The Experience of Stress in Air Travel Situations: Development of the Air Travel Stress Scale

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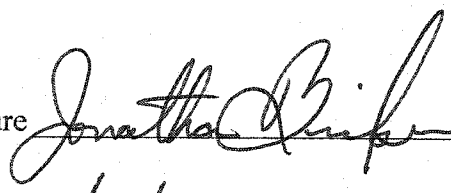
Signature 

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Abstract

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Despite the ubiquity of air travel and anecdotal evidence suggesting that air travel is personally demanding, little is known about the psychological stress of taking an airplane flight. To address this issue, a series of studies was conducted to develop a reliable and valid self-report measure of individual differences in the experience of air travel stress. This measure is called the Revised Air Travel Stress Scale (ATSS-R). In Study 1 (N=615), exploratory factor analysis revealed three factors: a) Air Travel Anxiety, b) Air Travel Anger, and c) Airline/Airport Trust. In Study 2 (N=3309), confirmatory factor analysis with a different sample cross-validated the three-factor structure and showed that the scales had good internal and retest reliability. A scale that totaled the Air Travel Anxiety and Air Travel Anger scales, called the Global Stress Scale, was also retained for subsequent studies in order to explore its potential utility. Study 3 (Ns ranged from 345 to 3309) found that the Air Travel Anxiety and Air Travel Anger scales were correlated with a variety of conceptually-related constructs, including fear of flying, driving anger, and recent hassles. Using two separate samples (Sample 1: N = 925, Sample 2: N = 674), Study 4 showed that the ATSS-R scales predicted stress reported for a specific air travel experience over and

above individual differences measures that are known to be correlated with stress. Finally, across two samples (Sample 1: N = 925, Sample 2: N = 2382), Study 5 consistently demonstrated a number of demographic differences in the ATSS-R scores, including gender, age, income, and how often a person flies. Taken together, these studies provided suggestive evidence for the reliability and construct validity of the ATSS-R. Implications for air travel stress management were discussed.

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Acknowledgements

I sincerely appreciate Professor Irwin Sarason for his excellent mentoring and wonderful sense of humor. In addition, I thank my entire Supervisory Committee for their thoughtful feedback on this project. I am especially grateful to my parents for their love and support.

Dedication

I dedicate this dissertation to people who experience air travel stress.

Introduction

Whether for business or pleasure, over 1.4 billion passengers boarded the world's airlines in 1998 (International Civil Aviation Organization, 2000). On the nation's 10 largest carriers alone there were over 570 million passengers in 1998 and 670 million in 2000 (Air Transport Association, 1999; 2001). Despite the growing number of air travelers throughout the globe, many of whom fly out of necessity, little is known about the stress associated with taking a flight. For at least the past four years, hundreds of worldwide media reports have anecdotally illustrated the stresses of air travel, ranging from the hassles of long airport security lines to "air rage" incidents involving passengers assaulting airline crew members. Moreover, these reports have suggested that air travel stressors such as flight delays and cancellations have important economic consequences in so far as they may lead business travelers to be late, absent, or have poorer job performance (see, for example, Rayner, 1998; Sharkey, 2000; Zoglin & Donnelly, 2002). Overall, these kinds of news reports suggest that air travel is personally demanding and that air travel stress continues to be of great public interest.

Although there are measures of how stress is experienced in general (Sarason, Johnson, & Siegel, 1978) and in similar environments like driving (Deffenbacher, Oetting, & Lynch, 1994), there is no existing psychological measure that reliably and validly assesses how stress is experienced in the context of air travel. Air travel stress may be unique from other forms of stress. Just as test anxiety sensitivity may exist independently of sensitivity to other kinds of stressors (Sarason, 1975), the demanding

situations that air travel presents may lead to stress reactions in a person who would not normally experience stress. One of the unique and potentially-stress inducing qualities of the air travel environment is that it is a situation in which, one the one hand, the primary purpose is to transit from one locale to another, but on the other hand, many different uncontrollable situations can arise which block that primary goal. The uncontrollability characterizing air travel may be what makes air travel stress distinct from the stress elicited by other forms of transportation. For example, whereas drivers are at the controls of their vehicles and are expected to follow the rules of the road, air travelers are not at the controls of the airplane, cannot enter and exit the airplane or their seats when they choose, and must have their belongings and person subjected to search by intrusive security personnel. Moreover, air travel environments present a series of potential adverse events in a concentrated period of time that may provoke anxious and angry reactions from travelers. These events may include long lines, flight delays, and the rude behavior of other passengers. The uniquely uncontrollable and impersonal qualities of this regulated environment may make it difficult for individuals to choose adaptive ways to cope with their stress reactions. Therefore, an air travel-specific measure of stress experience is needed. Such a measure would not only help provide a clear empirical and theoretical understanding of air travel stress, but could also be of value in the assessment of stressed travelers, development of air travel stress management programs, and assessment of intervention outcomes.

