

future research to provide support for early maladaptive schemas.

# APPENDIX A

# TABLES

Table 1. Correlations among selected Schema words and YSQ-SF domain; Matched neutral words

| Schema Domain | Schema Word | Relatedness | Emotionality | Neutral Words |
|---|---|---|---|---|
| **Disconnection & Rejection** | Abandonment | 0.608* | 0.248* | Indentation |
| | Rejection | 0.514* | 0.168 | Envelopes |
| | Deprived | 0.570* | 0.210* | Backpack |
| | Unsupported | 0.542* | 0.200* | Consecutive |
| | Lonely | 0.575* | 0.153 | Panels |
| | Shame | 0.587* | 0.320* | Cloth |
| | Defective | 0.551* | 0.236* | Incidence |
| | Lovable | 0.595* | 0.159 | Movable |
| | Outsider | 0.536* | 0.186 | Asterisk |
| **Impaired Autonomy & Performance** | Confident | 0.481* | 0.064 | Packaging |
| | Lost | 0.520* | 0.033 | Room |
| | Secretive | 0.410* | 0.074 | Dispenser |
| | Talented | 0.496* | 0.145 | Particle |
| | Incompetent | 0.400* | 0.246* | Dimensional |
| | Loser | 0.491* | 0.160 | Cargo |
| | Disappointment | 0.397* | 0.034 | Concentrations |
| | Letdown | 0.450* | 0.023 | Cartons |
| | Unsuccessful | 0.454* | 0.057 | Dictionaries |
| **Impaired Limits** | Superior | 0.372* | 0.240* | Register |
| | Entitled | 0.401* | 0.380* | Magnetic |
| | Glory | 0.325* | 0.146 | Angle |
| | Power | 0.461* | 0.296* | Files |
| | Control | 0.339* | 0.150 | Network |
| | Reckless | 0.381* | 0.271* | Printout |
| | Irresponsible | 0.425* | 0.323* | Interestingly |
| | Undisciplined | 0.374* | 0.204* | Conceptualize |
| | Incomplete | 0.398* | 0.258* | signatures |
| **Other Directedness** | Servitude | 0.308* | 0.310* | Underline |
| | Surrender | 0.111 | 0.203* | Furniture |
| | Unimportant | 0.401* | 0.099 | Parentheses |
| | Controlled | 0.340* | 0.114 | Maintained |
| | Respected | 0.348* | 0.074 | Producers |
| | Disregarded | 0.371* | 0.093 | Inventories |
| | Guilt | 0.390* | 0.205* | Spray |
| | Sacrifice | 0.029 | 0.099 | Delivered |
| | Selfless | 0.027 | -0.150 | Bookcase |
| **Overvigilance & Inhibition** | Spontaneous | 0.371* | 0.216* | Synchronous |
| | Emotional | 0.471* | 0.300* | Automated |
| | Uptight | 0.393* | 0.260* | Pebbles |
| | Closed | 0.342* | 0.403* | Viewed |
| | Perfectionist | 0.428* | 0.318* | Comprehending |
| | Scrupulous | 0.359* | 0.326* | Mesmerized |
| | Achievement | 0.382* | 0.266* | Forthcoming |
| | Demanding | 0.310* | 0.179 | Obtaining |
| | Criticism | 0.364* | 0.099 | Estimated |

