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An Investigation Of The Clinical Utility Of The State-Trait Anger Expression Inventory

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AN INVESTIGATION OF THE CLINICAL UTILITY OF THE STATE-TRAIT
ANGER EXPRESSION INVENTORY

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ABSTRACT

AN INVESTIGATION OF THE CLINICAL UTILITY OF THE STATE-TRAIT
ANGER EXPRESSION INVENTORY

The State-Trait Anger Expression Inventory (STAXI) has been proposed as a

valid instrument for screening participants for anger management interventions, for

treatment planning, and for outcome assessment. However, although this instrument has

been extensively studied in non-clinical populations, its effectiveness has not yet been

evaluated outside of a research setting. The purpose of the present study was to evaluate

the utility of the STAXI with a clinical population of individuals whose anger problems

caused them to seek treatment, either voluntarily or through court referral. Beyond

determining the degree to which scores in this population were consistent with the

predictions of State-Trait Anger theory, additional analyses were focused on determining

the relative effects of a set of demographic variables, including age, race/ethnicity,

educational level, and referral source.

The results of this study are mixed in the degree to which they are consistent with

the predictions of State-Trait Anger theory. As predicted, the means for the Trait Anger,

Anger-Out, and Anger Control scales were significantly different from the normative

group and the differences were in the expected directions. Further, the intercorrelations

of the Trait Anger scale and the other four scales were all significant, were of the

predicted magnitude, and the relationships were in the predicted directions. While there

was no significant mean difference between the normative group and the study group on

the State Anger scale, this scale was significantly skewed as predicted, with the majority

of scores in the non-angry range. However, contrary to findings in non-clinical samples, the Trait Anger scale identified only about half of the participants as having anger-management problems severe enough to require intervention.

The analysis of demographic variables showed small significant effects on some STAXI scales for this population. However, no variable impacted all scales. Further, in no case did the full set of variables account for greater than 11% of the variability of any scale.

Further study is recommended to provide additional insight on the variables affecting the utility of the STAXI as a screening tool with this population and to clarify the findings regarding the effects of race and ethnicity on STAXI scores.

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CHAPTER 1

Introduction

Statement of the Problem

Anger-management programs have become increasingly prevalent in correctional

settings. While these programs have a high degree of face validity for a wide range of

criminally aggressive behavior, little data exists on appropriate methods for screening

potential participants or for measuring treatment effectiveness (Hollenhorst, 1998).

Recently, the State-Trait Anger Expression Inventory (Spielberger, 1996) has been

proposed as a valid instrument for screening participants for anger management

interventions, for treatment planning, and for evaluating the effectiveness of therapeutic

interventions (Deffenbacher, 1992; Deffenbacher et al., 1996; Spielberger & Sydeman,

1994). As described below, this instrument has been extensively studied in non-clinical

populations. However, its effectiveness has not yet been evaluated with participants in

anger-management programs outside of a research setting.

The State-Trait Anger Expression Inventory – An Overview

Since its introduction in the early 1980s, the State-Trait Anger Expression

Inventory (STAXI; Spielberger, 1996) has become recognized as the most widely used

instrument for the measurement of the experience and expression of anger in research

settings (Mayne & Ambrose, 1999). In addition to studies conducted in the United

States, the STAXI manual cites several studies published or presented in Europe and Japan. Based on Spielberger's State-Trait Anger theory, this instrument combines two earlier scales, the State-Trait Anger Scale (STAS; Spielberger, 1983), and the Anger Expression (AX) Scale (Spielberger et al., 1985). The STAS measures anger expression as a component of personality, while the Anger Expression Scales measure the direction of anger expression (in or out) and the frequency of an individual's attempts to control anger. The STAXI, or selected STAXI scales, have been used extensively in research on anger management interventions (e.g., Chemtob, Novaco, Hamada, & Gross, 1997; Deffenbacher & Stark, 1992; Deffenbacher, Story, Stark, Hogg, & Brandon, 1987), cardiovascular health (e.g.,. Emerson & Harrison, 1990; Faber & Burns, 1996; Lai & Linden, 1992), and general health psychology (e.g., Friend, Hatchett, Schneider, & Wadhwa, 1997; Gaskin, Greene, Robinson, & Geisser, 1992; Shigehisa & Oda, 1993). However, if the STAXI is a valid measure for use in a clinical population, it should meet several criteria, as described below.

<u>Screening</u>

As a screening instrument, the STAXI should show evidence both of concurrent and discriminant validity; in other words, it should be able to identify individuals who have problems with anger of sufficient severity to require clinical intervention, while "screening out" individuals whose anger problems are not severe. Spielberger (1996) states that individuals in the 75th percentile and higher can be expected to have problems with anger management that have produced serious negative consequences. Deffenbacher et al. (1996) demonstrated that college students who scored at or above the

75th percentile on the STAXI Trait Anger scale reported significantly more frequent consequences of angry behavior than did students who scored in the lower 25th percentile.

Treatment Planning

As a tool for treatment planning, the STAXI should provide insight into the anger profile of a specific individual, in relation to applicable normative data. This requires that scores on the instrument can be interpreted based on a valid theory of personality and/or behavior. In the case of the STAXI, which was developed based on Spielberger's State-Trait Anger theory (Spielberger, 1996), scores on the instrument should be clearly related to this theory. Deffenbacher et al. (1996) found that in an undergraduate population, the results of the STAXI Trait Anger scale and Anger Expression Scales can in fact be predicted by State-Trait Anger theory.

Outcome Assessment

Finally, as a tool for outcome assessment, the instrument should provide an accurate measurement of both the baseline and post-treatment levels of each characteristic being measured. Deffenbacher and colleagues (Deffenbacher & Stark, 1992; Deffenbacher, Story, Stark, Hogg, & Brandon, 1987) have used the STAXI Trait Anger and Anger Expression scales for outcome assessment in treatment research on treatment programs for general anger reduction. These studies also used the 75th percentile criterion to identify individuals who were appropriate for their anger-management interventions. In the only published study to use the STAXI scales for outcome assessment with a clinical sample, Chemtob, Novaco, Hamada, and Gross

(1997) used this instrument along with the Novaco Anger Scale (Novaco, 1994) in a volunteer sample of 15 veterans diagnosed with Post-Traumatic Stress Disorder. Given that the STAXI scales have shown adequate convergent and discriminant validity (Deffenbacher et al., 1996), internal consistency (Fuqua et al., 1991; Spielberger, 1996), test-retest reliability (Jacobs, Latham, & Brown, 1988), and a consistent factor structure (Forgays, Forgays, & Spielberger, 1997; Fuqua et al., 1991), it can be concluded that the STAXI is an instrument with strong psychometric properties. The findings of existing validation studies are described in more detail in Chapters II and III.

Limitations of Existing Studies

An area of concern in extending the use of the STAXI to screening, treatment planning, and outcome assessment in clinical populations is that the primary validation studies both of State-Trait anger theory and the STAXI scales have been conducted with non-clinical populations, primarily with volunteer undergraduate psychology students. In the most comprehensive of these studies, Deffenbacher and colleagues (Deffenbacher et al.1996) used a contrast group design comparing two groups of undergraduate students. The first group scored at or above the 75th percentile of the Trait Anger Scale, which is the point at which Spielberger (1996) states that individuals will consistently have serious problems with their anger, and they had both admitted anger problems and indicated an interest in receiving help. The second group of students scored below the 25th percentile of the Trait Anger Scale and indicated no problem with anger. Because the first group had expressed an interest in receiving counseling, this group was described as a "high-anger counseling analog." While this approach has a certain degree of face validity, it is

unclear how closely this group represents an actual population of individuals whose anger has resulted in a referral to anger-management counseling. Some of the most significant differences between these studies and clients commonly referred for anger management programs are described below.

Involuntary clients. Unlike the groups comprising the above samples, a large source of referral for anger management programs in the U.S. is the court system (Hollenhurst, 1999). This presents two issues regarding the use of existing studies to recommend the STAXI as a practical tool for screening and measurement of treatment outcome. First, the students used in previous studies were assigned to the high-anger group based not only on their high Trait-Anger scores but also based on their admission of an anger problem and request for treatment in response to a survey. This assumes that they both answered the instrument honestly and that they were willing to report a problem with anger. This may not be a significant problem in a neutral research setting. However, individuals in clinical anger management programs who are referred by the court system may be motivated to under-report their problems with anger. Given that the STAXI is a self-report instrument, it is likely that denial of anger problems will affect STAXI scores for some individuals. Existing studies have not addressed this possibility, which could undermine the concurrent validity between STAXI scores and independently observed angry behavior.

In addition to the potential problems with concurrent validity of the STAXI, as described above, it is likely that individuals in a clinical anger-management setting will have experienced significantly greater problems with their anger than have the majority

of undergraduates. In fact, because so few of the participants in the studies conducted by Deffenbacher et al. (1996) had experienced legal consequences, this factor was dropped from their analyses. Therefore, the external validity of these studies may be limited.

Demographic variables. A second problem affecting the external validity of existing studies is that the undergraduate samples not only represent a limited range of ages, they also include very few racial or ethnic minority participants. This limits the degree to which these studies can be generalized to the U.S. population. For court-ordered clients, the problem is even more significant. The Federal Bureau of Investigation (1998) reported that 59.9% of the arrests of adults for assault, excluding aggravated assault, in 1997 were age 25 or older. Further, the percentages of these arrests for all ages were 62.6% White, 35.1% Black, 1.3% American Indian or Alaskan Native, and 1.0 % Asian or Pacific Islander.

Before the STAXI can be used with confidence as a screening tool or for outcome assessment in treatment settings, it is necessary to assess the degree to which the self-report nature of this instrument may compromise its concurrent validity in relation to independently observed problems with anger management, both with voluntary and non-voluntary clients in a clinical setting. Further, it is important to begin to explore the impact of a wider range of client variables, including race, age, educational level, and referral source (court-mandated or self-referred), which have not been examined in past studies. This knowledge is particularly important if STAXI results are to be individually interpreted and used for treatment planning in a therapy setting, rather than reported as aggregate measures of groups.

State-Trait Anger Theory

State-Trait Anger theory (Spielberger, 1996), as validated by Deffenbacher and colleagues (Deffenbacher, 1992; Deffenbacher et al., 1996), distinguishes between two components of anger: anger experience and anger expression. Spielberger defines Anger Experience as a construct consisting of two components: (a) anger as an emotional state, or "State Anger," and (b) anger as a more stable personality trait, or "Trait Anger."

State Anger

State Anger describes the angry feelings experienced by an individual at any given time, and can vary in intensity from "mild annoyance or irritation to intense fury and rage" (Spielberger, 1996). State Anger is accompanied by physical reactions indicating autonomic nervous system arousal, including muscle tension, increased heart rate, respiration, and blood pressure. The STAXI scale is S-Anger.

Trait Anger

Trait Anger is the overall tendency for an individual to experience angry feelings. Spielberger (1996) stated that individuals who are high in Trait Anger tend to perceive a wider range of situations as irritating and therefore they experience State Anger more often. Deffenbacher and colleagues (1996) demonstrated that individuals who scored high in Trait Anger on the STAXI tended to experience more frequent negative consequences as a result of their anger than did individuals scoring lower on this scale. However, legal difficulties were eliminated from their analyses because they occurred so infrequently.

The STAXI includes an overall scale for Trait Anger (T-Anger), and two subscales. Angry Temperament (T-Anger/T) measures the general tendency to experience anger without reference to a specific provocation, and Angry Reaction (T-Anger/R) measures the tendency to react angrily to perceived criticism or unfair treatment. However, these two subscales have not been extensively studied.

Anger Expression

Anger can be expressed in two basic ways, either by directing it outwardly toward individuals or objects in the environment (Anger-Out), or directing it inwardly by trying to suppress or "hold in" angry feelings (Anger-In). Outward expression of anger is associated with violent behavior, while anger suppression has been related to anxiety (Spielberger & Sydeman, 1994) and to hypertension (Mayne & Ambrose, 1999; Spielberger & Sydeman, 1994), particularly in men (Vögele, Jarvis, & Cheeseman, 1997). While these two forms of anger expression were initially viewed as opposite poles of a unidimensional scale, as habitual coping patterns these forms of expression are not mutually exclusive. For example, individuals who frequently hold their anger in may also frequently reach a "boiling point" at which they direct their anger outwardly. Findings on the intercorrelations of these scales have been mixed. In addition to the two forms of anger expression, Spielberger (1996) includes a third component in this construct, which is the frequency with which an individual attempts to control the expression of anger. The STAXI scales measuring these three dimensions of anger expression are AX/In, AX/Out, and AX/Con.

The STAXI scales and subscales are discussed in more detail in Chapter III.

Denial of Anger

Spielberger and Sydeman (1994) noted that the STAXI Trait-Anger scale has a small negative correlation with the Eysenck Personality Inventory Lie Scale (Eysenck & Eysenck, 1975). They commented that this may suggest either that "some people may inhibit reports of negative characteristics such as anger," or that "individuals who experience anger more frequently make less use of repression and denial as defenses against emotional arousal" (p. 304). Mayne and Ambrose (1999) further note that individuals may have a physical experience of anger but may be unable to label their emotions, a condition termed "alexithymia," which may also affect scores on any self-report inventory.

Socially desirable responding, or the tendency to present oneself in a positive light, has long been recognized as a confounding factor in self-report measures of personality, attitudes, and behavior (Paulhus & Reid, 1991). Paulhus and Reid distinguish between two types of socially desirable responding: (a) self-deception, which is the tendency for individuals to view themselves in a more positive light than is justified by reality; and (b) impression-management, which is the tendency to describe oneself favorably to others. They further distinguish between "denial," which is the repudiation of negative attributes, and "enhancement," in which an individual claims positive attributes. Denial and enhancement can be present in both self-deception and impression management.

It has been recognized in the field of health psychology that denial of anger is a common phenomenon in cardiac patients and is a contributing factor in coronary heart disease (Emerson & Harrison, 1990; Ketterer et al., 1998). Denial of anger is also quite

likely in populations of individuals whose anger has resulted in legal problems, and who may be referred to anger management programs by the courts or by parole officers. In the investigator's experience, even clients who are not mandated by the legal system to attend anger management groups sometimes report that they are attending reluctantly at the request of a family member or significant other. If a substantial proportion of individuals who take the STAXI in a clinical setting are misrepresenting their anger, then the concurrent validity of this instrument with these clients' actual behavior, and therefore its value as a screening tool, is decreased. Further, the utility of this instrument as a measure of outcome may be compromised if the scores do not accurately represent the levels of each client's anger before or after intervention. On the other hand, if denial of anger is observed and documented in a significant proportion of clients in clinical settings, the interpretation of individual scores can be modified to help counsel involuntary clients with established anger-management problems whose STAXI scores alone would not have placed them in an anger-management program.

Research Questions

Using chart review of records and STAXI data gathered from participants in a 10-week anger management group, this study will test the ability of the STAXI to provide meaningful clinical information in a representative sample of individuals whose anger problems have caused them to seek treatment, either voluntarily or involuntarily. Consistent with arrest data for assault (Federal Bureau of Investigations, 1998) participants in these groups are primarily male, ranging in age from young adult to retirement age, and about one-third are non-white. Given that the available pool of

participants included only 12 females, the sample in the present study is limited to male anger management clients. Because the setting was a community mental health clinic that serves a low-income population, the socioeconomic status of these individuals is generally low.

If the STAXI is indeed an appropriate measurement with this population, STAXI scores will show evidence of concurrent validity with existing anger management problems, which are either admitted by the individual or have been independently observed, and the scores will be consistent with the predictions of State-Trait Anger theory. Because of the nature of this sample, it is assumed that all of the participants have anger problems that have significantly affected their lives. Specifically, the questions to be addressed are as follows:

1. How effectively does the STAXI Trait Anger scale identify individuals with established anger-management problems, as predicted by State-Trait Anger theory (in other words, what is the "hit rate" in this sample)?

2. How accurately does State-Trait anger theory predict scores on the other STAXI scales in a clinical sample of individuals with established anger-management problems?

3. How do demographic variables, including age, race/ethnicity, educational level, and referral source affect questions 1 and 2 above?

Hypotheses

Based on the State-Trait anger theory presented by Spielberger (1996), the hypotheses for this study are as follows:

1.   The Trait Anger Scale as a Screening Variable

1a. Given that State-Trait anger theory predicts that individuals who have experienced serious consequences of their anger will score above the 75th percentile, it is expected that all of the participants will score above the 75th percentile for their appropriate norm group. The normative samples provided in the STAXI manual are described in more detail in Chapter II.

2.   State-Trait Anger Theory and the Remaining STAXI Scales

2a. State Anger is situation-dependent and the group setting is fairly non-threatening. Therefore, State Anger scores will be positively skewed, as they are in the normative groups of male adults, with the majority of scores clustered at the low (non-angry) end of the scale.

2b. Because State-Trait anger theory predicts that high-anger individuals will be angered by a wider range of situations, it is more likely that some of the participants will report moderate levels of State Anger even in a neutral environment. Therefore, the mean for the S-Anger scale will be slightly higher than in the relevant normative samples of male adults.

2c. As predicted by State-Trait Anger theory, Anger-In will show a positive correlation with Trait Anger. However, because Anger-In has been found to correlate more strongly with Trait Anxiety than with Trait Anger (Deffenbacher et al., 1996; Spielberger & Sydeman, 1994), this correlation will be small to moderate in size.

2d. Since overall levels of anger are expected to be higher in this population, mean scores for Anger-In will also be significantly higher than in the relevant normative samples of male adults.

2e. As predicted by State-Trait Anger theory, Anger-Out will show a moderate to high positive correlation with Trait Anger.

2f. Particularly since the majority of participants will have been referred for problems associated with the outward expression of anger, mean Anger-Out scores will be significantly higher than those in the relevant normative samples of male adults.

2g. As predicted by State-Trait Anger theory, Anger-Control will show a moderate to high negative correlation with Trait Anger.

2h. Since all participants have documented problems with control of anger, mean Anger-Control scores will be significantly lower than those in the relevant normative samples of male adults.