This dissertation describes the development of a measure of air travel stress, the Air Travel Stress Scale (ATSS). The initial version of the ATSS measured the general

tendency to perceive common air travel hassles as generally upsetting (Bricker & Sarason, 1999; 2001), with hassles generally defined as "the irritating, frustrating, distressing demands that to some extent characterize everyday transactions with the environment" (Kanner, Coyne, Schaefer, & Lazarus, 1981, p. 2). In these studies, the ATSS was related to trait anxiety and trait anger. Anger-prone men were significantly more likely to report air travel stress, whereas anxiety-prone women were more likely to report air travel stress. The dissertation provides the logical next steps in developing the ATSS. Specifically, several limitations of the ATSS were identified, the most important of which being that it appears to measure a broad, undifferentiated emotional reaction (i.e., feeling upset) to adverse air travel events like flight delays. There are likely to be a variety of specific emotional reactions to such adverse air travel events which each comprise meaningful dimensions of air travel stress. These specific emotional reactions will be discussed later in this Introduction. As will also be discussed in the Introduction, another source of air travel stress may be a traveler's trust in the organizations responsible for his/her comfort and safety: airports and airlines. To expand on the initial conceptualization of air travel stress and build on the prior work on the ATSS, a new three-dimensional air travel stress measure was developed. These dimensions are Air Travel Anxiety, Air Travel Anger, and Airline/Airport Trust. The product of this rethinking is a new scale, the ATSS-Revised (ATSS-R). The following studies: (1) examined the exploratory factor structure, descriptive properties (e.g., skewness, kurtosis) and internal reliability of the ATSS-R; (2) cross-validated the factor structure with a separate sample using confirmatory factor analysis and examined the ATSS-R's retest

reliability, (3) examined how the ATSS-R is associated with and distinguished from a variety of potentially-related individual differences measures, (4) examined the ATSS-R scales' prediction of stress reported for a specific air travel experience, and (5) examined demographic differences in the ATSS-R.

The Construct of Air Travel Stress

What is air travel stress? This section will attempt to define, differentiate, and partition the construct of air travel stress. Air travel stress is broadly defined as the propensity for individuals to experience negative emotional reactions to events that may occur while transiting through airports and being on airplanes. These air travel events are perceived as demanding action from individuals that is beyond their capabilities or making them feel helpless to act. As Sarason points out (cited in Tache & Selye, 1985), stress contains strong subjective elements and is clearly different from the objective stimulus. Hence, given a specific situation, what really is of importance is not so much the objective features of the situation as its perceived impact. Even events that are pleasant for most people might cause discomfort for some individuals. Hence, whether an air travel situation is stressful or not depends on how travelers appraise it and perceive their own abilities to cope with it.

Appraisals of air travel stress are largely a product of personality. This idea is based on Sarason's (1972; 1975) model of test anxiety that has illustrated that a common stressful stimulus (i.e., tests) elicits different levels of stress depending on individuals' personalities. Such sensitivity to experiencing stress in a testing situation is a fairly stable personality trait. Appraisals of air travel stress may be intrinsically tied to underlying

stable personality characteristics. For example, people who have lifelong tendencies to experience anxiety and anger tend to be at higher risk for perceiving a variety of situations as stressful (Carver, Scheier, Weintraub, & 1989; Sarason & Sarason, 2002). To that extent that such longstanding personal characteristics lead travelers to appraise air travel situations in consistent ways, their propensity toward air travel stress would probably remain stable over time. Sarason (1975) has also argued that test anxiety sensitivity may exist independently of sensitivity to other kinds of stressors. For instance, a test anxious person might not experience public speaking anxiety. The implication for air travel stress may be, for example, a person who has high air travel stress could be low in driving stress sensitivity, or even low in general life stress.

The original conceptualization of air travel stress (as used in the ATSS) concerned the assessment of a general negative emotional reaction (i.e., feeling "upset") to uncontrollable air travel situations. Air travel is a situation in which, one the one hand, the primary purpose is to transit from one locale to another, but on the other hand, many different uncontrollable situations may arise which block that primary goal. These uncontrollable situations are common. They include: waiting in line for check-in, going through the security gates, and locating the gate for the flight. In contrast with automobile commuting, travelers are not at the controls of the plane. Having to fly by the airline's schedule means travelers do not control when the plane will leave. The airport can be a demanding environment. Wayfinding can become frustrating for travelers because they may need to walk long distances to find the gate, the baggage claim, or the

exit. At times, travelers can experience problems locating these kinds of places at airports.