* $p < .05$

Table 2. Experimental stimulus words used in the Schema Stroop task

| Schema Domains | Schema Words | Neutral Words |
|---|---|---|
| **Disconnection & Rejection** | Abandonment | Indentation |
| | Rejection | Envelopes |
| | Deprived | Backpack |
| | Unsupported | Consecutive |
| | Lonely | Panels |
| | Shame | Cloth |
| | Defective | Incidence |
| | Lovable | Movable |
| | Outsider | Asterisk |
| **Impairment Autonomy & Performance** | Confident | Packaging |
| | Lost | Room |
| | Secretive | Dispenser |
| | Talented | Particle |
| | Incompetent | Dimensional |
| | Loser | Cargo |
| | Disappointment | Concentrations |
| | Letdown | Cartons |
| | Unsuccessful | Dictionaries |
| **Impaired Limits** | Superior | Register |
| | Entitled | Magnetic |
| | Glory | Angle |
| | Power | Files |
| | Control | Network |
| | Reckless | Printout |
| | Irresponsible | Interestingly |
| | Undisciplined | Conceptualize |
| | Incomplete | signatures |
| **Other Directedness** | Servitude | Underline |
| | Surrender | Furniture |
| | Unimportant | Parentheses |
| | Controlled | Maintained |
| | Respected | Producers |
| | Disregarded | Inventories |
| | Guilt | Spray |
| | Sacrifice | Delivered |
| | Selfless | Bookcase |
| **Overvigilance & Inhibition** | Spontaneous | Synchronous |
| | Emotional | Automated |
| | Uptight | Pebbles |
| | Closed | Viewed |
| | Perfectionist | Comprehending |
| | Scrupulous | Mesmerized |
| | Achievement | Forthcoming |
| | Demanding | Obtaining |
| | Criticism | Estimated |

Table 3. Mean domain scores on YSQ-SF and mean, minimal/maximal accuracy response rates, on the Schema Stroop task

| Domain Scores on YSQ-SF | YSQ-SF, Mean (SD) | Accuracy, Mean (SD) Min/Max |
|---|---|---|
| Disconnection and Rejection (DR) | 49.95 (21.30) | .979 (.026) .89/1 |
| Impaired Autonomy and Performance (IAP) | 33.92 (12.69) | .982 (.028) .85/1 |
| Impaired Limits (IL) | 24.31 (8.74) | .985 (.258) .89/1 |
| Other Directedness (OD) | 26.12 (8.08) | .984 (.027) .89/1 |
| Overvigilance and Inhibition (OI) | 28.38 (8.56) | .978 (.033) .85/1 |

Table 4. Correlation among accuracy rate and latency and interference response times on the Schema Stroop task

| Response Times | Latency | Interference |
|---|---|---|
| Disconnection and Rejection (DR) | .216 | .014 |
| Impaired Autonomy and Performance (IAP) | .181 | .007 |
| Impaired Limits (IL) | -.029 | -.167 |
| Other Directedness (OD) | -.135 | -.050 |
| Overvigilance and Inhibition (OI) | .034 | -.066 |

*p<.05

Table 5. Correlations among domains on YSQ-SF and latency response times on the Schema Stroop task

| | DR | IAP | IL | OD | OI |
|---|---|---|---|---|---|
| Disconnection and Rejection (DR) | .143 | | | | |
| Impaired Autonomy and Performance (IAP) | | -.093 | | | |
| Impaired Limits (IL) | | | .033 | | |
| Other Directedness (OD) | | | | .091 | |
| Overvigilance and Inhibition (OI) | | | | | .056 |

*p<.05

*Note*: Latency is the response time from the time stimulus (incongruent word) to response.

Table 6. Correlations among domains on YSQ-SF and interference response times on the Schema Stroop task

| | DR | IAP | IL | OD | OI |
|---|---|---|---|---|---|
| Disconnection and Rejection (DR) | .025 | | | | |
| Impaired Autonomy and Performance (IAP) | | -.051 | | | |
| Impaired Limits (IL) | | | -.031 | | |
| Other Directedness (OD) | | | | .015 | |
| Overvigilance and Inhibition (OI) | | | | | -.126 |

*p<.05

*Note*: Interference is the response time difference between the response times of latency schema word and latency neutral word.

REFERENCES

American Psychiatric Association (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.

American Psychiatric Association (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., rev.). Washington, DC: Author.

American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed., rev.). Washington, DC: Author.

Amir, N., Freshman, M., & Foa, E.B. (2002). Enhanced Stroop interference for threat in social phobia. *Journal of Anxiety Disorders, 16,* 1 - 9.