3. The Effect of Demographic Variables on STAXI Scale Scores

3a. The findings on the relationship between age and anger scores have been mixed (Cornell, Peterson, & Richards, 1999; Dalton, Blain, & Bezier, 1998; Spielberger, 1996; Stoner & Spencer, 1986; Stoner & Spencer, 1987). However, based on the age differences found in the adult normative groups, it is expected that all scales except AX/Con will be negatively correlated with age, and that AX/Con will increase with age.

3b. Because of a lack of existing research on the impact of race/ethnicity and minimal research related to educational level on STAXI scores, these variables will be evaluated for each STAXI scale against the null hypothesis.

3c. Because of evidence that court-mandated clients have higher levels of socially desirable responding, it is expected that court-mandated status will have a moderate negative correlation with all scales expect AX/Con, which will have a moderate positive correlation with court-mandated status.

Note that because the Anger Expression scale (AX/EX) is derived from three other STAXI scales, it will not be included in analyses for the present study.

Definition of Terms

Anger

The concept of anger has been defined in various ways in the literature, and the term "anger" has often been used interchangeably with the terms "hostility" and "aggression" (Spielberger & Sydeman, 1994). For the purposes of this study, "anger" refers to one of the types of anger experience, State Anger or Trait Anger, defined by Spielberger (1996) and discussed above. Anger is distinguished from hostility, which generally involves "attitudes that motivate aggressive behaviors directed toward destroying objects or injuring people," but which do not necessarily involve the experience of anger (Spielberger, Jacobs, Russell, & Crane, 1983, p. 16) and from aggression, which is described below.

Aggression

Aggression is defined as "destructive or punitive behavior directed towards other persons or objects" (Spielberger, Jacobs, Russell, & Crane, 1983, p. 16).

Reactive aggression is aggressive behavior in reaction to a provocation. Unlike instrumental aggression, reactive aggression occurs in response to feelings and expression of anger (Cornell et al., 1996).

Instrumental aggression is aggressive behavior that does not necessarily involve

anger, such as bullying or damage to property in the course of a robbery.

Assault

An assault is an unlawful threat or attempt to physically harm another person. Assault and battery is committed when the threat of physical harm is carried out (Schekall, 1998).

Aggravated assault is defined by the United States Bureau of Justice Statistics (1999) as an "attack or attempted attack with a weapon, regardless of whether or not an injury occurred and attack without a weapon when serious injury resulted."

Simple assault is an "attack without a weapon resulting in either no injury, minor injury (for example, bruises, black eyes, cuts, scratches or swelling) or in undetermined injury requiring less than 2 days of hospitalization. Also includes attempted assault without a weapon" (United States Bureau of Justice Statistics, 1999).

Denial of Anger

For the purposes of this study, denial of anger is defined as a self-report of anger experience or expression that is contrary to the individual's documented behavior. No judgment is made as to whether this denial is conscious or unconscious.

Educational Level

This is recorded as years of education, based on the highest grade or post-secondary year actually completed.

Race/Ethnicity

The categories of race/ethnicity included in the study population are recorded on intake based on the client's self-identification, as defined on the New Jersey Department of Human Services Unified Services Transaction Client Registry form (USTF-1). These categories are as follows: American Indian/Alaskan Native; Asian/Pacific Islander; Black, Not of Hispanic Origin; Hispanic; White, Not of Hispanic Origin; and Other.

Significance of the Study

Anger is clearly recognized as a serious societal problem, related to both physical health and violent behavior. Beyond the well-documented links between Type-A personality and cardiac disease, a recent study reported that the risk of stroke is twice as high for men who experience outbursts of anger than for men who control their tempers (Phillips, 1998). "Road rage" is increasingly seen as a contributing factor in fatal motor vehicle accidents. A recent article in The Economist ("Mad, Bad and on the Road," 1997) reported that according to the U.S. National Highway Traffic Safety Administration, cases of "violent aggressive driving" are increasing by roughly seven percent per year. Further, as of 1997, it was estimated that approximately 28,000 traffic deaths per year, or two-thirds of the total, are "wholly or partly the result of bad temper." As reported by the Federal Bureau of Investigations (1998), in 1997 nearly one million adults were arrested for simple assault in the United States, and of these, approximately 39,000 were in New Jersey.

The pool of potential clients for anger management interventions is clearly enormous. However, to generate and maintain these referrals, it will be critical for

practitioners to provide clear efficacy data for anger management interventions in populations similar to those seen in forensic settings. A well-validated scale can be used not only to measure treatment effectiveness and therefore to assist in the establishment of anger management programs as empirically supported/validated treatments, but also to increase the effectiveness of these interventions by allowing the practitioner to provide individualized feedback to clients based on their own personal characteristics. This study extends existing studies by evaluating STAXI data from a multiracial, clinical population of individuals with established anger-management problems.

Limitations

Because the data for this study were drawn from existing records, several desirable measures could not be included. First, the study assumes that individuals who have either been arrested for incidents of anger or have requested assistance with anger management do in fact have difficulty with anger control. While this assumption has a high degree of face validity, it would have been useful to obtain behavioral observations from families or significant others involved with the study participants to verify this assumption. Further, while the study does allow a measurement of the proportion of individuals who appear to be presenting themselves in a positive light by minimizing their anger problems, it is not possible to determine whether this is intentional or involves a more complex process of denial as an ego defense. It is unlikely that clients whose anger has caused problems in their lives are actually unaware that they are angry. However, a personality measure such as the Minnesota Multiphasic Personality Inventory (MMPI-2; Hathaway & McKinley, 1967) may have provided useful information in this

area, particularly since this instrument also incorporates a well-validated lie scale and scales to evaluate different forms of response bias. Another approach that has been used to evaluate bias based on a desire to present oneself in a positive light is the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960), which has been used to identify denial of anger in cardiac patients (Emerson & Harrison, 1990). A prospective study would have allowed the addition of such an instrument.

Since inwardly expressed anger has been associated with anxiety (Deffenbacher et al., 1996; Spielberger & Sydeman, 1994), an instrument such as the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) or the State-Trait Anxiety Inventory (STAI; Spielberger, 1983) may have provided further insight into the scores of individuals whose Trait Anger scores are low and who may appear to be denying anger.

The nature of the sample affects its external validity. Although annual income was not available from chart records, clients in this mental health center are primarily from a low-income population. Few have completed more than two years of college, and many have not finished high school. Further, the participants were male, which does not permit analysis by gender, and a significant proportion have a history of substance abuse problems. Although this sample is representative of a clinical anger management groups in a forensic population, it probably is significantly different from individuals who are seeking treatment because of anger-related medical problems. Although gender has not been a significant factor in previous studies using the STAXI, it would have been preferable to include a sufficiently large sample of women, which would have allowed gender to be considered in the analyses. Finally, the size of the study sample does not allow a factor analysis, which may have provided additional useful information.

CHAPTER II

Review of Related Literature

Before anger can be measured, it first must be defined and understood. This chapter begins with a summary of research concerning the nature of anger and its causes, the cognitive and physiological components of anger, and the relationship between anger and aggression. The next section discusses empirical support for the constructs of anger experience and expression as defined by Spielberger's State-Trait Anger Theory, which provided the foundation for the development of the State-Trait Anger Expression Inventory (STAXI). Also covered in this section are specific studies supporting the use of the STAXI to measure the constructs underlying this theory.

The final section provides a review of research concerning the relationship between the demographic variables of age, race/ethnicity, educational level, referral source (court-mandated or self-referred), and gender on self-report anger scores. This discussion supports the inclusion of the first five factors as predictor variables potentially affecting the relationship of State-Trait Anger Theory to STAXI scores in a clinical population, as well as a discussion of the extent to which findings based on the male sample in the present study can be generalized to women with anger management problems.

The Nature of Anger

Anger has been described as an emotion that arises in response to a perceived

threat to an individual's psychological well-being (Beck, 1999; Novaco, 1976). Novaco reported that in some sense, the individual feels diminished, and from a psychodynamic perspective the arousal of anger decreases internal conflict by focusing on the offender rather than on the self. Beck suggested that domestic violence results when an individual's shaky self-esteem is threatened by the spouse's perceived oppositional or disrespectful behavior. In the author's experience with clients in anger-management group therapy, a commonly reported anger trigger is a perception of being "disrespected." Therapy clients also frequently report, however, that they do not think at all; rather, they simply "react."

While cognitive theory focuses on the role of appraisal in mediating the arousal of anger, the question of whether cognitive appraisal is necessary and sufficient for anger arousal been debated for more than a century. As discussed below, under "Physiological Components of Anger," the arousal of anger is accompanied by strong physical sensations. According to the classic James-Lange theory of emotion, first published in 1890 (James, 1990), these physical sensations result directly from the perception of a threatening event without cognitive mediation, and these bodily changes in fact are the emotion. In a frequently cited experiment challenging the James-Lange theory, Schachter and Singer (1962) found that being given an appropriate explanation for bodily sensations induced by the injection of epinephrine (labeled as a "vitamin") both limited the degree to which participants would respond angrily to provocation and decreased their self-report of having felt angry during provocation. Therefore, Schachter and Singer believed that cognitive processing was a key part of the interpretation of a physical sensation as an emotion. However, the chicken-and-egg debate over the primacy of

affect versus cognition has yet to be resolved. One of the strongest proponents of the idea that emotions are not cognitively mediated has been Zajonc, whose affective primacy hypothesis suggests that, at least in some cases, affective reactions require virtually no cognitive processing (Zajonc, 1980; Zajonc, 1984; Murphy & Zajonc, 1993). Izard (1992) further suggests that there is a set of "basic" emotions, including anger, which can be triggered through innate neural substrates. This has been demonstrated to some extent through studies of facial expression. For example, students who were told to frown reported increased anger, and those told to smile reported increased happiness and greater perception of humor in cartoons (Kassinove & Sukhodolsky, 1995). Further, Zajonc, Murphy, and Inglehart (1989) were able to induce emotional responses by changing the temperature of cerebral blood flow.

Lazarus (1984, 1991) countered by stating that these findings do not rule out the role of cognition in emotion. This position is supported not only by Schachter and Singer's (1962) study with adrenaline injections and induced anger, but also by studies with panic disorder patients. For example, either activating or cognitively restructuring interpretations of bodily sensations can either induce or block panic responses to intravenous lactate infusion (Clark, 1994) and to CO_2 (Rapee, Mattick, & Murrell, 1986), both of which can produce panic in laboratory settings. Lazarus (1984, 1991) stated that appraisal is a necessary process in the generation of emotion, and that those appraisals which appear to lack cognitive mediation are in fact mediated through preconscious automatic cognitive processes.

Cognitive Components of Anger

Assuming that, at least in many cases, the arousal of anger depends on the individual's perception of the situation, it is important to note that this perception is not always inaccurate and that the arousal of anger is not always a negative event. Throughout history, anger has provided the impetus for social reform movements, and on a smaller scale, anger can be helpful in providing a motivation for appropriately assertive behavior. However, the inappropriate experience and expression of anger can have serious consequences, both for an individual's health and interpersonal relationships.

In describing how the arousal of anger is cognitively mediated, Beck (1999, p. 31) outlined a process that proceeds as follows:

Event
↓
Experience of loss/fear/distress
↓
Perception of having been "wronged"
↓
Shift of focus to the "offender"
↓
Mobilize to attack/restore balance of power
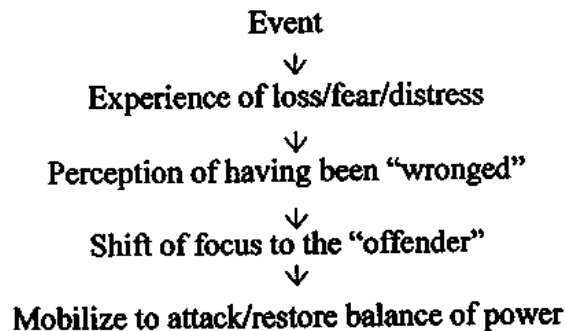
The experience of loss can be exacerbated by what Beck (1999, p. 32) refers to as faulty beliefs, which include statements such as "if somebody doesn't show me respect, it means I appear weak," which may be related to a core belief that the individual actually is weak. Faulty beliefs may also include "shoulds" and "musts," which create anger when they are applied to other people, who inevitably frustrate the individual by not complying with his or her inflexible demands. According to Ellis (1993), two fundamental irrational beliefs contribute to anger: "other people must treat me fairly and

nicely," and "the conditions under which I live must be comfortable and free from major hassles" (p. 162). Beck also defines "primal beliefs" as "beliefs that we consider vital to our existence or identity" (p. 32). Examples of primal beliefs that can lead to aggression include "I should punish (or beat up) anyone who doesn't show me respect." Hammond and Yung (1993) reported that the most common explanation offered by perpetrators of assault or homicide in two separate studies was retaliation or revenge, in many cases they stated it was in response to verbal or physical abuse. Beck noted that once anger is aroused, cognitive processing becomes further impaired, and cognitive distortions are more likely.

One of the forms of cognitive distortion most closely related to anger and violence is hostile attributional bias. In a review of factors influencing violent behavior, Hammond and Yung (1993) report that adolescents who are perceived by their peers to be aggressive were more likely to view others as having malicious motives for their behavior. These individuals also reported higher levels of anger and were more likely to believe that aggression was an appropriate response to provocation. A recent study by Eckhardt, Barbour, and Davison (1998) found that statements of maritally violent men during anger arousal included more hostile attributional bias, along with a greater number of irrational thoughts and cognitive biases, than both men who were maritally distressed but nonviolent and maritally satisfied men. Dodge, Price, Bachorowski, and Newman (1990) found that reactive aggression, but not instrumental aggression, was strongly linked to hostile attributional bias. This was true even when the effects of race, socioeconomic status, and intelligence were controlled. The tendency to attribute hostile intent to another's actions can result from early socialization, in which the individual has

been repeatedly subjected to blame from parents and others, creating what Graham and Hudley (1994) refer to as a "chronically accessible construct." In other words, the idea that harm was intentional becomes more readily accessible in an individual's memory, and therefore more quickly retrieved, than alternative explanations. In a study of 78 aggressive and 78 non-aggressive African American boys, grades 6 through 8, Graham and Hudley found that aggressive children made more severe judgments than did non-aggressive children in response to ambiguous vignettes, even when they were primed with non-aggressive explanations for the individual's behavior.

While the final stage in Beck's (1999) model involves mobilization to attack, whether or not the arousal of anger results in aggressive behavior depends on a variety of factors, which are described under "The Relationship of Anger and Aggression." Further, as discussed below, certain physiological factors may affect an individual's threshold for aggressive reactions to anger arousal.

Physiological Components of Anger and Aggression

While the emotional experience of anger is primarily a human one, a large body of animal research exists on aggression, some of which can increase our understanding of aggressive behavior in humans. Studies with animals have identified seven distinct types of aggression, each with its own pattern of behavior and separately identifiable neural pathway (Graham, 1990; Moyer, 1987). These types of aggression are predatory, which is related to hunting for food; intermale, which occurs when a dominant male's territory is threatened; fear-induced, which is related to self-defense; maternal, which is focused on defending a nest and offspring; irritable, which occurs in response to frustration, pain,

or deprivation; sex-related, which occurs between male and female as part of the mating process; and instrumental, which is the term given to any type of aggressive behavior that increases as a result of environmental reinforcement. Graham reported that in animals, these types of aggression can be linked to specific neural pathways.

Human studies have failed to show either such distinct forms of aggression or clearly defined neural pathways prompting them. However, of the types of aggression described above, Graham stated that the most closely related to the human experience of anger is irritable aggression. He further noted that the brain circuitry involved in irritable aggression is very similar to that involved in intermale and fear-induced aggression (p. 531). Stimulation of either the amygdala or hippocampus in humans has been shown to induce either fear or anger, which are moderated through closely related pathways (Graham, 1990; Moyer, 1987). Moyer reported that anger and anxiety can be induced by electrical stimulation of the posterior hypothalamus.

In humans, even when the angered individual does not actually respond with aggressive behavior, Beck (1999) pointed out that the body's "biological attack system" is nonetheless activated. In situations triggering both fear and anger, the sympathetic nervous system responds to prepare the individual either to escape or to fight the attacker. Physiological responses, commonly known collectively as the "fight or flight" response, include increased heart rate, increased respiratory rate, constriction of peripheral arteries and dilation of arteries supplying the brain and large muscles, inhibition of stomach and intestinal contractions, sweating, and release of glucose from the liver (Graham, 1990).

A variety of physiological factors have been shown to lower an individual's anger threshold. Alcohol has been associated with behavioral disinhibition and increases in

hostile thoughts (Moyer, 1987). The mechanism for this, however, is unclear. While traditional wisdom has been that alcohol directly anesthetizes areas of the brain responsible for inhibition, new evidence suggests that changes in behavior under the influence of alcohol are more related to indirect effects such impairment in perception and cognition, which may affect social judgment (Bushman, 1997; Pernanen, 1997) or to social norms that create expectations for behavioral effects, related to alcohol (Kallmen & Gustafson, 1998). Other studies, however, have shown that for a small group of individuals, alcohol consumption can cause EEG spiking in the temporal lobe, in the region of the amygdala (Moyer, 1987). This spiking is also seen in epilepsy patients who are prone to violent outbursts. In addition to alcohol, other drugs have been associated with violent behavior. Acute cocaine toxicity can lead to paranoia, aggressiveness, and homicidal behavior (Karan, Haller, & Schnoll, 1998). Among the possible symptoms of phencyclidine (PCP) intoxication are severe anxiety, panic, rage, aggression, and violence (Weiss & Millman, 1998). Moyer stated that paradoxically, benzodiazepines (such as Valium, Xanax, and Ativan), which are generally prescribed as anxiolytics, can also cause increases in hostility and aggression in higher doses. Certain brain disorders have been associated with increased irritability and aggression, including cerebral arteriosclerosis, some forms of dementia, including Korsakoff's dementia, Huntington's Chorea, head injury, and diffuse brain lesions (Moyer, 1987).