By assessing general negative emotional stress reactions (i.e., feeling "upset"), the original conceptualization of air travel stress was consistent with a negative affectivity model of stress. Watson and Clark's (1984) negative affectivity model states that a variety of negative mood states, including both anxiety and anger, comprise the same construct. Those high in negative affectivity will, in any given situation, tend to experience a significant level of distress. It may be that negative affectivity and perceived stress are both simply reflections of the same diffuse distress response. In other words, when subjects report that they perceive stress, this may simply be another way of saying that they are people who have a lot of negative affect. The point is that constructs like stress, anxiety, and anger cannot always be clearly distinguished, and to at least some extent, they may reflect a single underlying construct. For empirical support of this view, Watson and Clark (1984) reviewed common tests designed to measure anxiety, depression, and neuroticism. They found that these scales were highly intercorrelated, some as high as .75. They point out that trait measures of anger correlated in the .50 to .65 range with negative affectivity measures (Buss & Durkee, 1957; Swenson, Pearson, & Osbourne, 1973). Overall, Watson and Clark concluded that these seemingly diverse scales reveal a global dimension of individual differences in negative mood.

An alternative to the negative affectivity model of stress is a model that conceives of stress as distinct emotions elicited by specific situations. As will be discussed below, it is possible that challenging air travel situations elicit distinct emotions, especially anxiety

and anger. For empirical support of this possibility, the first two studies conducted on the ATSS (Bricker & Sarason, 1999; 2001) showed that trait anxiety was moderately related to air travel stress.

The function of anxiety is to alert the individual to the possibility of personal danger. Anxiety is composed primarily of high negative affect, associated with a sense of uncontrollability (Barlow, 1988; 1991). The sense of uncontrollability is focused on present and future threat, danger, or other negative events. There is a perceived inability to predict, control, or obtain desired results in certain upcoming situations or contexts (Barlow, 1988; 1991). One component of anxiety is an anxious affect (Craske, 1991). In the context of air travel, a traveler may feel tense when a flight is delayed or feel nervous when he/she is running late for a flight. A second, and related, dimension of anxiety is anticipatory thoughts (Craske, 1991). These thoughts are focused on contexts that are perceived as uncontrollable (Eysenck, 1967; 1981). These thoughts often manifest themselves as a worry over future negative events that may or may not happen. It is likely that those high in trait anxiety would experience anticipatory thoughts about negative air travel situations. For example, a traveler may worry about catching a cold from a fellow passenger but for several days after the flight his/her health is fine. A third major dimension of anxiety is somatic responses such as a racing heart, feeling keyed up, and muscle tension (Barlow, 1991). In air travel situations one might feel these sensations when seated between people on the airplane. Overall, these dimensions of anxiety, as they might be experienced in air travel situations, are referred to as the construct: "Air travel anxiety: Anxious reactions to adverse air travel events." This

construct is included in the ATSS-R. Furthermore, Study 1 and 2 examined whether Air Travel Anxiety comprises a distinct anxious reaction to adverse air travel events or whether this dimension is best subsumed under negative affectivity.

As will also be argued below, specific air travel situations may also elicit angry reactions. For empirical support of this possibility, the first two studies conducted on the ATSS (Bricker & Sarason, 1999; 2001) showed that trait anger was moderately related to air travel stress. Anger encompasses angry affect, hostile thoughts, and aggressive intentions. First, anger is an affect varying in intensity, from mild annoyance and irritations to rage (Spielberger, Johnson, Russel, Crane, Jacobs, & Worden, 1985). Second, hostile thoughts are an important component of anger. Individuals who have tended to attribute hostility in others' behaviors were more likely to develop coronary heart disease (CHD) later in life (Anderson, Bradley, Young, McDaniel, & Wise, 1985). Hostility includes cognitions focusing on mistrust and the tendency to interpret others' actions as malicious (Cook & Medley, 1954; Barefoot, Siegler, Nowlin, Peterson, Haney, & Williams, 1987). Hostile individuals will tend to have thoughts that demonstrate mistrust and resentment toward others. Hostile people are predisposed to perceive others' behavior as threatening. A third component of anger is aggressive intentions. This concept refers to strong intentions to behave aggressively toward others, even though one may not act on those intentions. Individuals with aggressive intentions may display behavior such as insulting, hitting, or yelling at another person when they believe that person behaves inappropriately (Spielberger et al., 1985).