Amir, N., McNally, R.J., Riemann, B.C., Burns, J., Lorenz, M., & Mullen, J.T. (1996). Suppression of the emotional Stroop Effect by increased anxiety in patients with social phobia. *Behavior Research and Therapy, 34,* 945 - 948.

Arntz, A. (1993). Endorphins stimulate approach behavior,

but do not reduce subjective fear. A pilot study. *Behavior Research and Therapy, 31,* 403 - 405.

Balota, D.A., Cortese, M.J., Hutchison, K.A., Neely, J.H., Nelson, D., Simpson, G.B., & Treiman, R. (2002). The English Lexicon Project. http://elexicon.wustl.edu/, Washington University Accessed February 15 - 20, 2008.

Beck, A.T. (1972). *Depression: Causes and treatment.* Philadelphia: University of Pennsylvania Press.

Beck, A.T., Emery, G., & Greenberg, R.L. (1985). *Anxiety disorders and phobias.* New York: Basic Books.

Beck, A.T., Rush, A.J., Shaw, B.F., & Emery, G. (1979). *Cognitive therapy for depression.* New York: Guilford Press.

Beck, A.T., Ward, C., Mendelsohn, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4,* 561 - 571.

Beck, J.G., Freeman, J.B., Shipherd, J.C., Hamblen, J.L., & Lackner, J.M. (2001). Specificity of Stroop interference in patients with pain and PTSD. *Journal of Abnormal Psychology, 110,* 536 - 543.

Becker, E.S., Rinck, M., Margraf, J., & Roth, W.T. (2001). The emotional Stroop effect in anxiety disorders: General emotionality or disorder specificity? *Anxiety Disorders, 15*, 147 - 159.

Bouman, T.K., Scholing, A., Emmelkamp, P.M.G. & Dijkstra, W. (1987). *Anxiety Disorders Interview Schedule (ADIS)* (intern report). Groningen: University of Groningen, Department of Clinical Psychology.

Bradley, B.P., Mogg, K., Millar, N., & White, J. (1995a). Selective processing of negative information: Effects of clinical anxiety, concurrent depression, and awareness. *Journal of Abnormal Psychology, 104*, 532 - 536.

Bradley, B. P., Mogg, K., & Williams, R. (1995). Implicit and explicit memory for emotion-congruent information in clinical depression and anxiety. *Behavior Research and Therapy, 33*, 755 - 770.

Buckley, T.C., Blanchard, E.B., & Hickling, E.J. (2002). Automatic and strategic processing of threat stimuli: A comparison between PTSD, panic disorder, and nonanxiety controls. *Cognitive Therapy and Research,*

*26*, 97 - 115.

Burgess, I.S., Jones, L.M., Robertson, S.A., Radcliffe, W.N., & Emerson, E. (1981). The degree of control exerted by phobic and non-phobic verbal stimuli over the recognition behavior of phobic and non-phobic subjects. *Behavior Research and Therapy, 19*, 233 - 243.

Cacioppo, J.T., Glass, C.R., & Merluzzi, T.V. (1979). Self-statements and self-evaluations: A cognitive-response analysis of hetero social anxiety. *Cognitive Therapy and Research, 3*, 249 - 262.

Caroll, J.B., Davies, P., & Richman, B. (1971). *Word frequency book.* Boston: Houghton Mifflin.

Carter, C.S., Maddock, R.J., & Magliozzi, J. (1992). The specificity of biased information processing in panic disorder and major depression. *Psychopathology, 25*, 65 - 70.

Chen, E., Lewin, M.R., & Craske, M.G. (1996). Effects of state anxiety on selective processing of threatening information. *Cognition and Emotion, 10*, 225 - 240.

Coles, M.E., & Heimberg, R.G. (2002). Memory biases in the

anxiety disorders: Current status. *Clinical Psychology Review, 22,* 587 - 627.

Derogatis, L.R. (1983). *SCL-90-R administration, scoring, and procedures manual-B.* Towson, MD: Clinical Psychometric Research.

