Assessment of Emotions: Anxiety, Anger, Depression, and Curiosity

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Anxiety, anger, depression, and curiosity are major indicators of psychological distress and well-being that require careful assessment. Measuring these psychological vital signs is of critical importance in diagnosis, and can facilitate treatment by directly linking intense emotions to the events that give rise to them. The historical background regarding theory and research on anxiety, anger, depression, and curiosity is briefly reviewed, and the nature and assessment of these emotional states and personality traits are examined. The construction and development of the State-Trait Anxiety Inventory (STAI), the State-Trait Anger EXpression Inventory (STAXI-2), and the State-Trait Personality Inventory (STPI) to assess anxiety, anger, depression, and curiosity, and the major components of these emotional states and personality traits, are described in detail. Findings demonstrating the diverse utility and efficacy of these measures are also reported, along with guidelines for their interpretation and utilisation in research and clinical practice. Research with the STAI, STAXI and STPI over the last 40 years has contributed to understanding vitally important measurement concepts that are especially applicable to the assessment of emotions. These concepts included the state–trait distinction, item intensity specificity, and the importance of items that describe the presence or absence of emotions.

Keywords: anger, anxiety, curiosity, depression, STAI, STAXI

INTRODUCTION

Emotions motivate behavior and have a significant impact on health and psychological well-being. According to the World Health Organization (2006), “Normally, emotions such as anxiety, anger . . . pain or joy interact to motivate a person to a goal-directed action. However, when certain emotions predominate and persist beyond their usefulness in motivating people for their goal-directed behaviour, they become morbid or pathological.” It is therefore essential to evaluate and monitor emotional states in diagnosis and...
treatment just as physicians in medical examinations routinely measure pulse rate, blood pressure, and temperature, the vital signs that provide essential information about physical health.

When a physician detects an abnormal pulse or elevated blood pressure during a medical examination, these symptoms may indicate a potentially significant problem in the functioning of the cardiovascular system. Intense anxiety and anger may be considered as analogous to elevations in pulse rate and blood pressure. The presence of a fever, as indicated by abnormally high body temperature, can be considered as roughly analogous to depression. While running a high fever may indicate that the immune system is not protecting the person from harmful viruses, symptoms of depression often reflect the presence of pervasive unresolved conflicts that contribute to an emotional fever.

Manifestations of anxiety, anger, and depression are critical psychological vital signs that are strongly related to an individual’s well-being. Variations in the intensity and duration of these emotions provide essential information about a person’s mental health that help to identify recent events and long-standing conflicts that have a significant impact on the individual’s life. Assessing emotional vital signs and providing timely and meaningful feedback will also enhance awareness and understanding of a person’s feelings, and help individuals to recognise and cope more effectively with their emotions.

Symptoms of high anxiety are typically found in almost all emotional disorders. From a psychoanalytic perspective, Freud (1936, p. 85) regarded anxiety as the “fundamental phenomenon and the central problem of neurosis”. Observations of daily life and recent research findings indicate that problems with anger are also ubiquitous (Deffenbacher, 1992). Consequently, careful assessment of the experience, expression, and control of anger is essential in psychological diagnosis and treatment planning (Sharkin, 1988).

Depression has been described as “the common cold of mental health problems that strikes the rich and poor as well as the young and the old” (Rosenfeld, 1999, p. 10). The World Health Organization estimates that 340 million people currently suffer from clinical depression, and that depression will become “the leading cause of disability and the 2nd leading contributor to the global burden of disease by the year 2020” (WHO, 2001). The experience of curiosity may be considered as a positive emotional vital sign. As a motivator of exploratory behavior, curiosity often contributes to effective personal adjustment and successful adaptation to environmental stimuli.

The goals of this article are to briefly review the evolution of anxiety, anger, depression, and curiosity as emotional concepts, and to evaluate the role of emotions as psychological vital signs. The construction and development of the State-Trait Anxiety Inventory (STAI), the State-Trait Anger Expression
Inventory (STAXI), and the State-Trait Personality Inventory (STPI) for measuring state and trait anxiety, anger, depression, and curiosity, and the experience, expression, and control of anger, will also be examined. In addition, guidelines for interpreting and using these measures in research and clinical practice are described.

HISTORICAL EVOLUTION OF ANXIETY, ANGER, DEPRESSION, AND CURIOSITY AS EMOTIONAL CONCEPTS

Darwin (1872/1965) considered fear and rage to be universal characteristics of both humans and animals that have evolved over time because these emotions facilitated successful adaptation and survival (Plutchik, 2001). According to Darwin, “If we expect to suffer, we are anxious; if we have no hope of relief, we despair” (1872/1965, p. 176). In addition to relating anxiety to depression, Darwin (1872/1965, p. 81) regarded fear as “. . . the most depressing of all the emotions; and it soon induces utter, helpless prostration”. Rage was also considered by Darwin (1872/1965, p. 74) to be a powerful emotion that motivated “. . . animals of all kinds, and their progenitors before them, when attacked or threatened by an enemy” to fight and defend themselves. He observed that rage was reflected in facial expression (e.g. reddened face, clenched teeth), accelerated heart-rate and muscular tension, and often resulted in violent behavior. For Darwin, anger was a state of mind that differed “. . . from rage only in degree, and there is no marked distinction in their characteristic signs” (1872/1965, p. 244). Thus, Darwin implicitly defined anger as an emotional state that varies in intensity, from mild irritation or annoyance to intense fury and rage.

Anxiety was defined by Freud (1924) as “something felt”, a specific unpleasant emotional state or condition that included apprehension, tension, worry, and physiological arousal. Freud (1936) equated objective anxiety with fear, which he considered to be an emotional reaction that was proportional in its intensity to a real danger in the external world. Consistent with Darwin’s evolutionary perspective, Freud’s “danger signal” theory emphasised the adaptive utility of anxiety for motivating behavior that helped a person cope more effectively with potentially harmful situations. Aggression was considered by Freud (1933/1959) to be an instinctual drive that motivated anger and aggressive behavior. When aggression cannot be directly expressed against external objects, it is turned back into the self, resulting in depression and other psychosomatic manifestations (Alexander & French, 1948; Freud, 1936).

The origin of the concept of depression can be traced to the 5th century BC writings of Hippocrates, the father of modern medicine (Jackson, 1986). The Greek term, melancholia, which has the connotation of both anxiety and depression, was used by Hippocrates to describe a “black mood” that
involved prolonged fear and sadness (Jackson, 1995). Galan’s restatement of Hippocrates’ description of melancholia as consisting of affective feelings, self-depreciating cognitions, and somatic symptoms prevailed for the next 1,500 years.

In theory and research on psychopathology, anxiety and anger have been recognised as major contributors to depression for the last 100 years (Freud, 1924, 1936; May, 1950/1977). The measurement of anxiety in diagnosis, treatment planning, and research has received significant attention for more than half a century (Taylor, 1953; Spielberger, 1983). While the assessment of anger has been relatively neglected, evidence from research on Type A behavior and heart disease (Friedman & Rosenman, 1974; Spielberger, Jacobs, Russell, & Crane, 1983; Spielberger & London, 1982), demonstrating that anger was a major component of the Type A syndrome, has stimulated the development of measures of anger and hostility (Spielberger, 1976, 1980, 1988, 1999).