These dimensions of anger may be manifested in the context of air travel, especially in relation to a traveler's perception of other passengers. For example, compared with travelers who tend not to be anger-prone, travelers with hostile thoughts may have a greater tendency to attribute the behavior of other passengers to rudeness. They may also show a general mistrust of other passengers. Individuals with aggressive intentions may feel a desire to hurt other passengers if they have become frustrated by those individuals' behaviors. Overall, these dimensions of anger, as they might be experienced in air travel situations, are referred to as the construct: "Air travel anger: angry reactions to other passengers' behavior." This construct is included in the ATSS-R. Furthermore, Study 1 and 2 also examined whether Air Travel Anger comprises a distinct emotional reaction to other passenger's behavior or whether this dimension is best subsumed under negative affectivity.

In further support of the overall view that stress can be partitioned into distinct components, a third dimension of air travel stress was found to be a meaningful construct in an analysis that will be described in Study 1 and 2 of the dissertation studies. This dimension was originally conceptualized to reflect one aspect of Air Travel Anger, specifically, a general mistrust of airline/airport personnel and a belief that they are incompetent. As will be shown in Study 1 and 2, this construct was more clearly conceptualized as a traveler's trust that the airlines and airports will ensure his/her comfort and safety. According to Rotter (1967), trust is an individual's characteristic belief in the sincerity, benevolence, or truthfulness of others. Trust is related to competitiveness, envy, resentfulness, vindictiveness, and a lack of feelings toward others

(Gurtman, 1992). There is evidence of modest relationships between measures of trust and those of maladjustment and distress (Rotter, 1980). For example, trust correlated .37 with subjective well-being (DeNeve & Cooper, 1998). The kind of trust that may be relevant to air travel stress is the individual's belief that the airlines and airports can generally be relied on to ensure his/her comfort and security. A person who believes that an airline cannot be trusted to ensure his/her comfort and security could reasonably experience distress while taking a commercial airplane flight. A passenger's trust of airlines and airports is important because ultimately his/her safety is in their hands.

Potential Individual Differences Correlates of Air Travel Stress

As stated earlier, appraisals of air travel stress may be intrinsically tied to underlying stable personality characteristics. This possibility raises the question: what are potential individual differences correlates of air travel stress? Three basic kinds of individual differences factors may be related to air travel stress: global personality traits, general measures of stress and coping, and situation-specific stress measures. Global personality traits include negative affectivity, trait anxiety, trait anger, and optimism. General measures of stress and coping include general life stress, recent hassles, and coping styles. Relevant situation-specific factors include the fear of flying, driving anger, and state stress experienced while in an air travel situation. Each of these three kinds of individual differences factors will be discussed in this section. The relationship between these individual differences factors and air travel stress was examined in Study 3.

Trait anxiety is a global personality factor that may be related to air travel stress. In contrast with a state, a trait is a relatively stable personal characteristic. Trait anxiety

is defined as the propensity to experience feelings of tension and apprehension, and to have a heightened autonomic nervous system activity (Spielberger, Gorsuch, & Lushene, 1970). Trait anxiety correlated .49 to .52 with health complaints (e.g., headaches, quality of sleep) for the past 12 months (Kohn, Lafreniere, & Gurevich, 1991). In addition, trait anxiety was related to higher levels of subjectively appraised overall stress and recent hassles (Kohn et al., 1991). Trait anxiety has correlated with trait anger in the range of .4 to .6 (Jorgensen & Richards, 1989). Although Air Travel Anxiety should be related to trait anxiety, air travel is a unique environment and the demanding situations that air travel presents may provoke anxiety in a person who would not normally become anxious. In contrast, because Air Travel Anger and Airline/Airport Trust are conceptualized as measuring anger and trust in air travel situations, these scales should be less correlated with trait anxiety than Air Travel Anxiety.