Based on crime statistics (Federal Bureau of Investigation, 1998), age is clearly related to aggressive offenses, with late adolescents and young adults accounting for the greatest proportion of arrests, and a significant reduction in later years. It is not clear, however, whether this is a reflection of biological or emotional maturity, or possibly

both. A recent study by Dabbs and Hargrove (1997) associated decreased testosterone levels with age-related decreases in criminal behavior in women. Testosterone may also be at least partially responsible for gender differences in aggressive behavior, reflected in the fact that men account for the majority of arrests for violent crime. For example the Federal Bureau of Investigations reported that 84% percent of arrests in 1997 were men. While gender-role socialization is probably a contributor to this, there is a large body of literature on the effects of testosterone on aggressive behavior in animals (summarized in Graham, 1990), and at least some evidence for a link between testosterone and aggression in humans. In animals, Graham mentioned that testosterone appears to affect brain organization in the prenatal period. In humans, testosterone levels in adults have been associated with hostility and antisocial personality traits (Aromaeki, Lindman, & Eriksson, 1999) and self-reported levels of aggressive personality (Harris, Rushton, Hampson, & Jackson, 1996). Further, injections of increasing levels of testosterone over a 6-week period resulted in significantly higher levels of aggressive behavior in comparison to placebo (Kouri, Lukas, Pope, & Oliva, 1995). However, in a meta-analysis of studies among college students, Archer, Birring, and Wu (1998) found no relationship between testosterone and aggressiveness. Another recent study with early adolescent boys (Tremblay et al., 1998) found that testosterone was not related to aggressiveness but was positively correlated with social dominance, which was predicted by height and body mass.

Finally, as may be intuitively expected, physical discomfort, including pain, fatigue, illness, stress, hunger, and extreme cold or heat have all been shown to decrease an individual's threshold of anger (Berkowitz, 1990).

The Relationship of Anger and Aggression

As discussed in Chapter I, the term "aggression" as used in this study addresses reactive aggression, which occurs in response to anger arousal, rather than instrumental aggression, which is generally motivated by personal gain. Aggression, which can be conceptualized in terms of State-Trait Anger Theory as the outward expression of anger, is not an inevitable reaction to anger arousal. In fact, Eckhardt and Deffenbacher (1995) cite a study by Averill (1982) showing that 90% of anger episodes do not result in aggressive behavior. A variety of factors both contributing to and inhibiting aggression have been cited in the literature. It has long been recognized that fear of retaliation or punishment will inhibit an aggressive response to anger arousal (Bandura, 1973; Beck, 1999; Berkowitz, 1989; Dollard et al., 1939). Other factors inhibiting an aggressive response to anger include empathy for the victim (Bandura, 1973; Beck, 1999), and an image of oneself as a mature, kind person, or a personal value system that prohibits violent behavior (Beck, 1999). Individuals may have also learned alternative, non-aggressive, styles of coping with frustration and anger (Bandura, 1973; Berkowitz, 1989; Novaco, 1976).

One of the most powerful factors that may inhibit an aggressive reaction to anger arousal is the expectation of social disapproval (Bandura, 1973; Berkowitz, 1989; Novaco, 1976). Social attitudes toward violence and aggression have been related to race/ethnicity, socioeconomic status, culture and gender.

Race/ethnicity and SES. Hammond and Yung (1993) reported that "virtually all"

studies on youth homicide and violence indicate that the group at highest risk for death or injury from assaultive violence in the United States is late adolescent and young adult African-American men from inner cities and low income families, and that the second highest risk is to Latino men from similar circumstances. In 1967, Ferracuti and Wolfgang (as cited in Cao, Adams, & Jensen, 1997) presented a theory that among young black males there was a "subculture of violence" that supported violent behavior in both defensive and offensive situations. However, among individuals of higher socioeconomic status, racial differences in violent behavior have not been supported (Paschall, Flewelling, & Ennett, 1998). Hammond and Yung suggested that in low-income communities, respect and social status may be of greater importance, and they cite studies indicating that assailants, drug dealers, and murderers were given high levels of respect. In these communities, assault was generally considered to be a response to personal disrespect or a need to protect self, family, or friends. However, clearly not all individuals in low-income communities are violent. Markowitz and Felson (1998) provided an alternative view of the relationship of socioeconomic status to violent behavior. In a sample of 254 randomly selected adults and 141 ex-offenders, they compared the frequency of self-reported physical or verbal aggression with measures of disputatiousness (self-reported likelihood of aggression in hypothetical circumstances), attitudes about the importance of showing courage in a fight or argument, and attitudes about the importance of seeking retribution for a wrong. They found that low socioeconomic status was related to increased emphasis on retribution and courage, and that younger adults and males were more likely to emphasize retribution. However, the level of emphasis on courage and retribution explained 25% of the variance in

disputatiousness, and when added to a multivariate equation they caused both age and gender effects to significantly decrease and SES effects to disappear. Further, disputatiousness was directly correlated with frequency of violence and mediates the effect of all other variables. This study found no significant race effects for any variable.

An additional factor contributing to violent behavior may be the level of exposure to violence in low-income communities. Paschall, Flewelling, and Ennett (1998) found that an individual's previous exposure to violence was a critical factor in predicting violent behavior, to such an extent that when this variable was added to the regression model, racial differences became nonsignificant. However, they reported that minority participants were significantly more likely to report exposure to violence and a higher number of low-SES indicators.

Regional culture. The subculture of violence theory has been extended to the Southern and Western United States, and suggested that these regions have developed a "culture of honor." Cohen (1998) suggests that in groups that function according to a culture of honor, the usual social prohibitions against violence do not exist in situations in which someone's honor (i.e., one's masculine reputation) has been threatened. To support this position, Cohen cited research indicating that Southerners respond to perceived insults with greater emotional, cognitive, physiological, and behavioral signs of aggression and dominance than do Northerners. Further, Cohen noted that the South and West have higher rates of homicide committed in the context of an argument or a quarrel (reactive aggression), although the rates of homicide during the course of other felonies (instrumental aggression) do not differ by region.

By contrast to U.S. culture, some cultures view not only aggression but even the display of anger as so dangerous to the social group that expression of anger is not tolerated. Tanaka-Matsumi (1995) suggests that this is more common in collectivistic cultures, including Japanese, Tahitian, and Eskimo cultures. The importance of in-group cohesion is reflected in self-reports of anger antecedents. Tanake-Matsumi reported that while Americans and Europeans report that their angry episodes are most often triggered by personal relationships, Japanese are more likely to report interactions with strangers as a primary source of anger. However, the fact that a culture outwardly disapproves of any sign of conflict may mean that violence remains unreported rather than that it doesn't exist. Kozu (1999) indicated that violence against women is not uncommon in Japan, and that police do not take reports of domestic violence seriously. Because of the desire to avoid bringing shame to the family, family members rarely discuss family conflict with outsiders.

Gender. Several studies have reported gender effects in attitudes toward anger and aggression (Harris & Cook, 1994; Harris & Knight-Bohnhoff, 1996; Locke & Richman, 1999) and in styles of anger expression (Kopper, 1993; Kopper & Epperson, 1996), despite the general finding that men and women do not differ in the levels of anger they experience (Sharkin, 1993; Stoner & Spencer, 1987). The arrest statistics for violent crime do suggest that while women may experience equal levels of anger, their expression is less often physical (Federal Bureau of Investigation, 1998). Kopper and Epperson found that men were more likely to report aggressive acting out as a response to anger. Nunn and Thomas (1999) found that sex-role stereotyped anger expression in

men and women was moderated by self-esteem. High self-esteem men and women were equally willing to express aggression by administering blasts of white noise to a confederate. However, the strongest blasts were delivered by low self-esteem men and the weakest by low-self-esteem women.

Empirical Support for State-Trait Anger Theory

As discussed in Chapter I, State-Trait Anger Theory addresses two overall components of anger: anger experience and anger expression. This section discusses existing support for these constructs.

Anger Experience

State-Trait Anger Theory conceptualizes anger experience as consisting of two components, anger as an immediate subjective experience (State Anger), and a personality trait characterized by the tendency to experience frequent state anger (Trait Anger). The idea that emotions should be addressed in terms of both transient states and more stable personality traits was first presented by Cattell and Scheier (1961), who differentiated between state and trait anxiety. Spielberger's early work followed from this and resulted in the development of the State-Trait Anxiety Inventory (Spielberger, 1983). State-Trait Anger theory follows from this model.

State anger. Spielberger (1996) defined state anger as follows: "an emotional state marked by subjective feelings that vary in intensity from mild annoyance or irritation to intense fury and range" (p. 1). He further stated that

"state anger is generally accompanied by muscular tension and arousal of the autonomic nervous system. Over time, the intensity of state anger varies as a function of perceived injustice, attack or unfair treatment by others, and frustration resulting from barriers to goal directed behavior" (p. 1).

These statements have varying levels of empirical support. The idea that anger is an emotional state that varies in intensity has not been directly tested, but it has such a high degree of face validity that for the purposes of this study it will be accepted as true. The physiological correlates of anger have been extensively documented, as discussed previously. Spielberger's assertion that anger varies over time as a function of perceived injustice and other factors is supported by studies of cognitive factors in anger, which have also been discussed above. Further, as reported by Jacobs, Latham, and Crane (1988), the test-retest reliability of the STAXI State Anger scale (.21 - .27) is substantially lower than for the Trait Anger scale (.70 - .77), which provides some support for the idea that state anger is a transient phenomenon, while trait anger is more stable.

Trait anger. Spielberger (1996) stated that "trait anger is defined as the disposition to perceive a wide range of situations as annoying or frustrating and the tendency to respond to such situations with more frequent elevations in state anger" (p. 1). Further, he stated that "individuals high in trait anger experience state anger more often and with greater intensity than individuals low in trait anger" (p. 1).

These statements are supported by a series of studies conducted with undergraduate psychology students by Deffenbacher, et. al. (1996). In all of these

studies, as discussed in Chapter 1, "high anger" participants were defined as those who scored at or above the 75th percentile on the Trait Anger Scale and had admitted a problem with anger, and "low anger" participants were those who scored below the 25th percentile and indicated no anger problems. To test the range of situations perceived as anger-provoking, participants completed the Novaco Anger Inventory (AI; Novaco, 1975), which consists of 90 situations for which the individual indicates on a 5-point scale how much anger he or she would experience. Frequency and intensity of anger was evaluated through a daily anger log. In addition, intensity of anger was evaluated through a variety of measures. First, the Anger Situation measure (Deffenbacher, Demm, & Brandon, 1986) asks participants to rate their intensity of anger from 1 (no anger) to 100 (maximal anger ever experienced) in response to their most angering ongoing personal situation. Also, participants were asked to rate the intensity of their most common anger-related physical symptom (e.g., shaking, sweating, flushing, etc.). Finally, participants' measured and recorded their heart rates before and after listening to a provocative audiotape, in which they were asked to put themselves in the position of the victim, and they completed the State Anger scale at the end of the provocation exercise.

As predicted, high-anger students reported being angered by a greater number of situations, and they reported that they became angry more frequently over a one-week period. Further they reported anger of greater intensity on all self-report measures. However, contrary to predictions, high-anger and low-anger individuals did not differ in heart rate elevation following the provocation exercise. It is possible that this result was because the provocation exercise used a single situation, which was hypothetical rather than personal. Therefore, while individuals may have easily imagined and reported what

they would have done, they may not have actually experienced anger and its related physical symptoms at the time of the exercise.

Anger Expression

State-Trait Anger Theory includes the following three components of anger expression: (a) anger that is expressed outwardly toward others or toward the environment, or "anger-out;" (b) anger that is suppressed or "held in," or "anger-in;" and (c) attempts to control angry feelings, or "anger-control."

The concepts of "anger in" and "anger out" were introduced by Funkenstein, King, and Drolette (1954), during a period in which medical and psychological research was first beginning to focus on the relationship between emotions and physiological reactions. They observed 69 male college students in a stress-inducing situation in which they were asked to perform mental calculations and digit series exercises of increasing difficulty, and then were subjected to verbal abuse after each mistake. Recordings of pulse and blood pressure were taken before and immediately after the exercise. Participants were interviewed about their emotional reactions during the exercise and were encouraged to express their feelings openly. They were categorized according to their self-report of having experienced anger, anxiety, or a combination of these two. Those who reported anger were further categorized based on whether this anger was reported to be directed toward the self (anger-in) or toward the experimenter (anger-out), or a combination of the two. Individuals who reported mostly anger-in or anxiety had significantly greater increases in pulse rate than those who reported anger-out, and those who reported anxiety had significantly greater increases in systolic blood pressure. This

study suggests that anger-in and anger-out are qualitatively different from each other. Note that although the terms "anger-in" and "anger-out" are the same as those by State-Trait Anger Theory to describe the direction of anger expression, this study was designed to determine the direction of angry feelings, but not necessarily whether these feelings would have been expressed or suppressed had the individual not been encouraged to "vent" after being provoked.

Harburg, Blakelock, and Roeper (1979) conceptualized anger-in and anger-out as emerging from a more general coping style they termed "resentment," which they said involves both physiological anger arousal and psychological hostility. They saw this in contrast with another coping style, which they termed "reflection." These categories are roughly parallel to the State-Trait Anger categories of anger-in, anger-out, and anger control. In response to a hypothetical situation in which they were unfairly criticized by a supervisor, participants who said they would do nothing or let it pass over were classified as anger-in; those who said they would protest directly or to someone else were classified as anger-out, and those who said they would employ problems solving methods such talking to the supervisor and trying to work things out were classified as reflective. This study found that individuals with resentful coping styles (either anger-in or anger-out) had higher blood pressure than individuals with a reflective style (anger control). However, this study examined reactions only to a single hypothetical situation, and therefore it not possible to know whether the styles of anger expression reported in this study indicated participants' most common responses.

During the initial development of the Anger Expression Scale, Spielberger and his colleagues assumed that anger-in and anger-out were part of a continuum, on opposite

ends of a unidimensional, bipolar scale (Spielberger & Sydeman, 1994). However, based on their factor analysis, they determined that these were in fact independent factors. In a validation study of the STAXI factor structure with Midwestern undergraduates (Fuqua et al., 1991), the correlation between Anger-In and Anger-Out was small (.04) and non-significant, which supports the theory that these are independent constructs.

With regard to the relationship of anger expression and anger experience, State-Trait Anger theory predicts that individuals high in trait anger will tend to express their anger in less adaptive and less functional ways (Deffenbacher et al., 1996), including more frequent anger suppression and outward expression rather than attempts to control anger. Deffenbacher et al. predicted that this would result in high-anger individuals experiencing more frequent and severe negative consequences as a result of their anger. In the sample of students described above, Deffenbacher and colleagues administered the STAXI anger expression scales before a provocation exercise and then administered the Coping Strategies measure (Novaco, 1975) following the exercise. The Coping Strategies measure requires the individual to rate the probability from 1 to 7 that they would use each of 6 strategies in the following categories: physical antagonism, verbal antagonism, and constructive coping. This study found that, as predicted by theory, individuals high in trait anger also had higher levels of anger expression both in and out, and that they reported less use of constructive coping strategies. Additional analysis indicated that this was not due to differences in the nature of provocations these individuals encountered in their daily lives.

Evidence for the Clinical Utility of the STAXI

The studies of the general psychometric qualities and factor structure reported in

the STAXI professional manual are reviewed in Chapter III. The following is a more detailed discussion of evidence presented in Chapter I for value of the STAXI in the clinical applications for which Deffenbacher et al. (1996) and Sharkin (1996) have recommended its use.

Screening. As a screening tool, an instrument should accurately identify individuals whose anger problems are severe enough to require clinical intervention, and it should also eliminate individuals whose anger problems are not severe or who are suffering from another problem, such as anxiety or depression. In other words, the instrument should show evidence of both convergent and discriminant validity in the population with which it will be used.

As discussed below under "outcome assessment," the STAXI has shown evidence of convergent validity with other self-report measures of anger. Further evidence for ability of the Trait Anger scale to identify both angry and non-angry students was presented by Deffenbacher and his colleagues in the series of studies discussed above (1996). In these studies, students who scored at the 75th percentile or above on the STAXI and indicated a problem with anger reported significantly greater problems with anger than did students who scored below the 25th percentile. However, this may have become somewhat a self-fulfilling prophecy, as they selected their "angry" participants based on high trait anger scores and a self-reported anger problem, and their "non-angry" participants were selected based on low trait anger scores and a self-report of no problems with anger. They did not report what percentage of individuals with trait anger scores above the cutoff actually reported problems with anger or what percentage below

the cutoff did not report problems.

A recent study by Cornell, Peterson and Richards (1999) examined the validity of trait anger and anger expression as predictors of aggressive behavior in a population of incarcerated male adolescents. In contrast to the above study, in which the participants were primarily White, the sample in this study was 66% African American, 31% White, and 3% "other." In this study, participants completed both the Novaco Anger Scale (Novaco, 1994), which is a 72-item measure of anger experience and intensity, and the STAXI. In addition, the following three validity items were included to detect inappropriate or careless responding: "I am telling the truth on this questionnaire," "I am reading each question on this questionnaire carefully before responding," and "In answering these questions, I am telling the truth, not just trying to look good." Discriminant function analysis indicated that the Trait Anger scale accurately classified 66% of participants as violent or not violent, while the combined Trait Anger, Anger-Out, and Anger-Control scale accurately classified 71 percent. While this result was presented by the authors as a success, these predictions were not significantly more accurate than staff predictions based on prior behavior. Further, the researchers note two complications that may affect the clinical utility of self-report instruments in this population. First, participants in this study were promised anonymity and confidentiality, which meant that their scores would not be shared with the treatment staff. It is not known whether, or how, their response styles would have changed if it were possible that scores would affect their treatment. Second, approximately 17% of the completed instruments were omitted from the study because of inappropriate responses to one or more of the validity items. Therefore, while this results of this study indicated statistical significance, the practical

significance is questionable.