In summary, fear (anxiety), anger (hostility, rage), and depression (melancholia) were considered by Darwin and Freud to be fundamental emotional states that had powerful effects on thoughts and behavior. Both Darwin and Freud also recognised that depression generally resulted from the interaction of anxiety and anger. Like anxiety and anger, symptoms of depression vary in severity, from feeling sad or gloomy for a relatively short period of time, to deep long-lasting despair, extreme guilt, hopelessness, and thoughts of death that could result in suicide. Persistent depression as a personality trait can also produce behavioral and physical symptoms such as fatigue, insomnia, impotence, frequent crying, chronic aches and pain, and excessive gain or loss in weight (Rosenfeld, 1999).

The insecurity caused by anxiety was also viewed by Freud (1936, 1959) as a major instigator of exploratory behavior, thus linking curiosity to anxiety. Although Freud did not directly address the origins of curiosity, he considered exploratory behavior to be determined by instinctive biological urges and ego mechanisms that served to reduce threat and insecurity (Aronoff, 1962). William James (1890), who was strongly influenced by Darwin’s (1872/1965) views on evolution, also proposed an instinct theory of curiosity. He considered attraction to a novel stimulus as adaptive because it facilitated survival. Although the fear (anxiety) aroused by novel situations often inhibited curiosity, it was also adaptive because the novel stimulus might prove to be dangerous. Thus, James, like Freud, recognised a potentially antagonistic relationship between curiosity and fear, which often resulted in the simultaneous arousal of these two emotions.

Curiosity can be broadly defined as a desire to acquire new knowledge and experience that motivates exploratory behavior (Berlyne, 1949, 1950, 1954; Loewenstein, 1994; McDougall, 1921). While scientific interest in curiosity has been reflected in the history of the discipline of psychology for more than...
a hundred years (James, 1890), research on the assessment of curiosity has received only passing attention (Spielberger & Starr, 1994). Of the small number of researchers who have studied curiosity and exploratory behavior, Daniel Berlyne is clearly the most notable and influential contributor (Beswick, 2000). Berlyne (1954, 1960) identified two types of curiosity, which he labeled perceptual and epistemic. Perceptual curiosity was defined as “the curiosity which leads to increased perception of stimuli” (Berlyne, 1954, p. 180); epistemic curiosity was defined as “the drive to know” (p. 187). Two types of exploratory behavior were also differentiated by Berlyne (1960), which he labeled diversive and specific. Feelings of boredom stimulated a desire for stimulus variation that motivated diversive exploration; specific exploration was motivated by curiosity that stimulated acquiring new information about novel stimuli.

The fundamental importance of anxiety, anger, depression, and curiosity as emotional states that motivate a wide range of behaviors makes clear the need to assess both the intensity of these emotions and how frequently they are experienced. In early studies of human emotions, introspective reports were used in efforts to discover and measure the qualitative feeling-states (“mental elements”) that were associated with different emotions (Titchener, 1897; Wundt, 1896). Feelings were considered by Wundt (1896) to be basic, short-lived experiences, whereas emotions were more complex experiences that involved related feelings. It should be noted that Wundt disagreed with the James-Lange theory, which assumed that a person first responded cognitively to a situation and then experienced the emotion, including physiological arousal followed by behavioral reactions. According to Wundt, introspection research demonstrated that the emotion comes first, followed by cognition, physiological arousal, and behavioral consequences.

With the advent of behaviorism, research on emotion shifted from the investigation of subjective feelings to the evaluation of physiological and behavioral variables that could be objectively measured. The methodology of behaviorism required investigators to assess the impact of carefully defined and/or manipulated antecedent conditions on cognitive, physiological, and behavioral responses that could be objectively measured. Beginning in the 1960s, stimulated by a renaissance in cognitive psychology, the unique contributions of thoughts and feelings to emotional reactions was increasingly recognised. Emotions are now generally defined as complex psychobiological states, consisting of affective feelings, cognitions, and physiological arousal (Spielberger, 1966). Since the quality and intensity of the feelings experienced during emotional arousal are the most unique and distinctive features of a particular emotion, accurate assessment of emotions requires measurement of the intensity of qualitatively different emotional states as they fluctuate over time.
The STAI was developed to provide reliable, relatively brief, self-report scales for assessing state and trait anxiety in research and clinical practice (Spielberger, Gorsuch, & Lushene, 1970). Freud’s (1936) Danger Signal Theory and Cattell’s concepts of state and trait anxiety (Cattell, 1966; Cattell & Scheier, 1958, 1963), as refined and elaborated by Spielberger (1966, 1972a, 1972b, 1977, 1979a, 1983), provided the conceptual framework that guided the construction of the STAI. State anxiety (S-Anxiety) was defined as the intensity at a particular time of subjective feelings of tension, apprehension, nervousness, and worry, with associated activation (arousal) of the autonomic nervous system. Trait anxiety (T-Anxiety) was defined in terms of relatively stable individual differences in anxiety-proneness as reflected in the frequency that anxiety states have been manifested in the past and the probability that feelings of S-Anxiety will be experienced in the future.

When test construction for the STAI began in 1964, the initial goal was to develop an inventory consisting of a single set of items that could be administered with different instructions to assess both state and trait anxiety (Spielberger et al., 1970). A large pool of items was adapted from existing anxiety measures, and new items were written to assess either the presence or absence of anxiety. The essential psychological content of each item was retained, but the format was modified so that the same item could be given with different instructions to assess either S-Anxiety or T-Anxiety. The state instructions required respondents to report the intensity of their feelings of anxiety, “right now, at this moment”. The trait instructions asked subjects to report how they generally feel by rating the frequency that the anxiety-related feelings, cognitions, and symptoms described by each item were experienced.

A preliminary pool of more than 60 anxiety items was administered to large samples of university students and psychiatric patients, first with state and then with trait instructions. In responding to the S-Anxiety items, subjects rated the intensity of their feelings (e.g. “I feel nervous”) on the following 4-point scale: (1) Not at all; (2) Somewhat; (3) Moderately so; (4) Very much so. In responding to the T-Anxiety items, subjects reported how they generally feel by rating themselves on each item, using the following 4-point frequency scale: (1) Almost never; (2) Sometimes; (3) Often; (4) Almost always. Based on extensive item-validity research with more than 2,000 study participants, a final set of 20 items was selected for the preliminary form of the STAI (Spielberger et al., 1970).

Research with the preliminary STAI indicated that altering the instructions could not overcome the strong state or trait psycholinguistic connotations of key words in a number of items (Spielberger et al., 1970). For example, when
given with trait instructions, “I worry too much” was stable over time and correlated highly with other T-Anxiety items, but scores on this item did not increase in response to stressful circumstances, nor did they decrease under relaxed conditions, as required for the construct validity of S-Anxiety items. In contrast, “I feel upset,” was a highly sensitive measure of S-Anxiety. Scores on this item increased markedly under stressful conditions and were lower under relaxed conditions. However, when given with trait instructions, the item scores were unstable over time and correlations with other T-Anxiety items were relatively weak.

Given the difficulties encountered in measuring state and trait anxiety with the same items, the STAI test-construction strategy was modified and separate sets of 20 items were selected to assess S-Anxiety and T-Anxiety. When given with state instructions, items with the best construct validity, as indicated by substantially higher scores under stressful than non-stressful conditions, were selected for the 20-item STAI(Form X) S-Anxiety Scale. When given with trait instructions, those items that were most stable over time with the best concurrent validity, as indicated by the highest correlations with the Taylor (1953) Manifest Anxiety Scale (MAS) and Cattell and Scheier’s (1963) Anxiety Scale Questionnaire (ASQ), were selected for the 20-item STAI-(Form X) T-Anxiety Scale (Spielberger et al., 1970). Only five of the STAI-(Form X) items were the same in both the 20-item S-Anxiety and the 20-item T-Anxiety scales. The remaining 15 items in each scale were relatively unique measures of either state or trait anxiety.