Trait anger may also be associated with air travel stress. Trait anger is a personality disposition, defined in terms of the frequency of angry states experienced over time (Spielberger, Jacobs, Russell, & Crane, 1983). Trait anger has been associated with driving anger (Deffenbacher, Huff, Lynch, Oetting, & Salvatore, 2000) and neighborhood stress (Ewart & Suchday, 2002). Trait anger is believed to contribute to coronary heart disease (CHD), among other physical illnesses (Anderson et al., 1985). Furthermore, anger and hostility have been hypothesized to be a central feature of posttraumatic stress disorder because they are a core component of survival responses in traumatic situations (Beckham, Moore, & Reynolds, 2000; Chemtob, Novaco, Hamada, Gross, & Smith, 1997). People who tend to become angry in general should be more likely to become

angry in air travel situations. However, air travel is a unique environment and the situations that air travel presents may provoke anger and hostility in a person who would not normally become angry. In contrast, Air Travel Anxiety is believed to measure the propensity to react anxiously, as opposed to angrily, to adverse air travel events. Therefore, trait anger should be less correlated with Air Travel Anxiety than with Air Travel Anger.

In stress research, attention has also focused on individual differences in negative affectivity. Negative affectivity is related to more frequent daily stressors (Bolger & Zuckerman, 1995; Marco & Suls, 1993). Negative affectivity may be an important moderator of stress reactivity, increasing the intensity of negative mood responses to minor stressors (Bolger & Zuckerman, 1995; Marco & Suls, 1993). Air Travel Anxiety would probably be moderately and positively correlated with negative affectivity. There are several reasons for this hypothesis. Although negative affectivity encompasses anxiety, it also encompasses a wide range of other negative emotions, including anger, sadness, and guilt. Moreover, the Air Travel Anxiety scale assesses anxiety within a particular situation, whereas negative affectivity measures the predisposition to experience negative emotions across situations. Several studies have shown that trait negative affectivity scales were moderately correlated (in the .30 to .50 range) with self-report stress measures (Watson & Pennebaker, 1989;Watson, Pennebaker, & Folger, 1987). Also, the standard ten-item instrument of negative affectivity, the PANAS-NA (Watson, Clark, & Tellegen, 1988), includes only two items (i.e., hostile and irritable) that measure angry affect whereas it has four items (i.e., scared, nervous, jittery, and

afraid) that measure anxious affect. Therefore, negative affectivity should be more related to Air Travel Anxiety than Air Travel Anger.

Optimism has been shown to mitigate the effects of stressors on psychological functioning. Optimism is conceived of as a generalized expectancy for favorable or unfavorable outcomes (Scheier & Carver, 1985). In the domain of health, Scheier and Carver (1985) postulated that optimists are able to cope with stressful events more successfully than pessimists and also engage in more health-enhancing behaviors, thus assuring their better health. Using their self-report measure of optimism—pessimism, the Life Orientation Test (LOT; Scheier & Carver, 1985), these investigators have amassed considerable evidence in support of these hypotheses. For example, Scheier & Carver (1993) found that optimists reported using more effective methods in coping with stressful situations than pessimists report using. Dispositional optimists have shown moderately less mood disturbance in response to a number of different stressors, including adaptation to college (Aspinwall & Taylor, 1992; Scheier & Carver, 1992), and breast cancer surgery (Carver et al., 1993). These findings may be attributed to optimists' belief that discrepancies between their goals and their current attainment will be resolved, minimizing defeat-related moods such as anxiety and anger (Carver & Scheier, 1985). Optimists probably view the problems they experience in air travel situations as inconveniences and try to make the best of an unpleasant situation. However, because some air travel problems are often uncontrollable, the belief that things will get better would have only a modest influence on reducing air travel stress.

A number of individual difference measures of stress and coping may be associated with air travel stress. These include measures of stressful life events, hassles, and coping styles. Stressful life events have been studied in relation to a host of social, psychological, and medical outcomes (Cohen & Williamson, 1988). Felner et al. (1986) has argued that major life events are best conceptualized as markers of a more dynamic transitional process. Major life events, which are distal to the person's immediate life circumstance, may exert some of their impact through the exacerbation of more proximal stressors and demands (e.g., hassles) with which the person must attempt to cope (Felner et al., 1986). It is possible that severe negative life events may lead an individual to have fewer resources with which to cope with the hassles of air travel.

Substantial literature suggests that everyday hassles or mundane irritants negatively affect physical and mental health (e.g., Burks & Martin, 1985; Kanner et al., 1981; Weinberger, Hiner, & Tierney, 1987). Hassles have been defined as "the irritating, frustrating, distressing demands that to some extent characterize everyday transactions with the environment" (Kanner et al., 1981, p. 2). Hassles have been related to perceived stress, minor ailments, and psychiatric symptomatology (Kohn et al., 1991). The main difference between the ATSS-R and daily hassles is that the ATSS-R measures the hassles of a particular situation whereas daily hassles scales measure hassles across a variety of life experiences. People who perceived hassles in general are probably likely to perceive hassles while traveling by plane.