The discriminant validity of the STAXI has been generally confirmed by low correlations between the STAXI scales and measures of other constructs, including extraversion and curiosity (Spielberger, 1996). In the development of this instrument, items that had content validity for anger but also correlated highly with measures of anxiety were eliminated from the scales (Spielberger & Sydeman, 1994). However, the STAXI manual reports moderate positive correlations of all STAXI scales with trait anxiety (.24 - .38, $p < .001$), as measured by the State Trait Personality Inventory. This is not unreasonable, as anger and anxiety can be viewed as conditions that frequently co-exist.

Of the three anger expression scales, the least robust in terms of discriminant validity appears to be AX/In. While the conceptualization of anger-in as defined by State-Trait Anger theory is distinct from the psychodynamic concept of repressed anger or "anger turned inward," which has been theoretically related to depression, there is some evidence that an anger-in style of anger expression is correlated with depression. In a study of 247 undergraduates, Clay, Anderson, and Dixon (1993) found that scores on anger-in, but not anger-out or anger-control, had a modest positive correlation (.37) with scores on the 22-item Inventory to Diagnose Depression (IDD: Zimmerman & Coryell, 1987). Further, Deffenbacher et al. (1996) found that, at least with college students, anger-in was correlated more strongly with scores on both the Trait Anxiety Inventory (.50, $p < .01$) and the Beck Depression Inventory (.37, $p < .01$) than it was with trait anger (.28, $p < .01$). Trait anger, by contrast, correlated strongly with anger-out (.70, $p < .01$) and with anger control (- .58, $p < .01$). While this supports the use of the STAXI with

individuals who have problems controlling outwardly expressed anger, it does raise

questions about the conclusions that can be drawn from a high score on the AX/In scale.

Treatment planning. To use the STAXI in individual treatment planning, it is

important to be able to provide feedback to a client based on his or her scores relative to

an appropriate normative group. Further, to accurately interpret the individual score

profile, it would be important to know that scores on the different scales relate to State-

Trait Anger theory in a consistent way.

The STAXI manual provides percentile and T-score data for the following

normative groups: Adult males ($\underline{n}$ = 2,880) and females ($\underline{n}$ = 1,182), college student

males ($\underline{n}$ = 1,377) and females ($\underline{n}$ = 1,384), and adolescent males ($\underline{n}$ = 1,264) and females

($\underline{n}$ = 1,205). Adults, which comprise the normative group to be used in the present study,

ranged in age from 18 - 67, with a mean of "approximately 40." This information was

not provided by gender. No information is given on the racial/ethnic composition of this

group, although the group included a wide range of socioeconomic status, based on the

job titles listed in the manual for participants (e.g., managerial, technical, clerical, sales,

and factory workers; senior military officers; and postal employees). Given the large size

of this sample and wide range of occupations and ages, it is assumed to be adequate for

the purposes of this study. While percentile and T-score data are not available by age

group, the manual provides sufficient descriptive statistics to allow this information to be

calculated for the following age groups, by gender: 18 - 30; 31 - 40; and 41 and older.

Any significant race/ethnicity effects on anger scores found in the present study may

suggest the need for further subgrouping in the normative sample to allow its use for

individual evaluation of clients in a clinical population.

The mean age for college students was 19.65, and as with the adult group, no information is given on age range or racial/ethnic breakdown. The adolescents ranged in age from 12 to 18, with a mean of 14. The adolescent sample was 82% white. In addition to the general normative tables, the manual provides limited data on special-interest groups, including male and female medical/surgical patients (n = 219), military recruits (n = 1,869), and prison inmates ("n" was not provided). The medical/surgical patients were over 95% White, and ranged in age from 30 to 82 years, with a mean of 50. No racial/ethnic or age data were provided for the prison and military recruit samples. While the normative data provided in the manual were certainly based on a large number of individuals, the lack of certain critical descriptive data on the samples and the apparent focus on non-minority individuals limits the applicability of these norms to therapy clients whose background may vary from that of the participants in these normative studies.

The relationship of the STAXI to the predictions of State-Trait anger theory has been confirmed in a college student population by Deffenbacher et al. (1996), as described previously. However, the participants in the studies conducted by Deffenbacher and his colleagues were young, primarily White, and because they were college students, it may be inferred that they were of higher socioeconomic status than the participants in the present study. To date, no study has been conducted to validate the predictions of State-Trait Anger theory in a low SES group with a significant proportion of minority participants.

Outcome assessment. The value of any scale for outcome assessment depends on its ability to do three things. First, it must accurately measure the construct of interest both at the beginning and ending of treatment. Second, it must do so with a minimum amount of measurement error; at least with a degree of error that is significantly smaller than the expected change over the time of treatment. Third, the test-retest reliability of the instrument must indicate that the instrument is stable enough to provide confidence that any change is due to actual changes in the client and not to random fluctuation in scores.

Evidence for the ability of the STAXI to accurately measure anger experience and expression has been provided through evidence of convergent validity with other measures. One of the most widely accepted scales for measuring anger experience, other than the STAXI, is the Novaco Anger Scale (NAS; Novaco, 1994). Novaco reported that the Trait Anger scale of the STAXI had a correlation of .84 with the NAS. Deffenbacher's studies (Deffenbacher et al., 1996) showed evidence of concurrent validity with anger self-report, anger logs, self-reported styles of anger expression, and self-reported physiological anger symptoms. Further, as discussed in Chapter III, the STAXI manual indicates moderate to high (.30 to .71) correlations with measures of hostility. As State-Trait Anger theory views anger and hostility as related but different constructs, it is appropriate that these correlations are not higher.

While the manual does not provide information on Standard Error of Measurement for the STAXI scales, these can be calculated based on the means and standard deviations provided for the normative groups. The formula for standard error is as follows, where s_x is the standard deviation and r_{xx} is the reliability coefficient

$$S_m = S_x \sqrt{(1 - r_{xx})}$$

(Pedhazur & Schmelkin, 1991). Using this formula, with α as the reliability coefficient, the standard error of measurement for the Trait Anger scale is 2.04.

$$2.04 = 4.81 \sqrt{(1 - .82)}$$

Given that scores on the Trait Anger scale range from 10 to 40, this appears adequate. However, it is important to note that the accuracy of measurement for outcome assessment is also affected significantly by the test-retest reliability in addition to the value of α..

Evidence for adequate test-retest reliability was provided, as discussed earlier, in a study of 395 undergraduates conducted by Jacobs, Latham, and Brown (1988). This study indicated test retest reliabilities ranging from .62 to .81 for the Trait Anger and Anger Expression scales. However, this is the only study that has addressed this issue. It is not possible to evaluate the generalizability of this data, since the authors provide no data on age ranges or racial/ethnic composition of the sample.

Demographic Variables and Anger Scores

Demographic variables in anger scores can result from physiological factors, from cultural group differences in the way anger is experienced or expressed, or from factors that affect the response style of a particular group on a self-report instrument. The following discussion provides an overview of existing literature on demographic variables in anger scores, either on the STAXI or on other instruments, specifically

designed to measure anger experience or expression. Of the variables discussed below, age, race/ethnicity, educational level, and referral source are evaluated in the present study. A brief discussion of gender differences in anger scores provides evidence for the generalizability of the present sample to both men and women with anger management problems.

Age. The findings of studies evaluating the relationship of age to STAXI scores have been mixed, although there appears to be a general trend toward decreasing anger scores with increasing age. In the STAXI adult normative sample, both males and females in the 18 - 30 age range had higher S-Anger, T-Anger, and AX/Out scores than those in older groups. Further analysis showed that the majority of this difference was explained by the scores of individuals from age the 18 – 22 range (Spielberger, 1996).

Stoner and Spencer (1986) studied the effects of age on anger experience scores in a sample of 150 community volunteers ranging in age from 21 to 83 years divided into three age groups (Young Adult, 21-39 years; Middle Age, 40-59 years; and Old, 60-83 years). To account for the effect of higher educational level in younger participants, education was included in their analysis as a covariate. They found no age effect for either S-Anger or T-Anger. Since there is little overlap in this study between the Young Adult group and Spielberger's (1996) youngest adult group, these findings are consistent with the pattern of anger experience scores in the STAXI normative sample. However, in a second study with the same population, Stoner and Spencer (1987) found that Young Adults and Middle Age participants expressed more anger-out than the Old group and that these two groups also had higher total anger expression scores. Therefore, while

anger experience may not be as strongly related to age, the expression of anger appears to be. This is supported by a recent study with parents of undergraduates by Forgays et al. Spielberger, Ottaway, and Forgays (1998), who found that for men, increased age may be related to increases in a factor they term "feel-like-expressing-anger" on the S-Anger scale. This factor was present in for women in both an undergraduate (Forgays, Forgays, & Spielberger, 1997) and adult (Forgays et al., 1998) sample, but present for men only in the adult sample. Therefore, as men age, they may be more likely to choose not to express anger. In a racially mixed sample of adults ranging in age from 19 to 91 years, Welte and Russell (1993) found that socially desirable responding was related to lower self-report of anger expression and it also increased with age, which may partially explain the age-related decrease in anger scores found in other studies. While the above studies were conducted with normal, rather than criminal populations, their findings are consistent with findings that the proportion of arrests for anger-related crimes decreases with increasing age (Federal Bureau of Investigation, 1998).

Three studies have examined the relationship of age and anger scores in with non-clinical participants in offender populations. In a sample of male sex offenders, Dalton, Blain, and Bezier (1998) found a moderate inverse relationship (-.29) between age and T-Anger/R scores, indicating that older offenders are somewhat less likely to react angrily to a perceived insult. They found no differences in other STAXI scales. In a sample of 65 incarcerated adolescents between the ages of 15 and 18, no significant correlation was found between age and scores on either the STAXI or the Novaco Anger Scale (Cornell, Peterson, & Richards, 1999). However, given the limited age span of this sample, this result may be related to restriction of range.

Finally, Silverman and Vega (1990) evaluated the effect of a variety of demographic variables on STAXI scores of 783 male and female inmates. They found that, as in the normative sample, age was negatively correlated with Trait Anger and all anger expression scales except Anger Control, which increased with age.

The present study will evaluate whether the age effects found in non-clinical populations are also present in a clinical sample.

Race/ethnicity. As discussed in Chapter I, race and ethnicity have not been extensively considered in previous studies with anger measures. In the only study that used the STAXI with a substantial proportion of minority participants (66% African American), Cornell, Peterson, and Richards (1999) found no significant correlation between race and scores on either the STAXI or the Novaco Anger Scale. In a study evaluating the effect of anger coping styles on blood pressure, Harburg, Blakelock, and Roeper (1979) found that the reported use of anger-in, anger-out, or reflective coping styles in response to unfair criticism by a supervisor did not vary by race.

With respect to general racial effects in self-report measures, several studies have examined the effect of race/ethnicity on socially desirable responding. These studies tested the assumption that because individuals of color have lower access to power and resources, they may have more reason to actively engage in socially desirable responding than would White males (Rosenfeld, Booth-Kewley, Edwards, & Alderton, 1994). The findings of these studies have been mixed. Booth-Kewley, Rosenfeld, and Edwards (1992) found that in a sample of 24 Hispanic and 191 non-Hispanic White male Navy recruits, Hispanic respondents had higher scores on a measure of impression

management, but not on positive self-deceptive enhancement. In a later study by Rosenfeld et al. it was found that Hispanic participants, particularly Mexican Hispanics, scored higher on both self-deceptive enhancement and overall social desirability than either Black or White participants. However, contrary to the previous study, there were no main effects or interactions for race on the measure of impression management.

Other studies have found no effects at all for race/ethnicity. In a study of self-reported smoking in urban adolescents, Wills and Cleary (1997) found no difference in the validity of self-report for White, Hispanic, or Black participants. Further, Heine and Lehman (1995) found no difference in social desirable responding between university students of European descent and Japanese exchange students, despite a prediction that Japanese students would engage in a greater degree of impression management. Phelps, Meara, Davis, and Patton (1991) found that in a sample of 80 Black and 80 White female graduate and undergraduate students, there was no significant difference in tendency to respond in a socially desirable manner on the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964). However, the applicability of this data to the present study is limited, as these students were of higher socioeconomic status and the instruments were completed in a non-threatening environment.

The present study assumes that all participants are motivated to some extent to present a positive image. Given the lack of data on the impact of race/ethnicity on STAXI scores and the mixed results of studies on socially desirable responding, the present analysis can be considered to be exploratory with regard to these effects.

Educational level. As a correlate of socioeconomic status, educational level may be expected to affect attitudes toward anger, particularly with regard to acceptable forms

of anger expression. To date, only two studies have directly addressed the relationship of educational level and anger scores. In a sample of incarcerated adolescents, Dalton, Blain, and Bezier (1998) found correlations between education and STAXI scales of .13 or lower, accounting for less than 2% of the variance in any scale. However, none of these adolescents had the opportunity to have accumulated greater than a high-school education; therefore, this is not an unexpected finding. In a sample of adult inmates, Silverman and Vega (1990) found that high school graduates had higher mean Anger Control scores and lower mean scores on the other two anger expression scales and on Trait Anger than did non-graduates.

Some research has suggested that increasing socioeconomic status (SES) and educational level are correlated with increases in socially desirable responding. In a sample of 1,933 adults participating in a study of stress, alcohol abuse, and hypertension (Welte & Russell, 1993), income and education were combined to form an index of socioeconomic status. In this study, higher SES was negatively correlated with social desirability, which was in turn negatively correlated with anger scores. This would suggest that individuals of higher income and education would be less likely to under-report either their experience or expression of anger. However, it should be noted that this was a non-threatening environment and respondents were guaranteed anonymity.

The present study examines the effect of educational level on self-report anger scores in a clinical population. Given the relative lack of data in this area, this analysis can be considered exploratory.

Referral source. Existing research, as well as clinical experience, suggests that self-report scores of individuals in the criminal justice system may be affected by

different variables than scores of undergraduates. As discussed earlier, in a study evaluating the clinical utility of the STAXI with incarcerated adolescents (Cornell, Peterson & Richards,1999), 17% of the instruments were eliminated from the study because of inappropriate responses to a 3-item validity index.

In validating the recently developed Aggression Questionnaire (Buss & Perry, 1992) in an offender population, Williams, Boyd, Cascardi, and Poythress (1996) found that, contrary to predictions, the mean aggression scores of 200 individuals awaiting trial for a variety of offenses were no different from the mean scores of college students in Buss and Perry's 1992 study. The authors suggested that this result may have been because only 22% had been arrested for violent crimes, or that, despite a promise of anonymity these individuals may have been motivated to present a positive image prior to sentencing. Beyond the lack of differences in means, however, this study found that the four-factor structure reported for college students (Physical Aggression, Verbal Aggression, Hostility, and Anger) was not supported in this population. Rather, a two-factor solution consisting of Physical Aggression/Anger and Verbal Aggression/Hostility was more appropriate. It should noted that this sample differed from the college student sample not only of the basis of offender status but also in age (17 - 69 versus 18 - 20) and educational status (23% had completed high school or a GED versus 100% of the original sample). Further, this sample was 60% non-white. Although Buss and Perry did not provide a racial/ethnic breakdown of their participants, it is assumed that their sample did not include as many minority participants.

There is some evidence that referral source may affect the intercorrelations of the STAXI scales. While studies of the Anger Expression Scales with undergraduates

showed minimal correlations between AX/In and AX/Out (Fuqua et al., 1991), studies with adult sex offenders (Dalton, Blain, & Bezier, 1998) and incarcerated adolescents (Cornell, Peterson, & Richards, 1999) found significant positive correlations of .34 and .27, respectively. This may reflect either an actual relationship between the scales or the response set of the individual.

Gender. In developing the STAXI, items were selected with the goal of making the instrument gender-neutral (Spielberger & Sydeman, 1994). In Stoner and Spencer's (1986, 1987) studies of the STAXI with 150 community volunteers, discussed above under "Age," no gender differences were found in either anger experience or anger expression measures. Further, there were no interaction effects between age and gender. In the development of a new instrument to measure anger, aggression, and hostility, Buss and Perry (1992) found no gender difference for overall levels of anger, but they did find that men had significantly higher scores on physical aggression, verbal aggression, and hostility. Effect sizes for differences in the means were .89 for physical aggression, .44 for verbal aggression, .19 for hostility, and .05 for anger.

Consistent with theories that women are socialized to avoid outward expression of anger, there is some evidence that male and female scores in anger expression are affected differently by social desirability. In a sample of 509 introductory psychology students, Bartz, Blume, and Rose (1996) found that while there were no differences in mean scores on either anger experience or anger expression scales of the STAXI, scores on the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964) accounted for a small amount (7.76%) of the variance in women's scores on the Anger-Out scale.

In studies with undergraduates (Forgays et al., 1997) and with parents of undergraduates (Forgays et al., 1998), the STAXI factor structure was found to be quite similar for males and females. Therefore, they concluded that the theoretical model supporting the STAXI was equally valid for both men and women.

Because of the findings discussed above, although men in a normative group may be expected to score higher on certain scales, it does not appear that patterns of STAXI scores and the relationships between scales are substantially different for men and women. Therefore, while the sample in the present study consists of men only, it is expected that the findings may be generalized to both men and women.

Summary

This chapter provided an overview of the nature of anger and its expression, a summary of empirical support for both State-Trait Anger Theory and the use of the STAXI to measure the constructs underlying this theory, and a review of research concerning the relationship between self-report anger measurement and the demographic variables addressed in the present study.

Anger is an emotion with both cognitive and physiological components. Aggression, either physical or verbal, is an outward expression of anger. Although anger and aggression are highly correlated, the relationship of anger and aggression are mediated by a variety of factors, including fear of retaliation or punishment, empathy for the victim, self-image, personal value system, or individual coping style. Social views of violence may also affect the outward expression of anger, and certain cultural groups have been associated with higher levels of violent behavior. Gender may also be a

mediating factor. While men and women do not appear to differ in the levels of anger they experience, women are less likely to express their anger in physical ways. This may result from a greater social cost to women from outward displays of aggression.