Following the publication in 1970 of the STAI(Form X), insights gained from more than a decade of research stimulated a major revision of this inventory. In revising the STAI, the primary goal was to develop “purer” measures for assessing state and trait anxiety in adolescents and adults. Careful scrutiny of the content of the STAI items with the best psychometric properties resulted in clearer conceptual definitions of the constructs of state and trait anxiety, which then guided the construction of potential replacement items for the revised STAI(Form Y). The item selection and validation procedures that resulted in the replacement of 30 per cent of the original STAI(Form X) items are described in detail in the STAI(Form Y) Test Manual (Spielberger, 1983).

In the construction and validation of the STAI(Form Y), more than 5,000 subjects were tested. Factor analyses of the Form Y items identified distinct trait and state anxiety factors (Spielberger, Vagg, Barker, Donham, & Westberry, 1980), which were generally consistent with the results of factor studies of the STAI(Form X) (Gaudry, Spielberger, & Vagg, 1975). However, the STAI(Form Y) T-Anxiety factors were stronger, more differentiated, and had better simple structure than the corresponding Form X factors, reflecting a better balance between the number of T-Anxiety present and absent items in Form Y (Spielberger et al., 1980). The STAI(Form Y) State and Trait

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Anxiety Scales are briefly described in Table 1, along with guidelines for interpreting scores on these measures.

<table>
<thead>
<tr>
<th>STAI scales</th>
<th>Number of items</th>
<th>Score range</th>
<th>Descriptions and guidelines for interpreting STAI Anxiety Scale scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>State-Anxiety (S-Anxiety)</td>
<td>20</td>
<td>20–80</td>
<td>Measures the intensity of feelings of anxiety as an emotional state at a particular time. Individuals with high S-Anxiety scores experienced relatively intense feelings of tension and anxiety at the time the test was administered. If S-Anxiety scores are elevated, the individual’s feelings are influenced by situational factors that are interpreted as indicating present or anticipated danger, or by thoughts relating to traumatic past events associated with the present situation.</td>
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<tr>
<td>Trait-Anxiety (T-Anxiety)</td>
<td>20</td>
<td>20–80</td>
<td>Measures individual differences in anxiety proneness as a personality trait as indicated by how often feelings of anxiety (S-Anxiety) are experienced over time. Persons high in T-Anxiety experience more frequent and intense feelings of S-Anxiety in situations perceived as dangerous or threatening, or when feeling inadequate in interpersonal relationships.</td>
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Reliability, Stability, and Internal Consistency of the STAI(Form Y)

Detailed psychometric information regarding the reliability and validity for the STAI(Form Y) are reported in the Test Manual (Spielberger, 1983). Test–retest stability coefficients for the T-Anxiety scale over intervals of 20 to 104 days were reasonably high for large groups of high school and college students, ranging from .73 to .86. In contrast, the stability coefficients for the S-Anxiety scale were relatively low, with a median $r$ of only .33. This lack of test–retest stability for the S-Anxiety scale was both expected and considered desirable because a valid state anxiety measure should reflect the influence of unique situational factors at the time of testing.

Since anxiety states are expected to vary in intensity as a function of perceived stress, measures of internal consistency such as alpha coefficients provide a more meaningful index of the reliability of S-Anxiety scales than test–retest correlations. Alpha reliability coefficients for the STAI/Form Y) S-Anxiety scale, computed by Formula KR-20 as modified by Cronbach.
(1951), were .86 or stronger for large, independent samples of male and female high school and college students, working adults, and military recruits, with a median coefficient across groups of .93 (Spielberger, 1983). For these groups, the alpha coefficients of the T-Anxiety scale were also uniformly high, with a median alpha of .90.

The distribution of scores for the STAI S-Anxiety scale when given under neutral conditions is positively skewed, and approaches a normal distribution under stressful conditions. Consequently, the alpha coefficients may be somewhat higher when this scale is given under conditions of greater psychological stress. For example, the alpha reliability for the STAI S-Anxiety scale was .94 when administered to college males immediately after a distressing film with instructions to report how they felt while watching the film. For the same subjects, the alpha for the S-Anxiety scale was .89 when given following a brief period of relaxation training.

**Content, Concurrent and Construct Validity of the STAI (Form Y)**

Individual STAI items were required to meet stringent validity criteria at each stage of the test development process (Spielberger, 1983; Spielberger & Gorsuch, 1966; Spielberger et al., 1970). Most of the original STAI items were selected on the basis of significant correlations with widely used measures of anxiety at the time the inventory was developed (Spielberger et al., 1970). However, it was subsequently noted that the content of several items adapted from the Taylor (1953) MAS reflected depression rather than anxiety (e.g. “I cry easily”; “I feel blue”). In developing the revised STAI (Form Y), the conceptual definitions of state and trait anxiety were improved, and the new items that were constructed in keeping with these definitions had better psychometric properties than the items with depressive content, which were replaced (Spielberger, 1983).

Relatively high correlations between scores on the STAI (Form Y) T-Anxiety scale with the MAS and the ASQ, ranging from .73 to .85, provide evidence of concurrent validity, indicating that all three inventories measure trait anxiety. It should be noted, however, that the 20-item STAI T-Anxiety scale requires less than half as much time to administer as the 50-item MAS and the 43-item ASQ, and is less contaminated with depression than the MAS. The correlations of the STAI (Form Y) S-Anxiety scale with the MAS and ASQ were less than .50, which were similar to the correlations between the STAI (Form Y) State and Trait scales.

Evidence of the construct validity of the STAI (Form Y) T-Anxiety scale is reflected in the relatively high mean scores for various neuropsychiatric (NP) patient groups for whom anxiety is a major symptom (American Psychiatric Association, 1994). Except for patients with character disorders, all NP
diagnostic groups have substantially higher T-Anxiety scores than normal subjects (Spielberger, 1983). General medical and surgical (GMS) patients with psychiatric complications also have higher T-Anxiety scores than GMS patients without such complications, indicating that the STAI T-Anxiety scale can help to identify non-psychiatric patients with emotional problems.

The construct validity of the STAI was demonstrated in findings that the S-Anxiety scale scores of college students were significantly higher during examinations and lower after relaxation training as compared to their S-Anxiety scores when they were tested in relatively non-stressful class periods (Spielberger, 1983). Further evidence of the construct validity of the S-Anxiety scale was observed in military recruits, whose S-Anxiety scores substantially increased while they participated in a highly stressful training program, and were much higher than those of high school and college students tested under relatively non-stressful classroom conditions. In constructing and validating the STAI, more than 10,000 adolescents and adults have been tested. Norms for high school and college students, working adults, military personnel, prison inmates, and psychiatric, medical, and surgical patients are reported in the STAI(Form Y) Test Manual (Spielberger, 1983). The State-Trait Anxiety Inventory for Children (STAIC), which was constructed to measure anxiety in 9- to 12-year-old elementary school children (Spielberger, 1973), has been used in numerous studies of children with emotional or physical problems.

Since first being introduced more than 40 years ago (Spielberger & Gorsuch, 1966), the STAI has been adapted in 60 different languages and dialects, and cited in over 14,000 archival studies (Spielberger, 1989). Research with the STAI has included experimental investigations and clinical studies of stress-related psychiatric, psychosomatic, and medical disorders. The STAI has also been widely utilised in investigations of general psychological processes, such as attention, memory, learning, and academic achievement; the effects of anxiety on situation-specific phenomena, such as speech anxiety and sports competition; and as an outcome measure in research on the effectiveness of biofeedback and behavioral and cognitive treatments.