People may respond to the stress of air travel in a variety of ways. The process of executing a response to stressful events is called coping (Carver et al., 1989). Folkman and colleagues (Folkman & Moskowitz, 2000) stated that coping has multiple functions, including the regulation of stress. In summarizing the literature, they also noted that coping is influenced by a variety of personality dispositions including optimism (for a review, see Carver & Scheier, 1999) and neuroticism (McCrae & Costa, 1986).

There are number of ways people cope with stress that may be maladaptive. One of these is the use of substances. The use of substances is conceptualized as a way of mentally avoiding stress (Carver et al., 1989). Tension reduction and stress-response dampening theories posit that substance use is a functional behavior directed at reducing stress and tension. Individuals who are particularly reactive to stress have been prone to use substances to cope (Greeley & Oei, 1999). Substance use has been associated with more harmful appraisals of upcoming stressors (Carver & Scheier, 1994). The uniquely uncontrollable and impersonal qualities of the air travel environment may make it difficult for individuals to choose adaptive ways to cope with their stress reactions. Because travelers may believe that there are few adaptive coping strategies available in that environment, stressed air travelers may be at risk for using unhealthy coping strategies like substance use.

A second potentially maladaptive way of coping with air travel stress is venting emotions. Venting is defined as the tendency to focus on whatever distress or upset one is experiencing and to freely express those feelings (Scheff, 1979). Carver et al. (1989)

have argued that such a response may sometimes be functional, especially in uncontrollable stressful situations. For example, there may be mental benefits for a person who vents as a way of mourning the loss of a loved one. On the other hand the distress of venting may also distract people from active coping efforts and movement beyond the distress. Moreover, venting has been correlated with higher levels of psychological and physical complaints (Day, 2001). Certain people may be more likely to cope by venting than others: venting has been associated with higher levels of trait anxiety and the perception of stressful situations as uncontrollable (Carver et al. 1989). Presumably, the hassles of air travel may present opportunities for people to cope by complaining about adverse air travel events, other passengers' behavior, and their experiences with airline/airport personnel.

It is arguable that acceptance is a functional coping response, in that a person who accepts the reality of a stressful situation would seem to be a person who is engaged in the attempt to deal with that situation (Carver et al, 1989). One might expect acceptance to be particularly important in circumstances in which the stressor is something that must be accommodated to, as opposed to circumstances in which the stressor can easily be changed. Acceptance has been related to higher levels of optimism and lower levels of anxiety (Carver et al, 1989). If people believe that there is nothing they can do to change the stressors of air travel, then the tendency to accept these problems may help ameliorate stress. If there is nothing that can be done, they may stop worrying about air travel stressors.

Positive reframing is a potentially adaptive coping technique that refers to mental strategies for reframing a stressful situation in a positive light (e.g., seeing a glass half full as opposed to half empty). Positive reframing is often taught and encouraged in cognitive behavioral therapy (e.g., Fava, Rafanelli, Cazzaro, Conti, & Grandi, 1998). Positive reframing has been associated with positive affect after the occurrence of stressful events (for a review, see Aldwin, 1994). Positive reframing was prospectively associated with increases in positive affect, controlling for the previous month's positive affect (Moskowitz et al., 1996). The tendency to look for the positive features of a challenging air travel situation may help ameliorate air travel stress. People who tend to cope in this way may believe the stressors of air travel are not as bad as they seem.

Active coping refers to efforts directed at managing stressful situations. It includes strategies for gathering information, making decisions, planning, and resolving conflicts and instrumental task-oriented actions (Lazarus & Folkman, 1984). Active coping can be very meaningful because it involves identifying situation-specific goals that engage the individual and may make it possible for an individual to experience situational mastery and control (Carver & Scheier, 1998). It may be that certain kinds of air travel stressors can be effectively managed with an active coping style. In particular, the adverse air travel events that evoke Air Travel Anxiety may be changed by a variety of practical strategies so long as a person is resourceful and aware of the operations of the air travel system and his/her rights as a passenger. For example, if a flight is delayed it is reasonable to imagine that an active coper would seek out ways to re-book him/herself on a flight leaving sooner using the same or another airline.