State-Trait Anger Theory distinguishes between the experience of anger and its expression, and further distinguishes between a tendency to experience anger as a trait and the immediate experience of anger arousal as a state. This theory predicts relationships among its components, which have been widely validated in non-clinical populations. In support of the use of the STAXI as a screening instrument, clear differences have been demonstrated between primarily White college students scoring in the upper quartile and the lower quartile of the T-Anger scale. What is not known, however, is whether the majority of individuals who have documented problems with anger will actually score above the 75th percentile, which is the recommended cutoff for screening. There is some evidence that STAXI scores were compromised by inappropriate or careless responding in a sample of incarcerated adolescents. The present study will provide data on the "hit rate" of the STAXI in a diverse clinical population of adult men.

Use of an instrument for individual treatment planning requires valid and relevant normative data, and evidence that the scores can be consistently related to theory for the relevant client group. The STAXI manual provides normative data by gender and age for a large sample of adults from a variety of socioeconomic groups. Although the racial and ethnic breakdowns of these groups are not provided, the data is judged to be adequate for the present study. If the STAXI score profile in comparison to the normative groups varies by race or ethnicity, this may provide evidence that the norms may need further

subgrouping.

For use in outcome assessment, an instrument must provide scores that are both accurate and stable over time. The STAXI has shown adequate evidence of convergent validity with other measures of anger and concurrent validity with self-reported anger incidents and consequences. Further, the standard error of measurement and test-retest reliability are adequate based on the normative samples. However, it has not yet been demonstrated that these results reflect the performance of the STAXI in a racially diverse, clinical sample.

Among the demographic variables that may affect scores on self-report measures of anger are age, race/ethnicity, educational level, referral source, and gender. These variables may affect not only the actual experience and expression of anger, but also the tendency to respond to self-report instruments in a socially desirable manner. While the present study does not include a direct measure of socially desirable responding, it can be assumed that social desirability plays some role for individuals in this population who score considerably lower than expected on the STAXI.

Substantial evidence exists in research with non-clinical populations to indicate that increasing age is associated with decreased scores on measures of anger expression and an increase in socially desirable responding. The present study will evaluate age effects in a clinical population. The few studies relating race/ethnicity and educational level to anger have had mixed results, as have studies of the relationship between these variables and socially desirable responding. Therefore, the present study will provide additional data to the limited amount of existing knowledge in this area. With regard to referral source, existing research suggests that individuals in forensic populations may

score differently on self-report instruments than individuals in the general population. Since the present study includes both court-mandated and self-referred anger management clients, this variable is included and is expected to affect response style. Finally, while gender has been shown to be related to levels of violent behavior, the STAXI items were selected with the goal of making this instrument equally applicable to both men and women, and the equality of the factor structure has been supported by recent studies with both college-age and middle-age men and women. Therefore, this variable would not be expected to significantly affect the "hit rate" of the STAXI or the relationship of STAXI scores to State-Trait Anger theory if the sample included both males and females. However, this remains an issue to be confirmed through replication with a female sample.

CHAPTER III

Method and Procedures

This section discusses the study participants, data collection procedures, administration information and a brief description of the psychometric properties of the STAXI, study design and analysis procedures, and power analyses for the statistical procedures to be used for each hypothesis.

Selection of Participants

Participants were 82 men who were enrolled in a 10-week anger management group conducted over the past two years at a hospital which houses a community mental health clinic, in central New Jersey. More than half (63%) were required to attend by the court or by their parole officers, generally after an arrest for assault in lieu of a prison term or as a condition of parole. A smaller percentage (27%) were voluntary. Participants had completed between 6 and 20 years of education, with a mean of 11.8 (SD = 1.84) years. The racial/ethnic composition of the sample is 60% White, 23% Black, 16% Hispanic, and 1% Asian. Fewer than half of the participants were employed full time (43%), while 12% were employed part time, 44% were unemployed, and 1 participant (1%) was on disability retirement. Marital status was 54% single, 24% divorced, and 22% married.

At the time of their intake, participants ranged in age from 18 to 67, with a mean age of 31.7 (SD = 10.83) years. While the range of ages is identical to that of the

normative group of adults, the mean age of this sample is about 8 years younger than the STAXI adult group ($\underline{M}$ = 40 years). Since a younger sample would bias the analyses in favor of many of the hypotheses, wherever possible the analyses will be adjusted to account for this mean age difference. This is discussed below under "Study Design and Statistical Analysis."

All participants were screened prior to entering the group, and individuals who were judged not able to appropriately participate in this group setting (e.g., those with a primary psychiatric diagnosis such as delusional disorder or mental retardation) were referred elsewhere. The most common DSM-IV (American Psychiatric Association, 1994) diagnosis for individuals accepted into the group was 312.34, Intermittent Explosive Disorder. Because it is recognized that violence does not necessarily involve anger, individuals whose behavior primarily involves antisocial instrumental aggression are not generally accepted into the group. However, chart review was conducted to ensure that such individuals were not included in the study. Further, although some clients have participated in more than one group of this anger management program, only data from their first group was included.

Data Collection

All new clients at the clinic received an intake interview, during which they provide background information, including medical and psychiatric treatment history. Confidentiality and its limits were explained, and clients signed a form indicating consent for outpatient treatment. This information becomes part of the client's chart. Data taken from charts for this study included age, sex, race/ethnicity, years of education, referral

source, and marital status.

Participants in anger management groups are routinely given the STAXI at the first group session, along with a measure of readiness for change, the University of Rhode Island Change Assessment Scale (URICA; McConnaughy, DiClemente, Prochaska, & Velicer, 1989). The URICA is not a focus of the present study and therefore is not discussed further. Participants were told that the STAXI scores are to help them understand their own experience of anger, that aggregate scores of both instruments may be used in research to help improve the group design, and that their individual scores will not become part of their medical record nor will they be shared with anyone outside the clinic. At the time the data was gathered, the investigator in the present study was a full-time predoctoral intern at this clinic and was participating in an hospital-approved study using the same data set.

At the third group meeting, group members are given their individual STAXI results and feedback concerning their scores relative to the appropriate norm group. This type of feedback is used for motivational purposes, as suggested by Miller and Rollnick (1991) for treatment of addictions.

Instrument

State-Trait Anger Expression Inventory

The State-Trait Anger Expression Inventory, or STAXI (Spielberger, 1996), is a 44-item self-report paper and pencil instrument designed to measure both the experience and expression of anger. This instrument is designed to be administered to individuals

from age 13 through adult who have at least a fifth-grade reading ability. Norms are available by sex, for adolescents, college students, adults, and special populations, as described in Chapter II. The normative sample used in this study is a general population of adult males. While machine scoring is available, instruments administered in this study have been hand scored.

The STAXI includes six scales and two subscales, as described below (Spielberger, 1996):

State Anger (S-Anger) is a 10-item scale that measures the intensity of angry feelings at the time the test is administered. Respondents rate their current feelings on a 4-point scale, where 1 = not at all, 2 = somewhat, 3 = moderately so, and 4 = very much so. Examples of S-Anger items are "I feel angry," "I feel aggravated," and "I feel like hitting someone."

Trait Anger (T-Anger) is a 10-item scale that measures the individual's general tendency to experience and express anger, without respect to his or her anger at the time of testing. This scale has two subscales. Angry Temperament (T-Anger/T) is a 4-item scale that measures the individual's tendency to experience and express anger without specific provocation. Examples of items in this scale are "I am quick-tempered," and "I am a hot-headed person." Angry Reaction (T-Anger/R) is a 4-item scale that measures the individual's tendency to express anger when he or she feels criticized or treated unfairly; for example, "It makes me furious when I am criticized in front of others," and "I get angry when I'm slowed down by others' mistakes." Respondents rate how they "generally feel" on a 4-point scale, where 1 = almost never, 2 = sometimes, 3 = often, and 4 = almost always. This scale is also used with the anger expression (AX) items

described below.

Anger-in (AX/In) is an 8-item scale that measures the frequency with which an individual holds in or suppresses angry feelings, that is, the expression of the feelings is inward. Examples of AX/in items are "I boil inside" and "I harbor grudges." Note that this scale is not related to the psychodynamic concept of "anger turned inward," which is a more complex process and is thought to result in depression as a consequence of denial of anger toward an external object (Spielberger & Sydeman, 1994).

Anger-out (AX/Out) is an 8-item scale that measures the frequency with which an individual's anger is expressed outwardly, toward either other individuals or objects. Examples of AX/Out items include "I lose my temper," "I slam doors," and "I argue with others."

Anger Control (AX/Con) is an 8-item scale that measures how often an individual attempts to control his or her expression of anger, including both outward and inward expression. Examples of AX/Con items include "I keep my cool," "I control my angry feelings," and "I am patient with others."

Anger Expression (AX/EX) provides an overall measure of the frequency of anger expression, regardless of the direction. It is represented as the individual's overall expression of anger, minus attempts to control anger expression. It is calculated as follows: AX/EX = AX/In + AX/Out − AX/Con + 16, where the number 16 is a constant added to eliminate negative numbers.

Scale validity. The STAXI has been shown to have at least a moderate level of convergent validity with other measures of anger and related constructs. The

professional manual reports correlations for the T-Anger scale ranging from .66 to .73 with the Buss-Durkee Hostility Inventory (Buss & Durkee, 1957), correlations ranging from .43 to .59 with the MMPI Hostility Scale (Cook & Medley, 1954), and correlations ranging from .27 to .32 with the MMPI Overt Hostility Scale (Hathaway & McKinley, 1967). Other studies supporting the validity of the STAXI that are not included in the manual are described in Chapter II.

Reliability. The STAXI professional manual reports that overall internal consistency measures (α) for the S-Anger scale were .90 for 2,880 adult males and .91 for 1,182 adult females. Alphas for the T-Anger scale were .82 for both males and females, and alphas ranged from .73 to .85 for the individual Anger Expression scales. Fuqua et al. (1991) reported that the alpha for the composite Anger Expression Scale (AX/EX) was .58, which they considered "too low for practical uses." The AX/EX scale is not used in the present study. Test-retest reliability was not reported for any of the scales. However, as discussed in Chapter II, the manual refers to a study that reported test-retest reliability coefficients for the T-Anger scale of .70 for males and .77 for females, and coefficients for the S-anger scale of .27 for males and .21 for females over a two-week period, which provides some support for the state-trait theory of anger experience (Jacobs, Latham, & Brown, 1988).

Factor structure. Because the instrument was developed in two stages, the factor structure was initially evaluated separately for the State-Trait Anger Scale (STAS) and for the Anger Expression Scale (AX). The STAS was administered as part of the 60-item

State-Trait Personality Inventory (STPI), which includes items measuring anxiety and curiosity in addition to anger. Factor analysis of the STAS resulted in a single S-Anger factor and two T-Anger factors (T-Anger/T and T-Anger/R) for both males and females. Factor analysis of the anger expression scales suggested three factors, AX-In, AX-Out, and AX-Control. It should be noted that the AX/In and Ax/Out scales were essentially orthogonal for both males and females, indicating that these are separate constructs and are not mutually exclusive.

The structure of the full instrument has been recently been assessed by two recent studies, which essentially supported the six-factor structure but also found a smaller seventh factor (Forgays et al., 1997; Forgays et al., 998; Fuqua et al., 1991). Forgays et al. (1997) performed separate principal-components analyses by gender, and found that this factor is different for college-age males and females. For females, the seventh factor includes items from the State Anger scale and appears to represent a desire to express anger in the current situation, while for males the seventh factor is less clear and includes several unrelated items from four different subscales. A recent factor analysis with data from parents of college students indicated that the seventh factor, "feel like expressing anger," is equally present and loads on the same items for both men and women in this age group (Forgays et al., 1998). While this presents possibilities for future research, the substructure of the State Anger scale is not of primary interest in the present study.

Study Design and Statistical Analysis

The design of this study is non-experimental and retrospective. Except as noted below, all statistical analyses were performed using SPSS for Windows, Version 9.0. As

described in Chapter I, the first five hypotheses evaluated whether the predictions of State Trait Anger theory that have been confirmed in non-clinical samples could be also be confirmed in a clinical sample. As has been the case with previous validation studies, these analyses did not address demographic variables, with the exception of adjustments for the age of the sample as described under Hypothesis 2b, below. Hypotheses 6a through 6d then evaluated the effect of demographic variables on STAXI scores in this population.

The following is a brief summary of each hypothesis and a description of the data analysis procedures that were used for each:

Hypothesis 1a. Given that State-Trait anger theory predicts that individuals who have experienced serious consequences of their anger will score above the 75th percentile, it was expected that all of the participants would score above the 75th percentile for the adult male normative group.

Hypothesis 1a was evaluated by determining the "hit rate," or percentage of scores in this sample that meet the screening criterion proposed by Spielberger (1996) that the percentile rank be at or above 75 based on the appropriate normative group. Percentile ranks for the adult male normative group were taken from the STAXI manual.

To determine if the result is significantly different from chance, cases were labeled as either "meets criterion" or "does not meet criterion," and they were entered into a Chi Square Test with the expected values representing the null hypothesis that 50 percent of the cases meet the screening criterion and 50 percent do not.

Hypothesis 2a. State Anger is situation-dependent and the group setting is fairly non-threatening. Therefore, it was expected that many participants would report no anger. As a result, it was expected that the majority of participants would score at the lower limit of the scale, causing State Anger scores to be positively skewed, as they are in the normative groups of adults.

This hypothesis was evaluated by examining the distribution of raw scores for the State Anger scale for the total sample and by calculating the value for scale skewness provided by SPSS. The significance of any skew was evaluated through the Kolmogorov-Smiroff test of normality, provided by SPSS. The STAXI manual reports that the data set in the normative sample is seriously skewed, although no quantitative description has been provided for this. Since the skew is expected to be marked, the significance level for the test of normality was set at $p < .01$. Additional qualitative data was provided by graphing the distribution of raw State Anger scores for the total sample.

Hypothesis 2b. Because State-Trait anger theory predicts that high-anger individuals will be angered by a wider range of situations, it is more likely that some of the participants will report moderate levels of State Anger even in a neutral environment. Therefore, it was expected that the mean for the S-Anger scale will be slightly higher than in the normative sample of adult males. To adjust for the lower mean age of the study sample in comparison to the normative group, statistical comparisons were done against the adult male norms for ages 18 - 30 years old.

Because it is not possible to do hypothesis testing in SPSS without the full data set for both samples, a t-test for independent samples were performed manually, following the procedure described by Witte (1993, p. 296). Calculations were based on the following data provided by the STAXI manual for the adult male normative samples, on the State Anger scale: $\underline{M}$ = 14.10, $\underline{SD}$ = 5.97, Variance ($\underline{SD}^2$) = 33.52, and $\underline{N}$ = 381.

Hypothesis 2c. As predicted by State-Trait Anger theory, it was expected that Anger-In would show a positive correlation with Trait Anger. However, because Anger-In has been found to correlate more strongly with Trait Anxiety than with Trait Anger (Deffenbacher et al., 1996; Spielberger & Sydeman, 1994), this correlation was expected to be small to moderate in size. This hypothesis was evaluated by calculating a Pearson $\underline{r}$ correlation between the raw scores on these two scales.

Hypothesis 2d. Since overall levels of anger are expected to be higher in this population, it was expected that mean scores for Anger-In would be significantly higher than in the normative sample of adults. This hypothesis was tested using the procedures described above for Hypothesis 2b, using the following data provided by the STAXI manual for the adult male normative sample, age 18-30, on the AX/In scale: $\underline{M}$ = 15.95, $\underline{SD}$ = 4.58, Variance ($\underline{SD}^2$) = 20.98, and $\underline{N}$ = 117.

Hypothesis 2e. As predicted by State-Trait Anger theory, it was expected that Anger-Out would show a moderate to high positive correlation with Trait Anger. This hypothesis was evaluated by calculating a Pearson $\underline{r}$ correlation between the raw scores

on these two scales.

Hypothesis 2f. Particularly since the majority of participants will have been referred for problems associated with the outward expression of anger, it was expected that mean Anger-Out scores would be significantly higher than those in the normative sample of adult males. This hypothesis was tested using the procedures described above for Hypothesis 2b, using the following data provided by the STAXI manual for the adult male normative samples on the AX/Out scale: $\underline{M}$ = 15.68, $\underline{SD}$ = 4.29, Variance ($\underline{SD}^2$) = 18.40, and $\underline{N}$ = 117.

Hypothesis 2g. As predicted by State-Trait Anger theory, it was expected that Anger-Control would show a moderate, negative correlation with Trait Anger. This hypothesis was evaluated by calculating a Pearson $\underline{r}$ correlation between the raw scores on these two scales.

Hypothesis 2h. Since all participants have documented problems with control of anger, it was expected that mean Anger-Control scores would be significantly lower than those in the normative sample of adults. For this scale, the adult normative data is not available by age. However, since Anger-Control increases in the normative sample from adolescent to college student to adult, substituting the full adult sample for the 18 - 30 subgroup could bias the study in favor of this hypothesis. Therefore, to provide a comparative sample most similar to the 18 - 30 age group, this hypothesis was tested using the procedures described above for Hypothesis 2b, using the following data

provided by the STAXI manual for the male college student normative sample on the AX/In scale: $\underline{M} = 23.19$, $\underline{SD} = 5.09$, Variance $(\underline{SD}^2) = 25.91$, and $\underline{N} = 254$.

Hypothesis 3. Based on research on anger and violence, and to some extent on studies reporting demographic effects on STAXI scores, it was expected that the following demographic variables may contribute to the variability in each of the STAXI scales discussed above: age, race/ethnicity, educational level, and referral source. Each of these variables is discussed briefly below. Their effects were evaluated by constructing a regression model for each of the STAXI scales discussed above, with the demographic variables as predictors and the scale score as the criterion variable.

Hypothesis 3a. Based on the age differences found in the adult normative groups, it was expected that all scales except AX/Con would be negatively correlated with age, and that AX/Con would increase with age. Age was evaluated as a continuous variable.