ASSESSING THE EXPERIENCE, EXPRESSION, AND CONTROL OF ANGER WITH THE STATE-TRAIT ANGER EXPRESSION INVENTORY (STAXI)

The maladaptive effects of anger are traditionally emphasised as a major contributor to the etiology of the psychoneuroses and depression. Research findings also indicate that anger and hostility contribute to the pathogenesis of hypertension (e.g. Crane, 1981; Harburg, Blakelock, & Roeper, 1979) and coronary heart disease (Friedman & Rosenman, 1974; Matthews, Glass, Rosenman, & Bortner, 1977; Spielberger & London, 1982). Although much
has been written about the negative impact of anger and hostility on physical and psychological well-being, definitions of these constructs remain ambiguous and are sometimes contradictory, leading to conceptual confusion and a diversity of measurement operations of questionable validity (Biaggio, Supplee, & Curtis, 1981).

Given the substantial overlap in prevailing conceptual definitions of anger, hostility, and aggression, we have referred to them, collectively, as the AHA! Syndrome (Spielberger et al., 1985). The concept of anger usually refers to an emotional state that consists of feelings that vary in intensity, with associated activation or arousal of the autonomic nervous system. Although hostility generally involves intense angry feelings, this concept also has the connotation of a complex set of attitudes and behaviors that include being mean, vicious, vindictive, and often cynical (Spielberger et al., 1985). Aggression as a psychological construct generally implies destructive or punitive behavior directed towards other persons or objects in the environment (Buss, 1961). It should be noted, however, that most psychometric measures of anger-related constructs tend to confound angry feelings with hostility and aggressive behavior.

Measuring Anger with the State-Trait Anger Scale (STAS)

The State-Trait Anger Scale (STAS) was constructed to assess the intensity of anger as an emotional state at a particular time, and to measure individual differences in anger proneness as a personality trait (Spielberger et al., 1983). The procedures for constructing the STAS were generally similar to those used in developing the STAI (Spielberger, 1980). State anger (S-Anger) was defined as a psychobiological state or condition, consisting of angry feelings that may vary in intensity, from mild irritation or annoyance to fury and rage, with associated activation of the autonomic nervous system. Trait anger (T-Anger) was defined in terms of individual differences in the frequency that S-Anger was experienced over time. Guided by these working definitions, a pool of items was constructed to assess the intensity of angry feelings (S-Anger) and individual differences in anger-proneness (T-Anger). In responding to the S-Anger and the T-Anger items, examinees rate the intensity of their angry feelings and the frequency that these feelings are experienced, using the same 4-point rating scales that are used in responding to the STAI State and Trait Anxiety scales.

A preliminary form of the STAS, consisting of 15 S-Anger and 15 T-Anger items, was administered to a large sample of university students (Spielberger et al., 1983). The alpha coefficients for the 15-item preliminary STAS S-Anger and T-Anger scales were .93 and .87, respectively, indicating a high level of internal consistency. The test–retest reliability coefficients for the

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STAS T-Anger scale over a 2-week interval were .70 for males and .77 for females (Jacobs, Latham, & Brown, 1988). In contrast, the stability coefficients for the STAS S-Anger scale were much lower (.27 for males, .21 for females), as would be expected for a measure of transitory anger.

Given the high internal consistency of the 15-item preliminary STAS S-Anger and T-Anger scales, it was possible to reduce the length of each of these scales to 10 items without unduly weakening their psychometric properties. The state and trait items with the largest item–remainder correlations (.50 or higher) were selected for the 10-item STAS S-Anger and T-Anger scales. Correlations between the 10- and 15-item S-Anger and T-Anger scales for college students and Navy recruits ranged from .95 to .99, indicating that the 10-item scales provided essentially the same information as the longer forms (Spielberger, 1988).

In factor analyses of the 10 items comprising the STAS S-Anger scale, only a single underlying factor was identified for both males and females, indicating that the S-Anger scale measures a unitary emotional state that varies in intensity. In contrast, factor analyses of the 10 STAS T-Anger items consistently identified two correlated factors, which were labeled Angry Temperament (T-Anger/T) and Angry Reaction (T-Anger/R). The T-Anger/T items described individual differences in the disposition to experience anger without specifying any provoking circumstance (e.g. “I am a hot headed person”; “I have a fiery temper”). The T-Anger/R items described angry reactions in response to situations that involved frustration and/or negative evaluations (e.g. “It makes me furious when I am criticised in front of others”).

The results of a study that compared hypertensive patients with medical and surgical patients with normal blood pressure provided strong evidence demonstrating that the two STAS T-Anger subscales measured different facets of trait anger (Crane, 1981). The finding that the T-Anger scores of the hypertensive patients were significantly higher than those of the medical and surgical patients was due entirely to the substantially higher T-Anger/R scores of the hypertensives. In contrast, the T-Anger/T scores of the hypertensives were essentially the same as those of the patients with normal blood pressure. Crane (1981) also found that hypertensive patients had significantly higher S-Anger scores while performing on a mildly frustrating task than patients with normal blood pressure.

The STAS T-Anger scale was administered to large samples of college students and Navy recruits (Spielberger et al., 1983), along with the Buss-Durkee (1957) Hostility Inventory (BDHI) and the Hostility (HO; Cook & Medley, 1954) and Overt Hostility (Hv; Schultz, 1954) scales. Moderately high correlations of the STAS T-Anger scale with all three hostility measures for males and females in both studies provide evidence of a strong relationship between T-Anger and hostility. Moderate correlations of the STAS
T-Anger scale were also found with the Neuroticism Scale of the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975) and the T-Anxiety scale of the State-Trait Personality Inventory (STPI; Spielberger, 1979b). These findings are consistent with clinical observations that neurotic individuals frequently experience guilt and anxiety in relation to their angry feelings (Spielberger, 1988).

In a series of studies, Deffenbacher (1992) found that individuals with high STAS T-Anger scores reported that they more frequently experienced intense angry feelings across a wide range of provocative situations than persons with low T-Anger scores. The high T-Anger individuals also reported experiencing anger-related physiological symptoms 2 to 4 times more often than those low in T-Anger. When provoked, individuals with high T-Anger scores also reported stronger tendencies to both express and suppress their anger, and more dysfunctional coping. Negative events, such as a failure experience, also had a more devastating (catastrophising) impact on high T-Anger individuals (Story & Deffenbacher, 1985).

Measuring the Expression and Control of Anger with the Anger Expression (AX) Scale

As our research on anger has progressed, the critical importance of differentiating between the experience of anger and the characteristic ways in which anger was expressed became increasingly apparent (Spielberger et al., 1985). In previous research, anger expression was implicitly defined as a unidimensional, bipolar construct (Funkenstein, King, & Drolette, 1954; Gentry, Chesney, Gary, Hall, & Harburg, 1982), varying from extreme suppression or inhibition of anger to the frequent expression of anger in aggressive behavior. The Anger EXpression (AX) Scale was constructed to assess this dimension, guided by working definitions of anger-in and anger-out that were formulated on the basis of a review of relevant previous research (Spielberger et al., 1985). Anger-in was defined in terms of how often an individual experiences, but holds in (suppresses), angry feelings. Anger-out was defined as the frequency that an individual expresses angry feelings in verbal or physically aggressive behavior.