Derogatis, L.R., & Melisaratos, N. (1983). The brief symptom inventory: An introductory report. *Psychological Medicine, 13,* 595 - 605.

DiNardo, P.A., & Barlow, D.G. (1988). *The anxiety disorders interview schedule, revised (ADISR).* Center for Stress and Anxiety Disorders, University at Albany, State University Of New York, Albany, New York.

Dodge, C.S., Hope, D.A., Heimberg, R.G., & Becker, R.E. (1988). Evaluation of the Social Interaction Self-Statement Test with a social phobic population. *Cognitive Therapy and Research, 12,* 211 - 222.

Ehlers, A., Margraf, J., Davies, S., & Roth, T. (1988). Selective processing of threat cues in subjects with panic attacks. *Cognition & Emotion, 2,* 201 - 219.

Eysenck, M.W. (1992). *Anxiety: The cognitive perspective.* Hillsdale: Lawrence Erlbaum Associates, Inc.

Fairbank, J., Couper, J., Davies, J., & O'Brien, J. (1980). The Oswestry Low Back Pain Disability Questionnaire. *Physiotherapy, 66,* 271 - 273.

Foa, E., Feske, U., Murdock, T., Kozak, M., & McCarthy, P. (1991). Processing of threat-related information in rape victims. *Journal of Abnormal Psychology, 100,* 156 - 162.

Foa, E., Ilai, D., McCarthy, P.R., Shoyer B., & Murdock, T. (1993). Information processing in obsessive-compulsive disorder. *Cognitive Therapy and Research, 17,* 173 - 189.

Foa, E., Riggs, D., Dancu, C., & Rothbaum, B.O. (1993). Reliability and validity of a brief instrument for assessing post-traumatic stress. *Journal of Traumatic Stress, 6,* 459 - 473.

Foa, E., Rothbaum, B.O., Riggs, D.S., & Murdock, T.B. (1991). Treatment of posttraumatic stress disorder in rape victims: A comparison between cognitive-behavioral procedures and counseling. *Journal of Consulting and Clinical Psychology, 59,* 715 - 723.

Francis, W.N., & Kucera, H. (1982). *Frequency analysis of English usage.* Boson, MA: Houghton-Miffin.

Glaser, B.A., Campbell, G.B., Calhoun, G.B., Bates, J.M., & Petrocelli, J.V. (2002). The early maladaptive schema questionnaire-short form: A construct validity study. *Measurement and Evaluation in Counseling and Development*, 35, 2 - 13.

Glass C.R., Merluzzi, T.V., Biever, J.L., & Larsen, K.H. (1982). Cognitive assessment of social anxiety: Development and validation of a self-statement questionnaire. *Cognitive Therapy and Research, 6,* 37 - 55.

Hartman, L.M. (1984). Cognitive components of social anxiety. *Journal of Clinical Psychology, 40,* 137 - 139.

Hill, A.B., & Knowles, T.H. (1991). Depression and the emotional Stroop effect. *Personality and Individual Differences, 12,* 481 - 485.

Holle, C., Neely, J.H., & Heimberg, R.G. (1997). The effects of blocked versus random presentation and semantic relatedness of stimulus words on response to a modified Stroop Task among social phobics. *Cognitive Therapy and Research, 21,* 681 - 697.

Hope, D.A., Rapee, R.M., Heimberg, R.G., & Dombeck, M.J.

(1990). Representations of the self in social phobia: Vulnerability to social threat. *Cognitive Therapy and Research, 14,* 177 - 189.

Horowitz, M.J., Wilner, N., & Alvares, W. (1979). Impact of event state: A measure of subjective distress. *Psychosomatic Medicine, 41,* 207 - 218.

Jensen, M., Karoly, P., & Harris, P. (1991). Assessing the affective component of chronic pain: Development of the Pain Discomfort Scale. *Journal of Psychosomatic Research, 33,* 149 - 154.

Keane, T.M., Caddell, J.M., & Taylor, K. (1988). Mississippi Scale for Combat-Related Postraumatic Stress Disorder. Three studies in reliability and validity. Journal *of Consulting and Clinical Psychology, 56,* 85 - 90.