Hypotheses 3b. Because of a lack of existing research on the impact of race/ethnicity and educational level on STAXI scores, these variables were evaluated for each STAXI scale against the null hypothesis. Race/ethnicity was dummy coded into two categories: White and Non-White, to balance the cell sizes. Educational level was evaluated as a continuous variable.

Hypothesis 3c. Because of evidence that court-mandated clients have higher levels of socially desirable responding, it was expected that court-mandated status will have a moderate negative correlation with all scales expect AX/Con, which would have a

moderate positive correlation with court-mandated status. This variable was dummy coded into two categories: Court-Mandated and Voluntary.

Power Analysis

The "power" of a statistical test refers to the probability that the test will yield statistically significant results, given that the phenomenon being tested is in fact present (Cohen, 1988). Power is described as 1- beta, where beta is the probability of Type II error, or erroneously failing to reject the null hypothesis. Power analyses are generally done prior to data collection to determine the number of participants necessary to achieve a significant result with the proposed research question and planned statistical analysis procedures. Because the data set for the current study is archival, it was possible to do post hoc power analyses, which estimate the actual power for each test, given the sample sizes involved.

Note that Hypothesis 2a concerns the shape of the distribution, for which power analysis measures are not available. Statistical power analyses for all other hypotheses were performed using the computer program GPower (Faul & Buchner, 1992). The power analyses do not require equal sample sizes, but they do assume normal sample distributions, homogeneity of variance, and homoscedasticity. However, Cohen (1988) stated that even when these assumptions are violated, the value of the power calculation is not greatly affected.

The following is a description of the estimated power for each calculation:

Chi-Square

Hypotheses 1 requires a chi-square test with two categories. The effect size for chi-square is as follows (Green, Salkind, & Akey, 2000):

$$ES = \frac{\chi^2}{(N)(categories - 1)}$$

For a medium effect size of .30 (Cohen, 1988), the power of this test at an alpha level of $p < .01$ is .56, and for a large effect size of .50 the power is .97.

Tests of Means

Hypotheses 2b, 2d, 2f, and 2h involve comparisons between the STAXI normative samples and the sample in the present study. As discussed above, the size of the normative samples to be used for each STAXI scale are different, as are the predicted effect sizes. Therefore, separate power analyses were done, as follows. Given that the four comparisons in these hypotheses are non-orthogonal, a Bonferroni correction (Pedhazur & Schmelkin, 1991, p. 485) indicates that the alpha level should be set at .05/4, or .0125. As described by Cohen (1988, pp. 25-27), effect size conventions for tests of means are in standard deviation units, as follows: small = .2, medium = .5, large = .8. Since the direction of difference is predicted, tests were one-tailed.

For hypothesis 2b, the sample sizes are 82 and 381, and the predicted effect is small to medium (.2 - .5). The power for this test is .27 for a small effect size and .92 for a medium effect size.

For Hypotheses 2d and 2f, the sample sizes are 82 and 117, and the predicted effect is medium to large. The power for these tests is .87 for a medium effect size and .99 for a large effect size.

For Hypothesis 2h, the sample sizes are 82 and 364, and the predicted effect size is medium. The power for this test is .99.

Tests of Correlations

Hypotheses 2c, 2e, and 2g predict correlations between STAXI scale scores in the study sample. As the direction of the correlations is predicted, tests are one-tailed. As discussed by Cohen (1988, pp. 110-116), the effect size, q, for differences in correlations is not a matter of simply subtracting one correlation from another, since differences between correlations of varying magnitudes are not linear. Therefore, the calculation requires a transformation of r as follows:

$$z = 1/2 \log e \frac{1+r}{1-r}$$

The effect size index is then $q = z_1 - z_2$ for a directional hypothesis, and for a non-directional hypothesis, $q = |z_1 - z_2|$. In this case of a predicted correlation between two scales, the effect size refers to the difference between a correlation of zero (H0) and the correlation that is predicted. In this case, based on Cohen's tables (Cohen, p. 111), the effect size is roughly equal to the size of the correlation.

Hypothesis 2c predicts a small to moderate (.1 - .3) correlation, which gives an effect size between .10 and .29. The power for this correlation is therefore between .23 and .86. Because previous studies have found correlations in the higher end of this range (Deffenbacher, 1992), this level of power is acceptable, though clearly not ideal.

Hypotheses 2e and 2g predict moderate to strong correlations (.3 - .5), which gives an effect size between .29 and .46. The power for these correlations is then between .85 and .99

Multiple Regression Analysis

Hypotheses 3a-3c were tested by constructing a multiple regression model. Tests for the power of multiple regression analyses depend on the predicted effect size, sample size, and number of predictors. The effect size index for multiple regression, f^2, refers to the ratio of the proportion of variance accounted for by the model divided by the proportion of variance attributable to random variation, or error (Cohen, 1988, p. 410). Conventions for multiple regression indicate that a small effect is .02, a medium effect is .15, and a large effect is .35 (Cohen, 1988, pp. 412-414). The power calculation for these hypotheses assumed a medium to large effect size, a sample size of 82, and 4 predictor variables (age, race/ethnicity, education, and referral source). This gives a power of between .79 and .99 for the model.

CHAPTER IV

Results

This chapter provides descriptive statistics for the STAXI scale scores, results of

hypothesis tests, supplemental analyses, and a summary of the findings of this study.

Descriptive statistics for the study sample were provided in Chapter III.

Descriptive Statistics for STAXI Scales

Table 1 summarizes the mean, standard deviation, minimum and maximum scores

for each STAXI scale. The possible scores for the Trait Anger and State Anger scales

range from 10 to 40, and the possible scores for the other three scales range from 8 to 32.

Table 2 provides the zero-order correlations between all STAXI scales and the

demographic variables included in this study.

Tests of Hypotheses

The discussion of hypothesis tests will be divided into the following subsections:

Trait Anger as a Screening Variable, Distribution of the State Anger Scale, Scale

Intercorrelations, Tests of Means, and Effects of Demographic Variables.

Trait Anger as a Screening Variable

Based on the theoretical prediction that individuals who have experienced serious

consequences of their anger will score above the 75th percentile, Hypothesis 1a stated that

Table 1

Descriptive Statistics for STAXI Scales in the Study Sample and Normative

Group

Scale	Normative Group				Study Sample			
	M	SD	Min	Max	M	SD	Min	Max
Trait Anger	19.88	5.48	10	40	22.91	7.53	10	40
State Anger	14.10	5.79	10	40	12.65	4.19	10	28
AX/In	15.95	4.58	8	32	15.45	4.01	8	26
AX/Out	15.68	4.29	8	32	19.38	5.54	8	30
AX/Con	23.19	5.09	8	32	18.99	5.98	8	32

Table 2

<u>Intercorrelations of STAXI Scales and Demographic Variables</u>

	S-Anger	AX/In	AX/Out	AX/Con	Age	Education	Race/Eth.	Referral
T-Anger	.326**	.334**	.768***	-.526***	-.043	-.095	-.280*	-.283*
S-Anger		.275*	.211	-.221*	.299**	.032	-.264*	-.253*
AX/In			.278*	-.180	-.078	-.155	-.224*	-.136
AX/Out				-.675***	-.079	-.063	-.214	-.297**
AX/Con					.053	.078	.194	.135
Age						.114	-.174	-.287**
Education							-.152	-.072
Race/Eth.								.365**

2-Tailed Significance Levels

* p < .05   **p < .01   ***p < .001

all of the participants should score above the 75th percentile for the adult male normative group. This was tested in two ways. First, the "hit rate" was determined based on the percentage of scores in this sample that meet the screening criterion. Of the 82 participants in the sample, 42 (51%) met the screening criterion and 40 (49%) did not.

While it appears obvious that this result is not statistically different from chance, this was confirmed through a Chi-Square test, χ^2 (2, $\underline{N}$=82) = .049, $\underline{p}$ = .825. Therefore, for this sample, the Trait Anger scale was no more effective than flipping a coin in identifying individuals whose anger management problems were sufficiently severe to require clinical intervention. Further, 11(13%) of the participants were at or below the 19th percentile based on the table of normative data (Spielberger, 1996), while 15 (18%) were at or below the 29th percentile, indicating that a substantial proportion of this sample scored in the range that Deffenbacher and associates (1996) considered "non-angry." Possible reasons for these results in this particular sample are discussed in Chapter V. However, in any case the results of this analysis are contrary to the recommendations of Deffenbacher et al. (1996), Sharkin (1996), and Spielberger (1996, 1999), who suggested that the Trait Anger scale be used as a screening tool for anger management programs.

Distribution of the State Anger Scale

Hypothesis 2a predicted that the majority of participants would score at the lower limit of the State Anger scale, causing scores on this scale to be positively skewed, as they are in the normative groups of adults.

This hypothesis was evaluated by examining the distribution of raw scores for the State Anger scale for the total sample and by calculating the value for scale skewness
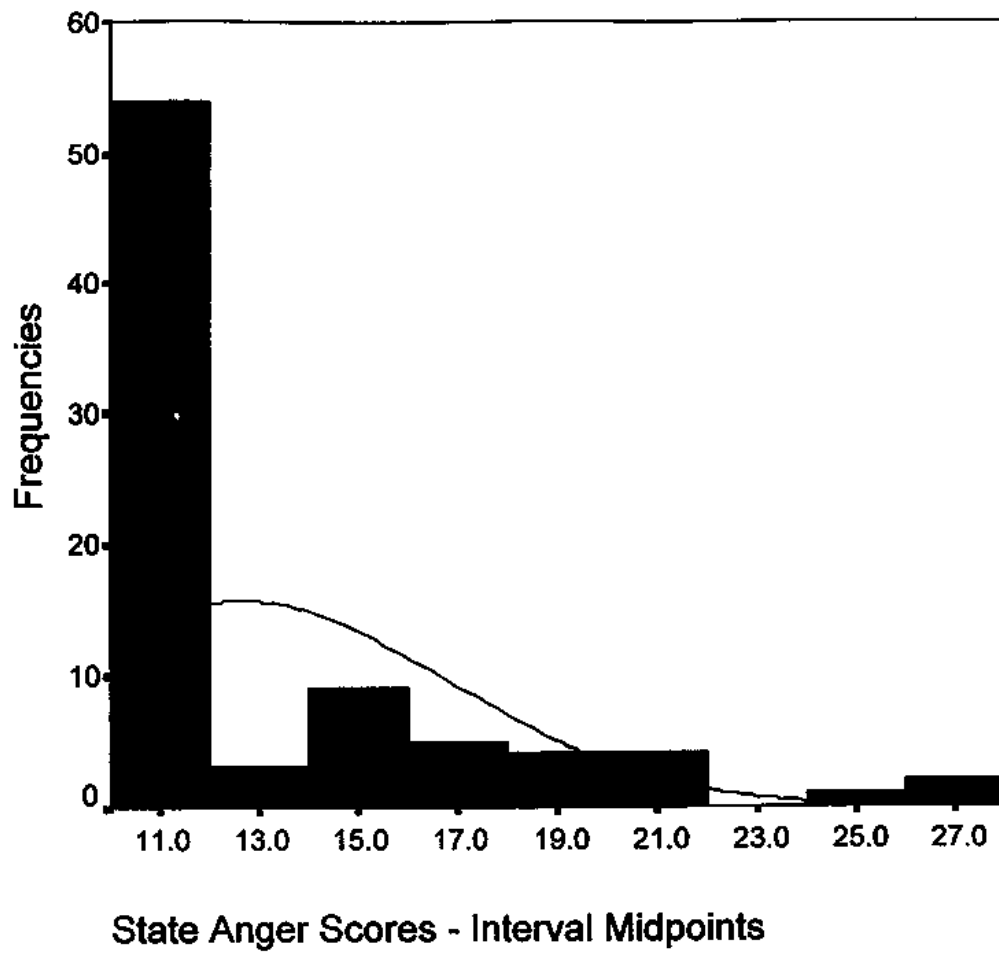
Figure 1. Distribution of Raw Scores for the State Anger Scale

through SPSS. The scale Skewness value was 1.91, and the Kurtosis was 3.57,

indicating that the scale was positively skewed and steep, which is consistent with the

hypothesis. Figure 1 provides a view of the distribution of scores for this scale.

The significance of the skew was evaluated through the Kolmogorov-Smiroff test

of normality, provided by SPSS. This statistic was .311, p = .000, indicating a significant

difference from a normal distribution. Therefore, as with the normative group, the

majority of participants in the present study reported experiencing little or no anger at the

time the STAXI was administered. This finding is consistent with State-Trait Anger

theory, which says that the state of anger arousal is transient and different from the

tendency to experience frequent anger arousal as a trait.

Scale Intercorrelations

State-Trait Anger Theory predicts specific relationships among the STAXI scales.

Table 2 summarizes the intercorrelations of the scales for this sample. Correlations for

which a direction was predicted were evaluated through one-tailed tests of significance;

additional scale intercorrelations are reported for reference purposes and are evaluated for

significance using two-tailed tests.

The following is a summary of the hypotheses related to scale intercorrelations

and the results for each.

Trait Anger/Anger-In. Hypothesis 2c predicted that Anger-In would show a small

to moderate positive correlation with Trait Anger. As predicted, the correlation between

these two scales was significant, and it was both positive and moderate in size, r (80) =

.33, $p < .01$. Therefore, individuals in this sample with higher scores on the Trait Anger scale were also likely to report frequent inward expression of their anger. This is consistent both with State-Trait Anger theory and with previous findings that Anger-In, given its stronger relationship with Trait Anxiety showed positive but moderate correlations with Trait Anger (Deffenbacher et al., 1996; Spielberger & Sydeman, 1994).

Trait Anger/Anger-Out. Hypothesis 2e predicted that Anger-Out would show a moderate to high positive correlation with Trait Anger. As predicted, there was a significant, high positive correlation between these two scales, $r(80) = .77$, $p < .001$. Therefore, individuals in this sample with high Trait Anger scores were also very likely to report that they frequently express their anger outward. This is consistent with State-Trait Anger theory and with previous studies. Given the high mean Trait Anger scores for this sample, discussed below and in Chapter V, this result is also consistent with the reason for referral for the individuals in this study.

Trait Anger/Anger Control. Hypothesis 2g predicted that Anger-Control would show a moderate, negative correlation with Trait Anger. As predicted, the correlation between these two scales was significant, negative and moderate in size, $r(80) = -.53$, $p < .001$. Therefore, individuals in this sample with high Trait Anger scores were less likely to report frequent efforts to control the expression of their anger. As with Anger-Out, these findings are consistent with State-Trait Anger theory, with previous studies, and with the reason for referral for the study participants.

<u>Tests of Means</u>

Based on State-Trait Anger Theory, several differences were predicted between the mean scores of the study sample and those of the STAXI normative sample. As discussed in Chapter III, because an SPSS multivariate analysis would have required the full normative data set, these hypotheses were evaluated through manual t tests for independent samples using the descriptive statistics provided for the normative sample. The significance level was set through a Bonferroni correction at $p < .0125$. The results of these comparisons are summarized in Table 3. While no hypothesis directly addressed the mean of the Trait Anger scale, results of a t test of means for this scale are also included in Table 3 for reference purposes. State-Trait Anger theory would predict that the mean of the Trait Anger scale would be higher than that for the normative group. The Trait Anger mean ($M = 22.91$, $SD = 7.53$) was, in fact significantly higher than that for the normative sample, ($M = 19.88$, $SD = 5.48$), $t (461) = 4.244$, $p < .0001$, indicating that on average, participants in the present study reported higher levels of Trait Anger than did the normative group of adult males.

The following is a description of the findings summarized in Table 3, for the scales for which a specific hypothesis was formulated.

<u>State Anger.</u> Hypothesis 2b predicted that the mean score for State Anger would be slightly higher than that for the normative sample. The results of this test indicated a non-significant difference between the two groups. Therefore, on average, individuals in the study sample did not report higher levels of current anger than did individuals in the normative sample of adults. While it is possible that this is due to the therapists' skill at

Table 3

Summary of Differences in Scale Means Between Study Sample and STAXI

Normative Group of Adult Males

Scale	Normative Group	Study Sample	T obs.	T crit.	Sig.
Trait Anger	19.88	22.91	4.244	2.249	****
State Anger	14.10	12.64	-2.176	2.249	ns
AX/In	15.95	15.44	-.817	2.259	ns
AX/Out	15.68	19.38	5.286	2.259	****
AX/Con	23.19	18.99	-6.176	2.249	****

Note. Normative group for the first four scales was Adult Males, ages 18 - 31. Because

the manual did not provide data for this age range for AX/Con, this comparison used the

normative data for Male College Students. Critical t is indicated for $p < .0125$.

****$p < .0001$

creating a non-threatening environment, other possible reasons for this are related to the characteristics of the sample and are discussed in Chapter V.

Anger-In. Hypothesis 2d predicted that the mean score for Anger-In would be significantly higher than for the normative group. Contrary to predictions of State-Trait Anger Theory, the difference between these two means was negligible. Therefore, on average, individuals in the study sample did not report significantly higher levels of inward anger expression than did those in the normative sample. Although the results are inconsistent with State-Trait Anger theory, they are not entirely surprising given the focus in this sample on outward anger expression. This is discussed further in Chapter V.

Anger-Out. Hypothesis 2f predicted that since the majority of participants had been referred for problems associated with the outward expression of anger, mean Anger-Out scores would be significantly higher than those in the normative sample of adult males. The mean for the study sample (M = 19.38, SD = 5.54) was significantly higher than that for the normative group (M = 15.68, SD = 4.29), t (197) = 5.286, p < .0001, indicating that on average, participants in the present study reported significantly higher levels of outward anger expression than did those in the normative group.

Anger Control. Hypothesis 2h predicted that since all participants have documented problems with control of anger, mean Anger-Control scores will be significantly lower than those in the normative sample of adults. As expected, the mean score for Anger Control (M = 18.99, SD = 5.98) was significantly lower than that for the

normative sample ($\underline{M}$ = 23.19, $\underline{SD}$ = 5.09), $\underline{t}$ (334) = -6.176, $\underline{p}$ < .0001, indicating that

on average, participants in the study sample reported less frequent attempts to control

their anger than did those in the normative group. Again, in addition to supporting State-

Trait Anger theory, these findings are consistent with the behavioral evidence of

difficulty in controlling anger in this population.