The content of the AX Scale items ranged from describing strong inhibition or suppression of angry feelings (AX/In) to the extreme expression of anger directed toward other persons or objects in the environment (AX/Out). The AX Scale also included items for assessing the middle range of the hypothesised unidimensional anger-in/anger-out continuum. The format for rating the AX Scale items was the same as that used with the STAS T-Anger scale, but the instructions differed markedly from those used in assessing T-Anger. Rather than simply asking respondents to rate themselves according to how they generally feel, they were informed that “Everyone feels angry
or furious from time to time . . . ”, and instructed to report “. . . how often you generally react or behave in the manner described when you feel angry or furious” (Spielberger, Reheiser, & Sydeman, 1995, p. 58). The following are examples of AX Scale items:

“When angry or furious”:
AX/In: I keep things in; I boil inside, but I don’t show it.
AX/Out: I lose my temper; I strike out at whatever infuriates me.

Johnson (1984) administered the preliminary 33-item AX Scale to 1,060 high school students. The results of separate factor analyses for both females and males clearly indicated that the AX Scale items were tapping two independent dimensions, which were labeled Anger/In and Anger/Out on the basis of the content of the items with the strongest loadings on these factors. Given the strength and clarity of the Anger/In and Anger/Out factors and the striking similarity of both factors for males and females, the items with the strongest loadings on each factor were selected to form 8-item AX/In and AX/Out subscales (Spielberger et al., 1985). The items selected for the AX/In subscale had uniformly high loadings for both sexes on the Anger/In factor (mdn. = .665) and negligible loadings on the Anger/Out factor (mdn. = -.045). Similarly, the 8 items selected for the AX/Out subscale had high loadings for both sexes on the Anger/Out factor (mdn. = .59) and negligible loadings on Anger/In (mdn. = -.01).

Pollans (1983) factored responses to the 33 preliminary AX Scale items for a large sample of college students and found clearly defined anger-in and anger-out factors, with essentially zero correlations between the 8-item AX/In and AX/Out subscales for both males and females. Similar findings have subsequently been reported for other populations (Knight, Chisholm, Paulin, & Waal-Manning, 1988; Spielberger, 1988). In a study of the internal consistency and reliability of the 8-item AX/In and AX/Out subscales, Jacobs et al. (1988) found alpha coefficients ranging from .73 to .84, and test–retest reliability correlations of .64 to .86 over varying time periods. Thus, the 8-item AX/In and AX/Out subscales are factorially orthogonal, empirically independent, internally consistent, and relatively stable over time. Clearly, the AX/In and AX/Out subscales measure two distinct components of anger-expression.

Pollans (1983) also found that three items (“Control my temper”; “Keep my cool”; “Calm down faster”) included in the AX Scale to assess the middle range of the hypothesised anger-in/anger-out continuum coalesced to form the nucleus of a third factor, which stimulated the development of an Anger Control (AX/Con) subscale. Dictionary and thesaurus definitions and idioms pertaining to the control of anger guided the construction of additional anger control items. The resulting pool of anger control items was administered to a large sample of university students, along with the AX/In and AX/Out subscales.
subscale items. In separate factor analyses for males and females, a strong anger control factor was identified, along with clearly defined anger-in and anger-out factors. The five items with the strongest loadings on the anger-control factor for both males and females were added to the three original anger control items to form the 8-item AX/Con subscale.

The 24-item AX Scale, which included 8-item AX/In, AX/Out and AX/Con subscales, was administered to a large sample of university students (Spielberger, Krasner, & Solomon, 1988). In factor analyses of responses to the AX Scale items, anger-control consistently emerged as the strongest factor for both males and females; all 8 AX/Con items had dominant salient loadings on this factor. Well-defined Anger/In and Anger/Out factors were also found; all 8 AX/In and 8 AX/Out items had dominant salient loadings on the appropriate factor. The AX/Con subscale correlated negatively with the AX/Out subscale for both males \(r = -0.59\) and females \(r = -0.58\). Correlations of the AX/In subscale scores with the AX/Out and AX/Con subscales were essentially zero for both sexes (Pollans, 1983; Spielberger et al., 1988).

Spielberger et al. (1988) found moderately high positive correlations of the AX T-Anger/T subscale with the AX/Out scale, suggesting that persons with an angry temperament are more likely to express their anger toward other people or objects in the environment rather than to suppress it. Small positive correlations of the T-Anger/R subscale with the AX/Out and AX/In subscales appear to indicate that individuals who frequently experienced anger when frustrated or treated unfairly were equally likely to express or suppress their anger (Spielberger, 1988). Small but highly significant positive correlations of the AX/In and AX/Out subscales with the T-Anxiety scale of the State-Trait Personality Inventory (STPI) suggest that persons who more often suppressed or expressed their anger tend to experience anxiety more frequently than those with low anger expression scores.

As previously noted, Harburg et al. (1979) and Gentry et al. (1982) found that individuals who suppressed their anger had higher systolic and diastolic blood pressure. Williams et al. (1980) reported that patients with high MMPI Hostility scores were more likely to develop coronary artery disease. Similarly, Dembroski, MacDougall, Williams, and Haney (1985) observed that high ratings of “anger-in” or potential for hostility were positively associated with the severity of atherosclerosis. In keeping with these findings, a major reason for constructing the AX Scale was to facilitate the investigation of how the expression and/or suppression of anger contributed to the etiology of hypertension, atherosclerosis, and coronary heart disease.

Johnson (1984) investigated the relationship of AX Scale scores with systolic (SBP) and diastolic (DBP) blood pressure for a large sample of high school students \(N = 1,114\). The correlations of AX/In scores with SBP and DBP were positive and highly significant for both sexes; students with very high AX/In scores had much higher SBP. After partialing out the influence of...
a number of variables previously found to be related to BP (e.g. height, weight, dietary factors, racial differences, family history of hypertension), the AX/In scores continued to be positively and significantly associated with elevated SBP and DBP. In multiple regression analyses, Johnson found that AX/In scores were better predictors of blood pressure than any other measure for both males and females. In contrast, the correlations of AX/Out scores with blood pressure were quite small for both sexes.

**Measuring the Experience, Expression, and Control of Anger with the STAXI**

The 20-item STAS and 24-item AX scales were combined to form the 44-item *State-Trait Anger Expression Inventory* (STAXI), which was developed to measure the experience, expression, and control of anger (Spielberger, 1988). Fuqua et al. (1991) administered the STAXI to 455 undergraduate college students, and factored their responses to the 44 items. The first six factors identified by Fuqua et al. (1991) were each defined by essentially the same items comprising the STAXI S-Anger, AX/In, AX/Out, and AX/Con scales, and the T-Anger Temperament and Reaction subscales. Almost all of the 44 STAXI items had dominant salient loadings on the appropriate factor and negligible loadings on the other factors. A small seventh factor, “Feel like expressing anger”, was also identified by Fuqua et al. (1991), which was defined primarily by strong loadings for three of the 10 STAS S-Anger items (Feel like . . . breaking things, banging on the table, hitting someone), which also had strong loadings on the Fuqua et al. S-Anger factor.

Van der Ploeg (1988) administered a Dutch adaptation of the 10-item STAS State Anger Scale to male military draftees in the Netherlands. Factor analysis of responses to these items identified two S-Anger factors, indicating that “feeling angry” and “feel like expressing anger” were distinct components of anger as an emotional state. Subsequent factor analyses by Forgays, Forgays, and Spielberger (1997) of responses to the 44 STAXI items provided further evidence of two distinctive, relatively independent S-Anger factors. Based on the content of the items with dominant salient loadings, these factors were labeled *Feeling angry* (e.g. “I feel furious”, “I feel angry”) and *Feel like expressing anger* (e.g. “I feel like swearing”, “I feel like hitting someone”). The “Feel like expressing anger” factor was defined by high loadings on items that described either verbal or physical expression.