Keane, T.M., Fairbank, J.A., Caddell, J.M., Zimering, R.T., Taylor, K.L., & Mora, C.A. (1989). Clinical evaluation of a measure to assess combat exposure. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 1,* 53 - 55.

Keele, S.W. (1972). Attention demands of memory retrieval. *Journal of Experimental Psychology, 93,* 245 - 248.

Kerns, R., Turk, D., & Rudy, T. (1985). The West Haven Yale Multidimensional Pain Inventory. *Pain, 23,* 345 - 356.

Kessler, R.C., Chiu, W.T., Demler, O., & Walters, E.E. (2005). Prevalence, severity, and comorbidity of twelve-month DSM-IV disorders in the National Comorbidity Survey Replication (NCS-R). *Archives of General Psychiatry, 62,* 617 - 627.

Kindt, M., Bierman, D., & Brosschot, J.F. (1997). Cognitive bias in spider fear and control children: Assessment of emotional interference by a card format and a single-trial format of the Stroop task. *Journal of Experimental Child Psychology, 66,* 163 - 179.

Kindt, M., & Brosschot, J.F. (1997). Phobia-related cognitive bias for pictorial and linguistic stimuli. *Journal of Abnormal Psychology, 106,* 644 - 648.

Klorman, R., Weerts, T.C, Hastings, J.E., Melamed, G.B.G., & Lang, P. J. (1974). Psychometric description of some specific fear questionnaires. *Behavior Therapy, 5,* 401 - 409.

Lavy, E.H., van Oppen, P., & van den Hout, M.A. (1994). Selective processing of emotional information in

obsessive-compulsive disorder. *Behavior Research and Therapy, 32,* 243 - 246.

MacLeod, C.M. (1991). Half a century of research on the Stroop effect: An integrative review. *Psychological Bulletin, 109,* 163 - 203.

MacLeod, C., Mathews, A., & Tata, P. (1986). Attentional bias in emotional disorders. *Journal of Abnormal Psychology, 95,* 15 - 20.

Martin, M., Horder, P., & Jones, G.V. (1992). Integral bias in naming of phobia-related words. *Cognition & Emotion, 6,* 479 - 486.

Mathews, A., & Klug, F. (1993). Emotionality and interference with color-naming in anxiety. *Behavior Research and Therapy, 31, 57 - 62.*

Mathews, A., & MacLeod, C. (1985). Selective processing of threat cues in anxiety states. *Behavior Research and Therapy, 23,* 563 - 569.

McKenna, F.P., & Sharma, D. (1995). Intrusive cognitions: An investigation of the emotional Stroop task. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 21,* 1595 - 1607.

McNally, R.J., Amir, N., & Lipke, H.J. (1996). Subliminal

processing of threat cues in posttraumatic stress disorder? *Journal of Anxiety Disorders, 10,* 115 - 128.

McNally, R.J., Kaspi, S.P., Riemann, B.C., & Zeitlin, S.B. (1990a). Selective processing of threat cues in post-traumatic stress disorder. *Journal of Abnormal Psychology, 99,* 398 - 402.

McNally, R.J., Riemann, B.C., & Kim, E. (1990). Selective processing of threat cues in panic disorder. *Behavior Research and Therapy, 28,* 407 - 412.

McNally, R.J., Riemann, B.C., Louro, C.E., Lukach, B.M., & Kim, E. (1992). Cognitive processing of emotional information in panic disorder. *Behavior Research and Therapy, 30,* 143 - 149.

McNeil, D.W., Tucker, P., Miranda, R., Jr., Lewin, M.R., & Nordgren, J.C. (1999). Response to depression and anxiety Stroop stimuli in posttraumatic stress disorder, obsessive-compulsive disorder, and major depressive disorder. *Journal of Nervous and Mental Disease, 187,* 512 - 516.

Mogg, K., Bradley, B.P., & Williams, R. (1995). Attentional bias in anxiety and depression: The role

of awareness. *British Journal of Clinical Psychology, 34,* 17 - 36.