Effects of Demographic Variables

This study evaluated effects of the following demographic variables: age,

race/ethnicity, educational level, and referral source. Their effects were evaluated by

constructing a regression model for each of the five primary STAXI scales, with the

demographic variables as predictors and the scale score as the criterion variable. Based

on the strong STAXI scale intercorrelations reported above, it was recognized that the

findings of these analyses would not be independent of each other. Nonetheless, the

scores on each scale are represented in the STAXI manual as providing different clinical

information (Spielberger, 1996, 1999). To the extent that the STAXI scales are

measuring separate constructs, it is worthwhile to examine the impact of demographic

variables separately for each scale. Because the sample size does not provide sufficient

power for a multiple regression analysis to detect effects that would be clinically

irrelevant, it was judged that the risk of Type I error is not sufficiently high to require an

adjustment of the significance level. The effects of the scale intercorrelations are

discussed further in Chapter V.

As discussed in Chapter III, because the relative impact of these variables was not

predicted in advance, all variables were entered into the analyses simultaneously. For

each analysis, a plot of standardized residuals was produced and examined to ensure that the assumptions of linearity and homogeneity of variance were not violated. For the State Anger scale, plots of individual variables were also examined. While the extreme skew of the State Anger was a cause for concern, based on the plots it was judged that there was sufficient variability in this scale to continue with the analyses. Table 4 summarizes the five regression models.

The results of multiple linear regression indicate both the effect of the full set of variables on the overall model and the relative effects of each variable with the effects of the other variables partialed out. While the overall models were significant at the .05 level for Trait Anger, State Anger, and Anger-Out, the full set of demographic variables accounted for no more than 11% of the variability on any scale. The scale most strongly related to the set of variables evaluated was Trait Anger. However, within this model, only Race/Ethnicity and Referral Source made a significant unique contribution to the Trait Anger scores. No significant relationship for any demographic variable was found for the AX/Con scale.

The following is a summary of the findings of the regression analysis for each demographic variable. The implications of these findings are discussed more fully in Chapter V.

Age. Based on the age differences found in the adult normative groups, Hypothesis 6a predicted that all scales except AX/Con would be negatively correlated with age, and that AX/Con would be positively correlated with age. However, contrary to predictions, age was significantly related only to S-Anger. Further, this relationship

Table 4

Effects of Demographic Variables on STAXI Scale Scores

Scale	F (Model)	Sig.	Adj. R^2	Predictor	Beta
T-Anger	3.494*	.011	.110	Age	-.139
				Race/Ethnicity	-.234*
				Education	-.132
				Referral Source	-.247*
S-Anger	3.366*	.014	.105	Age	.236*
				Race/Ethnicity	-.184
				Education	-.032
				Referral Source	-.120
AX/In	2.257	.071	.058	Age	-.127
				Race/Ethnicity	-.237*
				Education	-.183
				Referral Source	-.099
AX/Out	3.163*	.018	.016	Age	-.182
				Race/Ethnicity	-.149
				Education	-.086
				Referral Source	-.301*
AX/Con	1.322	.269		Age	.103
				Race/Ethnicity	.190
				Education	.103
				Referral Source	.102

Note. The nominal variables Race/Ethnicity and Referral Source were automatically recoded by SPSS as follows: White = 1, Non-White = 2; Voluntary = 1, Mandated = 2. * $p < .05$

was in the opposite direction from that predicted; while a negative correlation was predicted, older participants had higher State Anger scores. As discussed in Chapter V, this may be related to the lower mean age of the court-ordered participants ($\underline{M}$ = 29.38, $\underline{SD}$ = 9.36) compared with the voluntary participants ($\underline{M}$ = 35.80, $\underline{SD}$ = 12.11). As a result, the individuals most likely to respond in a socially desirable manner were also younger.

Race/ethnicity. Because of a lack of existing research on the impact of race and ethnicity on STAXI scores, this variable was evaluated for each STAXI scale against the null hypothesis that race and ethnicity would have no effect on scale scores. The null hypothesis was supported for State Anger, Anger-Out, and Anger Control. Race/Ethnicity was found to have a significant negative relationship to Trait Anger; because of the way this variable was coded, this indicates that non-White participants reported lower levels of Trait Anger than did White participants. Race/ethnicity was also negatively related to Anger-In, indicating that non-White participants reported lower levels of Anger-In. Because a larger percentage of court ordered participants than voluntary participants were non-White (54% vs. 17%), it is possible that this finding is influenced by a stronger tendency for court-ordered participants toward socially desirable responding. However, it should be noted that Race/Ethnicity did contribute unique variability to this scale, in addition to Referral Source. This is discussed further in Chapter V.

Educational level. As with race and ethnicity, this variable was evaluated for

each STAXI scale against the null hypothesis. As the participants' level of education had no significant effect on any STAXI scale, the null hypothesis was supported for all scales. This is contrary to the results of the only two previous studies examining this variable, both of which were with non-clinical samples of incarcerated males (Dalton, Blain, & Bezier, 1998; Silverman & Vega, 1995). It is possible that these results are related to the characteristics of the sample in the present study. This is discussed in Chapter V.

Referral source. Because of evidence that court-mandated clients have higher levels of socially desirable responding, Hypothesis 6d predicted that court-mandated status will have a moderate negative correlation with all scales expect AX/Con, which would have a moderate positive correlation with court-mandated status. As predicted, court-mandated participants reported significantly lower levels of Trait Anger and Anger-Out. However, this variable had no significant effect on any other scale. While the Trait Anger and Anger Out scales are clearly related to the reason for referral of these participants, it was expected that Anger Control would also be affected, particularly since the scale intercorrelations indicate that individuals who denied high levels of anger expression reported more frequent attempts to control their anger. Chapter V discusses this further.

Supplemental Analyses

As discussed above, the Trait Anger scale was ineffective as a screening variable, identifying only 51% of the participants as meeting the screening criterion, despite the

finding that its mean was significantly higher than that for the normative group. This raised two further questions. First, given that the Trait Anger scale is a composite of two subscales, Trait Anger/Temperament (T-Ang/T) and Trait Anger/Reaction (T-Ang/R), the data were further examined to determine if this result was due to one or the other of these two subscales. As discussed in Chapter I, the T-Ang/T scale includes 4 items indicating a general tendency to become angry, independent of specific provocation, such as "I have a fiery temper." For this subscale, 57% met the screening criterion. The T-Ang/R scale consists of the following specific situations: "I feel infuriated when I do a good job and get a poor evaluation," "It makes me furious when I am criticized in front of others," "I feel annoyed when I am not given recognition for doing good work," and "I get angry when I'm slowed down by others' mistakes." For this subscale, only 18% met the screening criterion. It is possible that these items, while relevant for achievement-oriented college students, were not relevant for this population. This would be an area for further study. However, neither of these two subscales identified an acceptable proportion of this population to be effective as a screening tool.

The second question was whether another scale would be more effective for screening with this population. Therefore, two additional scales were evaluated. Because Anger Management programs typically focus on the outward expression and control of anger, and because the mean scores for Trait Anger, AX/Out, and AX/Con scales were significantly different from the normative group, the analyses performed on the Trait Anger Scale were repeated for these scales. Cornell, Peterson and Richards (1999) found that their ability to predict violent behavior in incarcerated adolescents was improved slightly by using a combination of these three scales. Table 5 summarizes the

results for the percentages of participants meeting the criteria for the two additional scales and their Chi-Square tests. Note that the criterion for Anger-Out was the 75th percentile, indicating extremely high levels of outwardly directed anger expression, while for Anger Control the criterion was the 25th percentile, indicating extremely low levels of anger control.

Table 5

Percentage of Participants Meeting Screening Criterion Based on

AX/Out and AX/Con Scales

Scale	Percent Meeting Criterion	χ^2	Sig.
AX/Out	77	23.610	.0001
AX/Con	22	25.805	.0001

The hit rate for AX/Out (77%) was consistent with the significantly higher mean for this scale. However, the hit rate for AX/Con (22%) was much lower than expected. The Chi-Square for the Anger Control scale indicated results significantly different from chance, but in the opposite direction from expected and in a direction inconsistent with the significantly lower mean score for the study group on this scale in comparison with the STAXI normative group.

Summary

The results of this study are mixed in the degree to which they are consistent with the predictions of State-Trait Anger theory. As predicted, the means for the Trait Anger,

AX/Out, and AX/Con scales were significantly different from the normative group at the .0001 level, and the differences were in the expected directions. Further, the intercorrelations of the Trait Anger scale and the other four scales were all significant at the .01 level, were of the predicted magnitude, and the relationships were in the predicted directions. While there was no significant mean difference between the normative group and the study group on the State Anger scale, this scale was significantly skewed as predicted, with the majority of scores in the non-angry range.

In several cases, however, the results were contrary to the predictions of State-Trait Anger theory. In particular, the 75th percentile screening criterion for the Trait Anger scale was not effective in detecting individuals with anger-management problems. Further analysis determined that the Anger-Out scale had a better hit rate than did the Trait Anger scale, with this population.

Finally, the results of the largely exploratory analysis of demographic variables showed small significant effects on some STAXI scales for this population. However, no variable impacted all scales. Further, in no case did the full set of variables account for greater than 11% of the variability of any scale. While age is clearly related to STAXI scores in the normative group, this variable had minimal effect on scores for the study group. Only the State Anger scale was significantly affected by age, and contrary to predictions, this effect was positive. For this sample, older participants expressed higher levels of current anger, which is in the opposite direction from the effect of age on the normative group. Race/ethnicity significantly affected scores on both Trait Anger and Anger-In, with non-White participants scoring lower on both scales. Educational level had no significant effect on any scale. Finally, referral source was significantly related to

both Trait Anger and to Anger Out, with court mandated clients scoring lower on both

measures.

The practical significance of these results and suggestions for further research are

discussed in Chapter V.

CHAPTER V

Discussion

As discussed in Chapter I, the State-Trait Anger Expression Inventory (STAXI) has been recommended as a tool for screening, outcome evaluation, and treatment planning in an anger management population. While this instrument has been shown to perform as predicted by State-Trait Anger theory in undergraduate populations, it has not been evaluated with individuals who are more characteristic of anger-management clients in clinical settings. The purpose of this study, therefore, was to evaluate the utility of the STAXI with a clinical population. Beyond determining the degree to which scores in this population were consistent with the predictions of State-Trait Anger theory, additional analyses were focused on determining the relative effect of a set of demographic variables on these scores.

As described in Chapter IV, the performance of this instrument based on the predictions of State-Trait Anger theory are mixed. In general, the effects of demographic variables were small. This chapter reviews the results for each hypothesis and their implication for the clinical utility of the STAXI. Following this is a brief discussion of changes introduced in the September, 1999 release of the STAXI-2, and suggestions for future research.

Trait Anger as a Screening Variable

As discussed in Chapter I, Spielberger (1996), Deffenbacher et al. (1996), and

Sharkin (1996) have all recommended the use of the 75th percentile cutoff on the Trait

Anger scale to indicate individuals for whom anger is most likely to be a serious problem

in their lives. Based on their clinical presentation, 100% of the study sample had

significant problems with anger management, and therefore an effective screening tool

would have identified close to 100% of these individuals as requiring intervention.

However, although the mean for the Trait Anger scale was significantly higher than for

the normative group, the 75th percentile screening criterion for this scale was no more

effective for screening than random assignment. Further, the finding that a substantial

proportion of individuals scored in or near the range used by Deffenbacher and associates

(1996) to define a "non-angry" population suggests that denial of anger may have been a

factor in the responses of at least some of these individuals. Further examination of the

data indicated that of the 15 individuals who scored at or below the 29th percentile, 13

were court mandated. While these numbers are too small to perform meaningful

significance tests, the finding that the majority of individuals who appeared to be denying

their anger is consistent with previous findings of increased socially desirable or

deceptive responding with offender populations (Cornell, Peterson, & Richards, 1999)

and with the negative correlation between the Trait Anger scale and the Eysenck

Personality Inventory Lie Scale (Spielberger & Sydeman, 1994). In addition,

examination of scores for the subscales T-Ang/T and T-Ang/R indicated that, while

neither identified an acceptable proportion of this sample, only 15% of participants met

the screening criterion based on specific situations. While this could indicate a higher

level of denial for this subscale, it is also quite possible that the situations selected may

not have been relevant for this population. Future research might focus on developing an

expanded item pool for this subscale and validating it in a more diverse population.

Since these individuals had generally been referred because of problems with anger expression, two additional anger expression scales were examined in supplemental analyses to determine if they were more effective as screening tools. The AX/Con scale, scored against a criterion of 25th percentile for reported attempts to control anger, performed even worse than the Trait Anger scale, correctly classifying only 22% of the subjects as having low enough levels of anger control to require intervention. It is possible that although from a behavioral perspective these individuals are frequently not successful in their attempts to control their anger, they perceive themselves as frequently making an attempt to do so. Despite the theoretically unpredicted results for the Trait Anger and AX/Con scales, 77% of the participants did meet the screening criterion for the AX/Out scale. Therefore, in this population, a large percentage of individuals did not report high levels of anger experience, and many reported that when they were angry they often attempted to control their anger. However, many of them also reported frequent outward expressions of their anger despite their attempts to control it.

These findings may indicate a high degree of denial of frequent or intense anger experience (Spielberger, 1996, 1999). On the other hand, it may be that for this population, their experience of anger is viewed as normative. If this is the case, when answering questions such as "I have a fiery temper," some individuals in this population may compare themselves to others in their peer group and may formulate their response from the perspective of not viewing themselves as having an worse temper than anyone else.

The contrast of a lower hit rate for Trait Anger (including both Trait Anger

subscales) and a higher one for AX/Out may indicate that given the normative behavior of their peer group, outward expression of anger may occur at a lower threshold of anger experience. Alternatively, it may be that outward expression of anger is viewed as a positive behavior in this group. As discussed in Chapter II, studies of the subculture of violence hypothesis have indicated that violent behavior is linked to low socioeconomic status, and the participants in these groups were almost uniformly of a low SES. Follow-up interviews with similar individuals after they complete the STAXI may provide insight into their thought process in responding.

Diagnostic instruments are often evaluated in terms of their sensitivity, or their ability to detect individuals who actually have a particular disorder, and their specificity, or their ability to exclude individuals who do not have the disorder. The sensitivity of the Trait Anger scale in this sample was 51%, and the sensitivity of the AX/Out scale was 77%. While the AX/Out scale may be a better screening measure, it would have nonetheless missed 23% of individuals in need of clinical intervention. Further, no study has yet evaluated the specificity, which is related to the "false positive" rate for any STAXI scale. Pending additional study, it is recommended that the STAXI not be used as a screening tool, particularly to the exclusion of clinical judgment. Further, to the extent that this population may be motivated to provide misleading answers, it may be appropriate to incorporate some form of validity scale when the STAXI is used with involuntary clients, as recommended by Dalton, Blain, and Bezier (1998).

Distribution of the State Anger Scale

As predicted, the majority of participants reported current levels of anger at the

lower limit of the State Anger scale, causing the distribution on this scale to be positively skewed, as it is in the normative groups of adults. This finding is consistent with State-Trait Anger theory, which says that the state of anger arousal is transient and different from the tendency to experience frequent anger arousal as a trait. In evaluating the clinical utility of the State Anger scale, these findings are considered in relation to the results of the comparison of means between the normative group and the study sample, which are discussed under "Tests of Means," below.

<div align="center">Scale Intercorrelations</div>

As predicted by State-Trait Anger Theory, participants with high Trait Anger scores also scored higher in Anger-Out and lower in Anger Control. This is consistent with the reason for referral for the participants in this study, who have had frequent difficulty controlling their outward expression of anger.

Further, participants with high Trait Anger scores tended to report greater levels of Anger-In, although as with other studies (Deffenbacher et al., 1996; Spielberger, 1996), this relationship was not as strong as it was with the other scales. This supports the position of State-Trait Anger theory that individuals who experience frequent anger do not exclusively express it in an inward or outward direction.

Overall, the scale intercorrelations were consistent with the predictions of State-Trait anger theory. This suggests that at least for clients who answer the questions in a non-defensive manner, the relationships between the scales are similar in a clinical and normative population. Therefore, the interpretations presented in the manual for high and low scores may assist with individual treatment planning and self-awareness for clients in

treatment. Further, these findings suggest that participants who may have been motivated to under-report their experience and expression of anger did so in a consistent rather than random manner. This could be confirmed in a larger sample, in which it would be possible to determine whether the factor structure of the STAXI is maintained with a clinical population.

Tests of Means

The following discussion addresses differences in scale means for which hypotheses were formulated.

State Anger

Contrary to predictions, the mean for this scale was not significantly different than it was for the normative group. It is likely that the lack of significant findings is at least in part a result of the skewed distribution of the scale scores. The lack of a significant difference in this study also suggests, however, that indicating current anger is not something anyone does easily, particularly in a non-anonymous setting. Dalton, Blain, and Bezier (1998) did find a higher mean for the State Anger scale with their sample of adult male sex offenders. However, these individuals may not have viewed an anger scale as directly related to their incarceration or potential release. By contrast, anger-management clients who were court-mandated or who were urged to attend by a spouse or family member may have more of a stake in appearing to be calm and rational at all times. Therefore, social desirability may have played a role in these results. This is consistent with observed behavior of anger management group members in session,

during which they often discussed outside anger incidents but rarely expressed anger directed at either the therapists or other group members.

Further investigation may focus on the possibility that social desirability may affect the results of the State Anger scale. However, the findings of such an investigation may be of limited practical value. Even if the skew of the scale did not make it difficult to distinguish between scores at the low end, the State Anger scale is largely situation-dependent and does not provide meaningful information that would help distinguish between individuals. Therefore, this scale appears to be of more value in research settings involving anger provocation than it would be in a clinical setting where the goals are to both identify and change patterns of behavior. If it were used in clinical practice, it may be used to measure response to provocation before and after treatment. However, for the provocation exercises to be meaningful for each individual, it would be advisable to construct these for each client, using a process similar to that used in creating anxiety hierarchies for systematic desensitization (e.g., O'Leary & Wilson, 1987).