One situation-specific factor that may be associated with air travel stress is the fear of flying. Fear of flying appears to be a heterogeneous phenomenon that likely includes the fear of heights, fear of injury, fear of confinement, claustrophobia, fear of loss of control, or even a combination of these (Van Gerwen, Spinhoven, Diekstra, & Van Dyck, 1997). Anticipation of danger motivates people to avoid air travel-related stimuli associated with possible physical harm. For instance, flying phobics may tend to avoid being on airplanes and others may avoid even the thought of flying because it reminds them of the possibility that they may die in a plane crash. Perhaps Air Travel Anxiety would be strongly correlated (e.g., r = .5 to .6) with the fear of flying. One speculation is that the more that people fear flying the more likely they will experience anxious reactions to adverse air travel situations like flight delays. However, Air Travel Anxiety may to some extent be different from fear of flying because, as suggested by Van Gerwen et al. (1997), the fear of flying encompasses multiple fears (e.g., fear of heights, confinement) and the central focus is on the potential for physical harm in a flying situation. Flying phobia should also be weakly related to Air Travel Anger because flight phobics, by definition, tend to feel afraid and not angry.

Another factor that may be related to air travel stress is driving anger. Driving anger is the propensity to become angry while driving an automobile (Deffenbacher et al., 1994). Trait driving anger has correlated positively with the frequency and intensity of state anger while driving, driving-related aggression, risky driving behavior, and accident-related variables. It is speculated that Air Travel Anger would be moderately related to driving anger. There are several reasons for this hypothesis. On the one hand, air travel

anger and driving anger both refer to angry reactions to other people's behavior in travel environments. However, air travel and driving can potentially provoke different levels of anger. In contrast with drivers, air travelers are forced to be in very close proximity to other passengers, often for more than several hours. Moreover, there are no physical barriers (like an automobile) between the traveler and other passengers and airline/airport personnel. Once on the airplane (or, as some may argue, beyond the security checkpoint), travelers must stay in close proximity to the other passengers.

A third situation-specific factor of interest is state stress. States are short-term, reversible conditions of people that may show intraindividual variability over time (Cattell, 1988; Nesselroade & Bartsch, 1977). State stress is a transitory condition involving generally unpleasant feelings that include fear and anger (Endler, 1983; Spielberger, 1983). State stress tends to be higher on days involving higher levels of stressful events (Affleck, Tennen, Urrows, & Higgins, 1994; Clark & Watson, 1988; DeLongis, Folkman, & Lazarus, 1988). In addition, daily hassles have been show to be associated with current and future levels of state stress (Marco & Suls, 1993). State stress is highly correlated with trait anxiety (i.e., $r = .5$ to .7; Endler, Cox, Parker, Bagby, 1992). People who possess high Air Travel Anxiety and Air Travel Anger should presumably experience high state stress when in an air travel situation. In contrast, to the extent that Airline Airport/Trust measures hostile beliefs, as opposed to angry emotions, this scale should be weakly related to stress experienced during a specific air travel experience.

Finally, an important part of assessing the quality of a self-report measure is to observe its correlation with social desirability. Social desirability is defined as a general personality trait, namely, the tendency to give socially desirable and intentionally distorted responses in self-description (Edwards, 1970). It is hoped that the ATSS-R would be no more than weakly related to social desirability because a desirable quality of a self-report individual difference scale is that the scores reflect the true feelings of the respondent. The correlation between the ATSS-R and social desirability scales is expected to be in the -.15 to -.25 range, consistent with the correlations observed with other stress scales (Ruehlman, Lanyon, & Karoly, 1999).

Potential Demographic Differences in Air Travel Stress

Demographics may represent an important set of personal characteristics associated with air travel stress in conceptually meaningful ways. One demographic factor may be gender. The sociocultural model of gender differences posits that social and cultural factors directly produce gender differences in personality traits. According to one interpretation of the sociocultural model (Eagly, 1987; Eagly & Wood, 1991), sex differences in social behavior stem from gender roles, which dictate the behaviors that are appropriate for men and women. Appropriate roles for women include free expression of anxiety and trust whereas more appropriate roles for men are free expression of anger. For support of this view, Feingold (1994) in a meta-analysis found that males scored higher than females on anger whereas females scored notably higher than males on anxiety and trust. Another interpretation of the sociocultural model assumes that personality scales are not perfectly valid measures of their constructs (Feingold, 1994).

Women may believe that anxiety, for example, is a socially acceptable characteristic of women and therefore are more willing to report themselves to be anxious. Men, by comparison, may have been socialized to believe that "wimps" are anxious and therefore underreport their level of anxiety. If so, a gender difference on a personality scale of anxiety may not necessarily reflect a gender difference in the anxiety construct. Based on this prior empirical evidence (Feingold, 1994), it is reasonable to speculate that women would report higher levels of Air Travel Anxiety and Airline/Airport Trust whereas men would report higher levels of Air Travel Anger. Such a result may partly reflect gender differences in social desirability.