On the basis of research findings that consistently identified more than one S-Anger factor, the original 44-item STAXI was revised and expanded. The revised 57-item STAXI-2 comprises 42 of the 44 original STAXI items, plus 15 new items that were constructed to measure three components of S-Anger (Spielberger, 1999). The 15-item STAXI-2 S-Anger scale includes three factorially derived 5-item subscales that assess: Feeling Angry (S-Anger/F), Feel
Like Expressing Anger Verbally (S-Anger/V), and Feel Like Expressing Anger Physically (S-Anger/P). Brief descriptions of the STAXI-2 scales and subscales, along with the number of items and the range of scores for each scale, are noted in Table 2.

The 10-item STAXI-2 T-Anger scale and the two 4-item T-Anger subscales that assess Angry Temperament (T-Anger/T) and Angry Reaction (T-Anger/R) are unchanged from the original 44-item STAXI. The 8-item STAXI-2 AX/Out and AX/In scales are also the same as in the original STAXI. The STAXI-2 scale for measuring the control of anger-out (AX/Con-Out) comprises 7 of the 8 original STAXI AX/Con Scale items, plus 1 replacement item. An entirely new 8-item scale was constructed to assess the control of anger-in (AX/Con-In), i.e. calming down to reduce the intensity of suppressed anger. The STAXI-2 AX Index, which provides a measure of total anger expression, is computed by the following formula; the constant, 48, was included to eliminate possible negative numbers:

\[
AX \text{ Index} = AX/Out + AX/In - (AX/Con-Out + Ax/Con-In) + 48.
\]

**Guidelines for Interpreting the STAXI Scale and Subscale Scores**

The STAXI has proved useful for assessing the experience, expression, and control of anger in normal individuals, and in evaluating the anger experienced by patients with a variety of psychological and medical disorders, including alcoholism, hypertension, coronary heart disease, and cancer (Defenbacher, 1992; Moses, 1992; Spielberger, 1988, 1999). Comparing the scores on the STAXI-2 scales and subscales of individual males and females with norms for high school and college students, working adults, psychiatric and medical patients, and other specific groups is an important first step in test interpretation. Norms for the STAXI-2 scales and subscales for male and female adolescents, adults, and psychiatric patients are reported in the Test Manual (Spielberger, 1999), which includes percentile ranks and T-Scores for each scale and subscale. Norms for the original STAXI are also available for general medical and surgical patients, prison inmates, and military recruits.

Guidelines for interpreting scores on the STAXI-2 scales and subscales are reported in Table 3. Individuals with high anger scores (above the 75th percentile) are more likely to experience and/or express angry feelings that interfere with optimal functioning. Persons with high anger-in and/or anger-out scores often have difficulties in interpersonal relationships, and may develop psychological and medical disorders. High AX/In scores when associated with high levels of anxiety have been found to be associated with elevated blood pressure and hypertension (Crane, 1981; Johnson, 1984). Individuals with high scores on both the AX/In and AX/Out scales (above the
TABLE 2
Brief Description of the STAXI-2 Anger Experience, Expression, and Control Scales and Subscales

<table>
<thead>
<tr>
<th>STAXI-2 scale/subscale</th>
<th>Number of items</th>
<th>Score range</th>
<th>Description of the STAXI-2 scale and subscale scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Anger (S-Anger)</td>
<td>15</td>
<td>15–60</td>
<td>Measures the intensity of angry feelings at a particular time, and the extent to which a person feels like expressing anger verbally or physically.</td>
</tr>
<tr>
<td>Feeling Angry (S-Ang/F)</td>
<td>5</td>
<td>5–20</td>
<td>Measures the intensity of the angry feelings that the respondent is currently experiencing.</td>
</tr>
<tr>
<td>Feel Like Expressing Anger Verbally (S-Ang/V)</td>
<td>5</td>
<td>5–20</td>
<td>Measures the intensity of current feelings related to the verbal expression of anger.</td>
</tr>
<tr>
<td>Feel Like Expressing Anger Physically (S-Ang/P)</td>
<td>5</td>
<td>5–20</td>
<td>Measures the intensity of current feelings related to the physical expression of anger.</td>
</tr>
<tr>
<td>Trait Anger (T-Anger)</td>
<td>10</td>
<td>10–40</td>
<td>Measures individual differences in anger as a personality trait in terms of how often angry feelings are experienced over time.</td>
</tr>
<tr>
<td>Angry Temperament (T-Ang/T)</td>
<td>4</td>
<td>4–16</td>
<td>Measures individual differences in the disposition to experience anger without specific provocation.</td>
</tr>
<tr>
<td>Angry Reaction (T-Ang/R)</td>
<td>4</td>
<td>4–16</td>
<td>Measures the frequency that angry feelings are experienced in reaction to situations that involve negative evaluations or being treated badly.</td>
</tr>
<tr>
<td>Anger Expression-Out (AX/Out)</td>
<td>8</td>
<td>8–32</td>
<td>Measures how often angry feelings are expressed in verbal or aggressive behavior directed toward other persons or objects in the environment.</td>
</tr>
<tr>
<td>Anger Expression-In (AX/In)</td>
<td>8</td>
<td>8–32</td>
<td>Measures how often angry feelings are experienced and turned inward or suppressed.</td>
</tr>
<tr>
<td>Anger Control-Out (AX/Con-Out)</td>
<td>8</td>
<td>8–32</td>
<td>Measures how often a person endeavors to prevent or control the expression of angry feelings, e.g. by “keeping the lid on”.</td>
</tr>
<tr>
<td>Anger Control-In (AX/Con-In)</td>
<td>8</td>
<td>8–32</td>
<td>Measures how often a person attempts to reduce and control angry feelings by calming down or cooling off.</td>
</tr>
<tr>
<td>Anger Expression Index (AX Index)</td>
<td>32</td>
<td>0–96</td>
<td>Provides a general index of anger expression based on responses to the STAXI-2 anger expression and control scales: AX Index = AX/Out + AX/In – (AX/Con-Out + AX/Con-In) + 48</td>
</tr>
</tbody>
</table>
90th percentile) may be at high risk for heart attacks and coronary artery disease, especially those who also have high anger control scores (Spielberger, 1999).

The STAS, AX, and the STAXI scales and subscales have been used extensively in research on the relationship between anger and health (Brooks, 1999).