Anger-In

Contrary to predictions of State-Trait Anger Theory, participants in the present study did not report significantly higher levels of Anger-In than did the adults in the normative sample. This may be related to the characteristics of the study sample, who were referred primarily for problems with the outward expression of anger. Although Deffenbacher, et. al. (1996) found that their "high anger" sample scored higher in both Anger-In and Anger-Out, the sample for the present study was selected based not on their Trait Anger scores but rather on their actual behavior. As discussed above under "Scale

Intercorrelations," those participants in the present study who scored high in Trait Anger also tended to have higher scores on Anger-In. This suggests that if the study sample with this population had been selected using the Trait Anger scale, the findings would have been consistent with Deffenbacher's findings. However, the practical implication of these findings is that, contrary to theory, anger-management clients as a group may not have higher levels of inward anger expression.

Anger-Out

As predicted, participants in this study reported significantly higher levels of Anger-Out than did the normative group. This is consistent with their reason for referral. As discussed above under "Trait Anger as a Screening Variable," the Anger-Out scale was the only one for which the 75th percentile screening criterion identified a significant proportion of the sample as requiring anger management intervention. These findings suggest that individuals in this group not only have higher mean levels of outward anger expression in comparison to the normative group, but also that a greater percentage of participants were willing to report high levels of outward anger expression in comparison with the other scales.

Anger Control

As predicted, on average, individuals in the study sample reported fewer attempts to control their anger than did individuals in the normative group. Given that the participants in this study were referred for behavioral problems with anger control, this finding is consistent not only with theory but with intuition. It is also consistent with the

strong negative correlation between the Anger Control and Anger-Out scales. However, as discussed previously, this did not result in a large proportion of individuals meeting a screening criterion based on Anger Control scores at or below the 25th percentile for the normative group. This may be because individuals who experience a very high level of anger are unlikely to express all of it, and to the extent that these individuals work to control their anger expression they may raise their scores above the theoretical screening threshold. It is possible, based on studies cited by Deffenbacher (1999), for individuals to have extremely high levels of both anger control and outward anger expression, and these individuals have found to be at significantly increased risk for cardiovascular disease.

Effects of Demographic Variables

The factors discussed above refer to the overall performance of the STAXI for this sample as a group. The results above are compared with the predictions of State-Trait Anger theory and with previous studies, most of which have not considered the effects of demographic variables on STAXI scores. Beyond determining the performance of the overall group, the present study asked whether the scores varied by demographic subgroups.

This study evaluated effects of the following demographic variables: age, race/ethnicity, educational level, and referral source. As discussed in Chapter IV, the overall effects of this set of demographic variables were small. While the overall models were significant for Trait Anger, State Anger, and Anger-Out, the full set of demographic variables accounted for no more than 11% of the variability on any scale. The scale most

strongly related to the set of variables evaluated was Trait Anger. However, within this model, only Race/Ethnicity and Referral Source made significant unique contributions to the Trait Anger scores. No significant relationship for any demographic variable was found for the AX/Con scale.

The following is a discussion of the effects of each demographic variable evaluated.

Age

Both anger experience and anger expression scores were expected to decrease with age, while anger control was expected to increase. However, contrary to predictions, age was significantly related only to S-Anger. Further, this relationship was in the opposite direction from that predicted; while a negative correlation was predicted, older participants had higher State Anger scores. This is contrary to the age effect shown by the normative group (Spielberger, 1996).

It is possible that the lack of an age effect in this population is related to the younger mean age of the court-ordered participants. Given that the younger participants in this study were more likely to be court-ordered, they may have had a greater stake in looking calm and thus countered any age effect. Further, the lower mean age of the court-mandated participants in this study is consistent with crime statistics showing decreased numbers of arrests in older individuals (Federal Bureau of Investigations, 1998). Therefore, the initial selection process into an anger-management group (arrest followed by court mandate) would have eliminated many of those individuals for whom age had decreased their levels of overall anger.

Race/Ethnicity

While Race/Ethnicity had no significant effect on State Anger, Anger-Out, or Anger Control, this variable did affect the Trait Anger and Anger-In scales. Non-White participants reported significantly lower levels of both Trait Anger and Anger-In than did White participants. As discussed in Chapter IV, this may be related to the higher proportion of non-White participants in the court-ordered subgroup, whose scores appeared to be affected by social desirability or denial on both the Trait Anger and Anger-Out scales. However, the results of the multiple regression analysis indicate that Race/Ethnicity and Referral Source both contributed significant unique variance to the Trait Anger scale. Further, Referral Source was not significant for Anger-In, while Race/Ethnicity was significant for this scale.

As discussed in Chapter II, no previous research has found race or ethnicity to be a factor in socially desirable responding. However, it may be that the results are not indicative of denial but rather, as suggested by Sharkin (1996), there may be a different perception of what defines a higher than average level of anger. Phelps et al. (1991) found that when Black and White undergraduates were presented with scenarios representing verbal aggression between two women of varying racial combinations, White students viewed all scenarios as more aggressive than did Black students, regardless of the race of the identified aggressor or victim.

As discussed in Chapter II, Harburg, Blakelock, and Roeper (1979) found no racial difference in the use of anger-in, anger-out, or reflection as a habitual coping style. However, in advocating for additional consideration of cultural factors in anger measurement, Sharkin (1996) pointed out that a study of 27 African-American college

students found that blood pressure significantly increased in response to racist provocation situations, but not to non-racist situations. Therefore, while self-reported anger in these situations was similar, the experience was clearly different. The STAXI does not differentiate between different causes of anger, and it may be that additional focus on situational determinants of anger would contribute to the value of this instrument in non-White populations.

It is important to note that there is insufficient information available from the present study to support any of the above hypotheses, and therefore the explanation of racial/ethnic differences remains a question for future study. It is further important to reiterate that, while the effect of this variable was significant, the amount of variability accounted for was small.

Educational Level

As with race and ethnicity, this variable was evaluated for each STAXI scale against the null hypothesis. As the participants' level of education did not even approach significance on any STAXI scale, the null hypothesis was supported for all scales. This was true both for the multiple regression analysis and for the zero-order correlations. As discussed in Chapter II, the only two studies to address the relationship of educational level and STAXI scores found a very small significant negative relationship, with more highly educated participants scoring higher on Anger Control and lower on Trait Anger and the other anger expression scales (Dalton, Blain, & Bezier, 1998; Silverman & Vega, 1990). However, while participants in both of these studies were prison inmates, they had not been specifically identified as either angry or violent. In a clinical population,

other factors may be more important. For example, it is possible that educational level in other samples, as a correlate of socioeconomic status, may have been related to residence in less violent environments. Almost all of the individuals in the present study, on the other hand, lived in low-income neighborhoods within a very small radius of the hospital. Therefore, while the range of educational levels in the present study is equal to or greater than that of the two studies mentioned above, their social environment may have been a stronger determinant of their attitudes and behavior.

Referral Source

As predicted, court-mandated status was negatively related to Trait Anger and to Anger-Out. This is consistent with previous findings that court-ordered clients had higher levels of socially desirable responding. However, this variable did not contribute unique variability to any other scale. As discussed with regard to differences in scale means and the Anger Control scale as a screening variable, while the mean score for Anger Control was lower than in the normative group, a large percentage of individuals in this study did not report extremely low levels of anger control.

Also discussed previously was the finding that court-mandated participants were younger than were the voluntary clients, and they were also more likely to be non-White. It is interesting to note that the zero-order correlation between State Anger and Referral Source was small but significant ($r = -.136$, $p = .022$). In the presence of the other demographic variables the impact of this variable on the State Anger scale did not approach significance.

Implications of Scale Revisions Introduced in the STAXI-II

The September, 1999 release of the STAXI-II (Spielberger, 1999) resulted in significant modifications to the State Anger and Anger-Control scales. Minor modifications were made to individual items in other scales, while the Trait Anger scale remained unchanged.

The changes to the State Anger scale reflected recent research discussed in Chapter II, concerning the factor structure of this scale. Two new subscales were added to address the factor labeled "Feel Like Expressing Anger." The "Feel Like Expressing Anger Verbally" scale includes items such as "I feel like yelling at somebody," while the "Feel Like Expressing Anger Physically" includes items such as "I feel like hitting someone" and "I feel like breaking things." While the manual does not include a table of scale intercorrelations, it may be intuitively expected that individuals who express high levels of feeling like expressing anger may also have higher scores on Anger-In. As discussed previously, the additional information available on the State Anger scale may be of greater interest in research and for measuring response to real-time anger provocation than for working with clients on modifying recurring patterns of anger experience and expression.

The Anger-Control scale was modified to provide separate measures of attempts to control outwardly directed anger (Anger-Control-Out) and inwardly directed anger (Anger-Control-In). In the case of the present study, it may have been useful to distinguish between these two variables, given the somewhat inconsistent findings with the Anger-In and Anger Control scales.

Limitations of the Present Study

As discussed in Chapter I, because the data for this study were drawn from existing records, several desirable measures could not be included. First, it would have been useful to obtain behavioral observations from families or significant others involved with the study participants to verify the assumption that the participants did, in fact have problems with anger control. Further, while the study did find that a substantial proportion of individuals appeared to be minimizing their anger problems, it is not possible to determine the reasons for this. A personality measure such as the Minnesota Multiphasic Personality Inventory (MMPI-2) may have provided useful information in this area, particularly since this instrument also incorporates a well-validated lie scale and scales to evaluate different forms of response bias. In addition to this, an instrument such as the Marlowe-Crowne Social Desirability Scale could have provided data to support the assumption that the negative relationship between Referral Source and anger scores was based on a socially desirable response style. A prospective study would have allowed the use of such an instrument.

While the present study was able to evaluate the sensitivity of the STAXI, or its ability to detect individuals whose anger is sufficiently problematic to require anger management intervention, it did not evaluate the "false positive" rate with an alternative sample from group known to have minimal problems with anger. If the specificity of this instrument is sufficiently poor, its value as a screening tool would be poorer than what is reported in the present study.

Also, as discussed in Chapter I, the nature of the sample affects its external validity. Although annual income was not reliably available from chart records, clients in

this community mental health center are primarily from a low-income population. Few have completed more than two years of college, and many have not finished high school. Further, the participants are male, which does not permit analysis by gender, and a significant proportion have a history of substance abuse problems. Although this sample is representative of a clinical anger management groups in a forensic population, it probably is significantly different from individuals who are seeking treatment because of anger-related medical problems.

While this study began to explore factors related to race and ethnicity, the number of participants from different racial/ethnic groups did not permit separate analysis by group. However, a recent series of focus groups with Puerto Rican adults revealed unique components of anger experience, some of which are not parallel with the structure of the STAXI (Malgady, Rogler, & Cortés, 1996). Further, the study did not consider possible differences related to gender.

Finally, the size of the study sample does not allow a factor analysis, which may have provided additional useful information concerning the relevance of this instrument to a clinical population.

Recommendations for Future Research

While this study found that a large proportion of individuals did not report anger experience or expression at the levels predicted by State-Trait Anger theory, further study is necessary to distinguish among the possible reasons for this result. To determine whether these individuals responded to the STAXI based on a social comparison with a violent peer group, qualitative study such as focus group interviews following the

administration of the STAXI may help to determine the thought process behind their responses. Such studies should include meaningful numbers of individuals from a variety of racial and ethnic groups and from women. Such qualitative studies would not only provide insight into how different groups of individuals respond to the current STAXI item pool, but they may also reveal additional culturally relevant subscales that may contribute to future revisions of this instrument. For example, based on their focus group research, Malgady, Rogler, and Cortés (1996) suggest that evaluation of the personality characteristic of vindictiveness would be useful in understanding symptomatology in a Puerto Rican population. Further, because there was only one Asian American participant in the present study, no consideration was given to the differences in conceptualization of anger in an Asian or Asian American population. However, Leifer (1999) has outlined a conceptualization of anger from a Buddhist perspective that is clearly in contrast to that of most Western cultures. Therefore, expanding the study of anger to cultures other than those represented in the present study would enrich the knowledge base from which individuals may be evaluated and treated. This may result in the addition of more culturally relevant situational items to the Trait Anger scale, in addition to items relevant to those in lower socioeconomic groups. As in the initial development of the STAXI, any scale modifications resulting from these studies would follow the normal development and validation process with large non-clinical samples before being evaluated with individuals from a clinical population.

In addition to increasing the focus on racial and ethnic diversity, randomized experimental studies could be constructed incorporating independent personality measures and scale validity indicators, such as a lie scale. These would contribute to the

understanding of low scores with individuals whose reported behavior indicates high levels of anger. A useful approach to such studies would be to compare clinical samples from individuals with independently validated anger problems with clinical samples of individuals whose problems do not involve anger. These studies would obtain both behavioral measures from independent observers and the results of objective instruments, in addition to scores for each STAXI scale. Such studies would provide additional data that may improve or help the understanding of how STAXI scores relate to actual levels of difficulty with anger management, and they also would allow an evaluation of the number of non-angry individuals who may have elevated STAXI scores.

Summary and Conclusions

Based on extensive study and validation with non-clinical populations, the STAXI has been recommended as a tool for screening, outcome assessment, and treatment planning in an anger management population. The purpose of the present study was to evaluate the utility of the STAXI with a clinical population. The following discussion reviews the findings relative to each of the recommendations for clinical use.

Screening

The scale recommended by Deffenbacher and associates (1996) and Sharkin (1996) for use as a screening tool was Trait Anger. Previous studies with non-clinical populations have indicated that individuals scoring at or above the 75th percentile on the Trait Anger scale had significantly greater difficulty related to anger management than did those who scored below the 25th percentile. The present study evaluated this from the

opposite perspective, asking how many individuals with identified difficulty in anger management would meet the screening criterion. For the Trait Anger scale, about half of the participants scored above the 75th percentile. Further, 18% of the sample, most of whom were court-mandated, scored below the 29th percentile. This suggests that denial of anger played a role in these results and should be taken into account when interpreting STAXI scores with an offender population. Further, given that the 75th percentile criterion for the T-Ang/R subscale identified only 18% of the participants, the relevance of the anger-provoking situations on this scale is questionable and would be an area for further study.

While the Anger-Out scale performed somewhat better, it still missed 23% of the sample. The Trait Anger and Anger-Out scales are unchanged in the STAXI-II. Therefore, it is recommended that the STAXI not be used as a screening tool unless it is given concurrently with a validity indicator or until one is incorporate into the scale.

Outcome Assessment

As discussed in Chapter I, the use of an instrument for outcome assessment requires that both the baseline and post-treatment measures are accurate and that the test-retest reliability be acceptable. While this study did not evaluate test-retest reliability, previous studies have supported this quality. However, in this population, the concurrent validity of the STAXI with observations of clinically significant anger management problems was inadequate. Given that the mean scores of this group were generally consistent with State-Trait Anger theory, it may be that the mean scores of a group would change significantly over time and therefore the STAXI may be somewhat useful as an

aggregate group measure. However, given that denial appears to be a significant problem in this population, it is conceivable that an initial goal for at least some group members would be to increase their scores on some scales, given that admitting a problem is essential to addressing it in a constructive manner. For some individuals, therefore, goals for change in the STAXI over time cannot be simply defined. Thus, this instrument appears to have limited value as an outcome measure for clinical purposes.

Treatment Planning

As discussed in Chapter I, a tool for treatment planning should provide insight into the anger profile of a specific individual, in relation to applicable normative data. Further, the scores must be related to each other in a predictable manner and interpretable based on a valid theory of personality and/or behavior. Studies with non-clinical populations have determined that this instrument has adequate psychometric properties, including both convergent and discriminant validity, internal consistency, and a stable factor structure.

With this population, as discussed above, the results were mixed in their consistency with the predictions of State-Trait Anger theory. All scale intercorrelations were as expected, indicating that based on the overall group the STAXI scores are related to each other in a predictable manner. The differences in means were consistent with the predictions of State-Trait Anger theory for the Trait Anger scale, Anger-Out, and Anger-Control. While the results were contrary to predictions for the State Anger and Anger-In scales, these findings are not of serious concern given that they are not related to the presenting problem with the present sample. However, findings based on differences in

means and scale intercorrelations do not fully address the utility of this instrument in providing helpful information for the treatment of an individual. It is common, as recommended for the STAXI, for personality instruments to define the 70th or 75th percentile level as indicative of clinically significant problems. Based on this criterion, the concurrent validity with independently observed anger management problems is not adequate.

With regard to demographic variables, the age effects seen in the normative sample were not observed with this sample. While this sample included a wide range of ages, as noted previously, because these individuals were referred based on difficulty with anger management they represent the subgroup who had not "mellowed with age." The implication of this for clinical practice is that while individuals in this population may appear more pathological as they are compared with progressively older normative groups, their levels of anger experience and expression may be relatively unchanged since adolescence.

Another demographic variable that may be considered in practice is race/ethnicity. While the results of this analysis should be considered preliminary, in the present study, non-White clients scored lower on the Trait Anger and Anger-In scales. Clinicians working with similar populations may supplement the STAXI with follow-up interview on specific items with non-White clients to provide additional qualitative information, particularly concerning the situational items on the Trait Anger scale.

Finally, court-mandated clients scored significantly lower on both the Trait Anger and Anger-Out scales, which are most clearly related to their reason for referral. Therefore, clinicians working with court-mandated clients should be aware that denial

may affect the responses of these individuals.

In conclusion, the results of the STAXI alone are unlikely to provide information superior to what could be obtained in a clinical interview. However, as a supplemental tool, it might be instructive to note the individual's response style, to the extent that this may indicate his or her willingness to admit to and address a problem in therapy. Further study may provide additional insight into the differences observed between this sample and the normative group and may contribute to further revisions that may increase the utility of the STAXI with more diverse populations.

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