Mogg, K., Bradley, B., Williams, R., & Mathews, A. (1993b). Effects of anxiety and awareness on color-identification latencies for emotional words. *Behavior Research and Therapy, 31,* 559 - 567.

Mogg, K., Bradley, B., Williams, R., & Mathews, A. (1993). Subliminal processing of emotional information in anxiety and depression. *Journal of Abnormal Psychology, 102,* 304 - 311.

Neshat-Doost, H.T., Moradi, A.R., Taghavi, M.R., Yule, W., & Dalgleish, T. (1997). Lack of attentional bias for emotional information in clinically depressed children and adolescents on the dot probe task. *Journal of Child Psychological Psychiatry, 41,* 363 - 368.

Quero, S., Banos, R.M., & Botella, C. (2000). Sesgos cognivitos en el trastorno de panico: Comparacion entrée el Stroop computerizado y con tarjetas [Cognitive biases in panic disorder: A comparison between computerized and card Stroop task]. *Psicothema, 12,* 165 - 170.

Schmidt, N.B., Joiner, T.E., Young, J.E., & Telch, M.J. (1995). The schema questionnaire: Investigation of psychometric properties and the hierarchical structure of a measure of maladaptive schemas. *Cognitive Therapy and Research, 19,* 295 - 321.

Segal, Z.V., Gemar, M., Truchon, C., Guiriguis, M., & Hrowitz, L.M. (1995). A priming methodology for studying self-representation in major depressive disorder. *Journal of Abnormal Psychology, 104,* 205 - 213.

Spielberger, C.D. Gorsuch, R.L., & Lushene, R.E. (1970). *Manual for the State-Trait Anxiety Inventory (self-evaluation questionnaire).* Palo Alto, CA: Consulting Psychologists Press.

Stroop, J.R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology, 18,* 643 - 662.

Unoki, K., Kasuga, T., Matsushima, E., Ohta, K., & Doi, N. (2000). Attentional process of emotional information: Comparison between clinical and nonclinical obsessive-compulsive disorder. [Japanese]. *Seishin Igaku (Clinical Psychiatry), 42,* 273 - 280.

Watson, J.P., & Marks, I.M. (1971). Relevant and irrelevant fear in flooding: A crossover study of phobic patients. *Behavior Therapy, 2,* 275 - 295.

Watts, F.N., McKenna, F.P., Sharrock, R., & Trezise, L. (1986). Color naming of phobia-related words. *British Journal of Psychology,* 77, 97 - 108.

Watts, F.N., Trezise, L., & Sharrock, R. (1986b). Processing of phobic stimuli. *British Journal of Clinical Psychology, 25,* 253 - 261.

Wechsler, D. (1981). *Wechsler Adult Intelligence Scale-Revised manual.* New York: The Psychological Corporation.

Wellburn, K., Coristine, M., Dagg, P., Pontefract, A., & Jordan, S. (2002). The schema questionnaire - short form: Factor analysis and relationship between schemas and symptoms. *Cognitive Therapy and Research, 26,* 519 - 530.

Williams, J.M.G., & Nulty, D.D. (1986). Construct accessibility depression and the emotional Stroop task: Transient mood or stable structure? *Personality and Individual Differences, 7,* 485 -4 91.

Williams, J.M.G., Mathews, A., & MacLeod, C. (1996). The

emotional Stroop task and psychopathology. *Psychological Bulletin, 120,* 3 - 24.

Young, J.E. (1990). *Cognitive therapy for personality disorders: A schema-focused approach.* Sarasota, FL: Professional Resource Press. Young, J.E. (1998). *Young Schema Questionnaire Short Form.* New York: Cognitive Therapy Center.

Zilberg, N., Weiss, D., & Horowitz, M. (1982). Impact of Event Scale: A cross-validation study and some empirical evidence supporting a conceptual model of stress response syndromes. *Journal of Consulting and Clinical Psychology, 50,* 407 - 414.