### TABLE 3
Guidelines for Interpreting High Scores on the STAXI-2 Scales and Subscales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Characteristics of persons with high scores on the STAXI-2 scales and subscales</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-Anger:</td>
<td>Individuals with high S-Anger scores experienced intense angry feelings at the time the test was administered.</td>
</tr>
<tr>
<td>T-Anger:</td>
<td>Individuals high in T-Anger frequently experience angry feelings, especially when they believe they are treated unfairly by others. Whether persons high in T-Anger express, suppress, or control their anger can be inferred from their scores on the AX/Out, AX/In and AX/Con scales.</td>
</tr>
<tr>
<td>T-Anger/T:</td>
<td>Persons with high T-Anger/T scores frequently experience angry feelings with little provocation, and are often impulsive if they have high AX/Out and low AX/Con scores. Individuals with high T-Anger/T scores who also have high AX/Con scores may be strongly authoritarian, and use anger to intimidate others.</td>
</tr>
<tr>
<td>T-Anger/R:</td>
<td>Persons with high T-Anger/R scores are sensitive to criticism, perceived affronts, and negative evaluation by others, and frequently experience intense feelings of anger under such circumstances. Those with high AX/Out scores are more likely to express their anger.</td>
</tr>
<tr>
<td>AX/Out:</td>
<td>Persons with high AX/Out scores frequently express anger in physically aggressive acts, such as assaulting other persons, or verbally express anger in the form of criticism, sarcasm, insults, and the extreme use of profanity.</td>
</tr>
<tr>
<td>AX/In:</td>
<td>Persons with high AX/In scores frequently experience intense angry feelings, which they suppress or inhibit, rather than expressing these feelings in aggressive behavior. Persons with high AX/In scores who also have high AX/Out scores may frequently express their anger in some situations, while suppressing it in others.</td>
</tr>
<tr>
<td>AX/Con-Out:</td>
<td>Persons with high AX/Con-Out scores tend to invest a great deal of energy in monitoring and preventing the outward expression of anger. While controlling external manifestations of anger is generally desirable, over-control can lead to passivity, depression, and withdrawal. Persons with high AX/Con-Out, high T-Ang, and low AX/Out scores are likely to experience chronic anger that they are not able to express.</td>
</tr>
<tr>
<td>AX/Con-In:</td>
<td>Persons with high AX/Con-In scores invest a great deal of time and energy in endeavoring to calm down to reduce their anger. While the development of internal controls over the expression of anger is generally seen in a positive light, it can reduce the person’s ability to respond with assertive behavior that might facilitate constructive solutions to frustrating situations. Persons with high AX/Con-In scores who also have high AX-Out and T-Anger scores have a higher risk for developing hypertension.</td>
</tr>
</tbody>
</table>

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Walfish, Stenmark, & Canger, 1981; Johnson & Broman, 1987; Schlosser, 1986; Vitaliano, 1984). As previously noted, elevations in scores on the STAXI T-Anger and anger expression and control scales have been identified as important risk factors for elevated blood pressure and hypertension (e.g. Johnson, Spielberger, Worden, & Jacobs, 1987; Kearns, 1985; Schneider, Egan, & Johnson, 1986; Spielberger et al., 1988; Spielberger et al., 1985; van der Ploeg, van Buuren, & van Brummelen, 1988). The STAXI has also been used to assess the experience, expression, and control of anger in research on: patients undergoing treatment for Hodgkins disease and lung cancer (McMillan, 1984); the role of anger in Type-A behavior (Booth-Kewley & Friedman, 1987; Janisse, Edguer, & Dyck, 1986; Krasner, 1986; Spielberger et al., 1988); psychological factors that contribute to chronic pain (Curtis, Kinder, Kalichman, & Spana, 1988; Kinder, Curtis, & Kalichman, 1986); and the use of marijuana (Stoner, 1988). James Moses (1992, p. 524) described the STAXI as a “specific, sensitive, psychometric instrument . . . [with] . . . great potential . . . to significantly further our understanding of important stress-based and stress-influenced syndromes”.

MEASURING ANXIETY, ANGER, DEPRESSION, AND CURIOSITY WITH THE STATE-TRAIT PERSONALITY INVENTORY (STPI)

The 80-item State-Trait Personality Inventory (STPI, Form Y) comprises eight 10-item scales for measuring state and trait anxiety, anger, depression, and curiosity (Spielberger, Ritterband, Sydeman, Reheiser, & Unger, 1995). The 10-item STPI S-Anxiety and T-Anxiety scales comprise the items with the best psychometric properties that were selected from the 20-item STAI-(Form Y) State and Trait Anxiety scales (see Table 1). The 10-item STPI State and Trait Anger scales include the same items as in the original STAXI S-Anger and T-Anger scales (see Table 2). The construction and validation of the 10-item STPI state and trait depression and curiosity scales are described in the following sections.

Measuring State and Trait Depression with the STPI

Symptoms of depression vary in severity, from feeling sad or gloomy for a relatively short period of time, to deep despair, hopelessness, extreme guilt, and thoughts of death that could result in suicide. Depressed persons often experience high levels of anxiety, and intense anger, which is turned inward, resulting in low self-esteem. Persistent depression can also lead to behavioral and physical symptoms such as frequent crying, fatigue, insomnia, chronic pain, and excessive gain or loss in weight (Rosenfeld, 1999). Clearly, depression is a complex, multifaceted syndrome with a number of underlying dimensions.
The State-Trait Depression Scale (STDS) was constructed to assess the intensity of feelings of depression as an emotional state and individual differences in depression as a personality trait. In developing the STDS, a pool of 40 items that described the presence or absence of depressive feelings and cognitions was adapted from four widely used measures of depression: the Beck Depression Inventory (BDI: Beck & Steer, 1987; Beck, Steer, & Brown, 1996); the Zung Self-Rating Depression Scale (ZUNG: Zung, 1965, 1986); the Center for Epidemiologic Studies Depression Scale (CES-D: Radloff, 1977); and the Depression Scale of the Multiple Affect Adjective Check List (Zuckerman & Lubin, 1985). The content and wording of each STDS item followed, as closely as possible, the description of depressive thoughts and feelings in the item from which it was adapted.

The 40 STDS items were administered to a large sample of university students, who responded to each item by rating themselves on the same 4-point scales that are used to assess state and trait anxiety and anger with the STAI and STAS. Study participants first rated the intensity of their depressive thoughts and feelings at a particular time, and then rated how often these manifestations of depression were experienced. Factor analyses of responses to the STDS items identified strong state and trait depression-present and depression-absent factors for both males and females. In selecting the best depression-present (dysthymia) and depression-absent (euthymia) items for the 10-item STPI State and Trait Depression Scales, the state and trait items were evaluated in separate factor analyses. Those items with the strongest loadings on the state and trait depression-present and depression-absent factors for both sexes were included in the 5-item STPI State Dysthymia (S-Dys), State Euthymia (S-Eut), Trait Dysthymia (T-Dys), and Trait Euthymia (T-Eut) subscales.

The STPI State and Trait Depression scales and subscales are briefly described in Table 4, along with guidelines for interpreting these measures. The alpha coefficients were .81 or higher for both sexes (mdn. $r = .90$) for the 10-item STPI State and Trait Depression scales, and the 5-item State and Trait Dysthymia and Euthymia subscales. The correlations of the STPI T-Dep scale with the BDI, ZUNG, and CES-D ranged from .72 to .85 (mdn. $r = .78$) for both females and males, which were somewhat higher than the corresponding correlations of these measures with the STPI S-Dep scale (mdn. $r = .655$). Thus, the BDI, Zung, and CES-D assess both state and trait depression (Ritterband & Spielberger, 1996), but appear to be somewhat better measures of more persistent trait-like depressive characteristics.

The STPI T-Dep scale and all three widely used depression measures correlated highly with the STPI T-Anxiety scale, reflecting a high degree of comorbidity of depression with anxiety (Gotlib & Cane, 1989; Mineka, Watson, & Clark, 1998). The STPI S-Dep scale also correlated substantially with T-Anxiety, but to a lesser degree. In addition, the STPI T-Dep and
S-Dep scales and the three widely used depression measures all correlated positively and significantly with the STPI T-Anger scale, but these correlations were substantially smaller than with T-Anxiety. Significant negative correlations of the STPI depression scales with the STPI T-Curiosity scale

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suggested that feelings of depression inhibit curiosity, which is consistent with James’s (1890) and Freud’s (1936) observations of an antagonistic relation between curiosity and fear.

Measuring State and Trait Curiosity with the STPI

Curiosity and exploratory behavior have been linked to a variety of motivational constructs, including instincts, drives, and intrinsic motivation (Cofer & Appley, 1964; Dashiell, 1925; Dollard & Miller, 1950; Harlow, 1953; Voss & Keller, 1983). While this research has been guided by diverse theoretical perspectives and contradictory empirical findings, it is generally agreed that curiosity has a significant impact on thoughts, feelings, and behavior, making the measurement of curiosity an essential requirement in the evaluation of emotions and personality traits.

The State-Trait Curiosity Inventory (STCI) was developed to measure the intensity of curiosity as a transitory emotional state, and individual differences in curiosity as a relatively stable personality trait (Spielberger & Butler, 1971; Spielberger, 1979b; Spielberger, Peters, & Frain, 1981). The STCI S-Curiosity scale requires respondents to report how they feel at a particular moment; the T-Curiosity scale instructs respondents to report how they generally feel. Subjects respond to the S-Curiosity and T-Curiosity scales by rating the intensity and the frequency of occurrence of their thoughts and feelings relating to curiosity and exploratory behavior on the same 4-point rating scales that are used to assess state and trait anxiety, anger, and depression.

Factor analyses of the STCI S-Curiosity and T-Curiosity items have consistently identified relatively independent state and trait curiosity factors (Spielberger & Starr, 1994). High levels of S-Curiosity reflect an intense desire to seek out, explore, and understand novel characteristics of the environment. The STCI T-Curiosity scale assesses individual differences in the disposition to experience S-Curiosity as a reaction to novel or ambiguous stimuli. Persons high in T-Curiosity feel curious more frequently and with higher levels of intensity than those who are low in T-Curiosity. The STCI State and Trait Curiosity scales were included in the 10-item STPI Curiosity scales. These scales are briefly described in Table 4, along with guidelines for interpreting high scores on these measures.

Guidelines for Using the STPI Scales and Subscales

The STPI can be rapidly and easily administered and scored to measure anxiety, anger, depression, and curiosity. If a patient is depressed or experiencing intense anxiety or anger, it is imperative for the examiner or therapist to deal immediately and directly with these feelings. Intense emotions can greatly interfere with judgment and reality testing, and can result in injuries.
to the patient or other persons. Feedback concerning emotional vital signs can also help patients to recognise and report relationships between their thoughts and feelings, and the events which give rise to them, thus facilitating the therapeutic process. The experience of curiosity may be considered as a positive emotional vital sign. As a motivator of exploratory behavior, curiosity often contributes to effective personal adjustment and successful adaptation to environmental stimuli.

Since the management of anxiety, anger, and depression are major concerns in counseling and psychotherapy, the continuous assessment of these emotions can facilitate the treatment process (Novaco, 1979). Barlow (1985) has also consistently emphasised the importance of utilising measures that differentiate between depression and anxiety during the course of treatment. While less attention has been given to the assessment of anger, Deffenbacher’s (1992) research clearly demonstrates that anger can be readily measured during treatment, and that it is important to do so. Continuing to assess anxiety, anger, depression, and curiosity as emotional vital signs during the course of treatment can also provide objective information regarding the effectiveness of the treatment process.

**SUMMARY AND CONCLUSIONS**

The historical background relating to theory and research on anxiety, anger, depression, and curiosity has been briefly reviewed. Darwin observed fear and rage in facial expressions, and considered these to be universal manifestations of anxiety and anger as adaptive products of evolution that contributed to survival. Similarly, Freud regarded anxiety and aggression as universal human characteristics, and both he and Darwin recognised that the interaction of anxiety and anger contributed to depression. Freud also theorised that the insecurity caused by anxiety often motivated curiosity and exploratory behavior.

The construction, development, and validation of the State-Trait Anxiety Inventory, the State-Trait Anger EXpression Inventory, and the State-Trait Personality Inventory to assess anxiety, anger, depression, and curiosity as emotional states and personality traits have been described in detail. Anxiety, anger, and depression are important indicators of psychological distress. These negative psychological vital signs should be carefully assessed in diagnostic evaluations, and continuously monitored in counseling and psychotherapy. Curiosity is a positive psychological vital sign that motivates exploratory behavior, which may contribute to resolving problems. Measuring these emotions as psychological vital signs was considered to be of critical importance in diagnosis and treatment, and for providing clients and patients with timely feedback for linking their intense emotions to the events and experience that gave rise to them.

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The construction of the State-Trait Anxiety Inventory was guided by Cattell’s (1966; Cattell & Scheier, 1958, 1963) conceptual distinction between state and trait anxiety. Separate state and trait instructions were developed in keeping with our intention to use these instructions with the same items to assess the intensity of anxiety as an emotional state and individual differences in anxiety proneness as a personality trait. However, our research on item selection indicated that different state and trait instructions could not overcome the strong linguistic connotations of key words in several items (Spielberger et al., 1970). For example, “I feel upset” and “I am worried” were good measures, respectively, of state or trait anxiety, but were not valid measures of both constructs. Similar limitations were encountered in the selection of items for measuring state and trait anger and depression.

In developing the revised STAI(Form Y), it was noted that the content of several items in the original STAI(Form X) that were adapted from other anxiety measures were more closely related to depression than anxiety (“I feel like crying”), or described overlapping characteristics of these emotions (“I am regretful”). Replacing these by items with content that was clearly related to anxiety (e.g. “I feel frightened”, “I feel nervous and restless”) resulted in improved scale psychometric properties. Additional items describing the absence of anxiety were also included in the revised STAI, replacing several anxiety-present items. These low intensity specificity items increased the sensitivity and range of measurement for the STAI state and trait anxiety scales. Items describing positive feelings indicating the absence of depression were also included in the STPI, increasing the range and sensitivity of the Depression scales.

The wording of each STAI, STAXI, and STPI item for measuring state anxiety, anger, depression, and curiosity reflects different levels of the intensity of these emotional states. For example, in the measurement of anger, “furious” indicates a high level of item-intensity specificity, whereas “annoyed” reflects a much lower level. It was considered desirable to include items with varying degrees of item-intensity specificity in the STPI scales. In developing the STPI, it was also considered important to eliminate items that described psychosomatic symptoms, which might be due to physical injury or medical conditions such as cancer or heart disease.

In summary, a number of important points that were recognised in developing the STAI, STAXI, and STPI are described in this paper. These included: (1) Taking the State–Trait distinction into account in developing measures of emotional states and personality traits; (2) Recognising that the wording of some items may have state or trait connotations that cannot be ameliorated with instructions; (3) Items varying in intensity specificity must be included to assess the wide range in the intensity and frequency of emotional experience; and (4) Items indicating positive feelings or the absence of negative emotions should be included for assessing the full range of an
emotion. Finally, it was noted that physiological symptoms should not be included in measures of emotion since these might be due to unrelated medical conditions such as heart disease or cancer.

Newman, Ciarlo, and Carpenter (1999) have proposed detailed guidelines for psychological tests that are used in diagnosis, treatment, and outcome assessment. These guidelines include clear instructions for administration and scoring, good psychometric properties, usable norms, and a history of successful use in research and clinical practice. The STAI, STAXI, and STPI appear to meet the criteria proposed by Newman et al. (1999). These measures have been used extensively with normal adolescents and adults, and diverse patient populations. The instructions for administration are brief and easy to follow, and the scoring procedures are objective and relatively uninfluenced by examiner bias. All three inventories have excellent psychometric properties and yield results that can contribute to diagnosis, treatment planning, and outcome assessment.

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