A second demographic factor of interest is age. There is empirical evidence that more recent birth cohorts score higher on anxiety measures than later birth cohorts (Twenge, 2000). According to Twenge (2000), decreases in social connectedness and increases in environmental dangers (e.g., divorce rates, crime rates) may be responsible for higher levels of anxiety among younger birth cohorts. Consistent with Twenge's (2000) hypothesis and the past empirical evidence, it is hypothesized that younger travelers are more likely to experience Air Travel Anxiety than older travelers.

A third demographic factor of interest is income. Considerable evidence has shown that lower socioeconomic status (SES), assessed with measures of educational attainment, income, and occupational status, tends to be associated with a higher prevalence of psychiatric disorders among children, adolescents, and adults (e.g., Kessler, Foster, Saunders, & Stang, 1995). Although air travel stress is not a psychiatric illness, this association is relevant because air travel stress is conceptualized as a psychologically

distressing experience. Two major theories have been advanced to explain the association between income and psychological distress. The first theory, Social Causation Theory, hypothesizes that environmental adversity, disadvantage, and stress associated with low SES contribute to the onset of stress (e.g., Hollinghead & Redlich, 1958). In contrast, Social Selection Theory hypothesizes that constitutional and environmental factors contribute to the onset of distress, which in turn cause individuals to experience downward drift in SES or to fail to rise out of low SES (e.g., Wender, Rosenthal, Kety, Schulsinger, & Welner, 1974). Research has provided support for both theories (e.g., Catalano, Dooley, Wilson, & Hough, 1993; Dodge, Pettit, & Bates, 1994; Shaw, Winslow, Owens, & Hood, 1998). Consistent with these two theories and their empirical support, in the context of air travel stress, it is likely that people with higher levels of income will report lower levels of Air Travel Anxiety and Air Travel Anger, and higher levels of Airline/Airport Trust. Because there is support for both theories, either causal direction of these relationships would provide evidence for the construct validity of the ATTS-R.

Several demographic factors describing an individual's air travel patterns may be related to air travel stress. These factors include whether a person is a business or a leisure traveler, how often a person flies domestically, and how often a person flies internationally. Because no prior studies have explored the relationship between these factors and *any* kind of stress, much less air travel stress, several speculations about these factors can be made. First, a business traveler has more at stake when he/she flies. A cancelled flight may mean missing an important meeting and perhaps a lost business

opportunity. Therefore, business travelers probably learn more quickly than leisure travelers about ways to anticipate and solve these kinds of problems. Business travelers are probably at less risk for Air Travel Anxiety because they may know adaptive ways to respond to the adverse air travel events assesses by the Air Travel Anxiety Scale. For instance, a business traveler may be more likely than other travelers to cope with a flight delay by re-booking him/herself on another flight. On the other hand, business travelers would probably have a much more difficulty trying to change other passenger's behavior. Thus, business travelers' tendency to try to fix a situation they cannot fix (i.e., other passengers rude behavior) may place them at higher risk for Air Travel Anger. Regarding Airport/Airline Trust, a business traveler probably would expect more from the airports and airlines. A business traveler depends on them for this livelihood. Thus, minor failures by the airlines and airports (e.g., a baggage screener allowing a potentially harmful object to pass through security) would probably quickly erode his/her trust in their ability to ensure his/her service and safety. Therefore, being a business traveler is probably a risk for factor for low Airport/Airline Trust.

A traveler who has recently flown outside of the United States may be familiar with the operating standards of airlines and airports in Western Europe and some Asian countries—popular destinations for international travelers. Data show that airports and airlines in Western Europe and parts of Asia are perceived by travelers to have higher security and service standards than airports and airlines in the United States (IATA, 2000). Thus, by comparing his/her usual experience with airlines and airports in the US with those in these countries, the US-based international traveler likely develops higher

expectations. Similar to the business traveler, but for these different reasons, the US-based international traveler would probably have less trust in the airlines/airports' abilities to ensure his/her comfort and safety. In contrast, the US-based domestic traveler would have little with which to compare his/her experiences. Hence, being a US-based domestic traveler would probably not predict Airline/Airport Trust. Finally, more frequent travel in the past year (whether international or domestic) should probably be a protective factor for Air Travel Anxiety. By virtue of their more recent and frequent exposure to air travel environments, these travelers probably have learned ways to manage the problems that cause air travel anxiety. These travelers may be more resourceful and aware of the operations of the air travel system and their rights as passengers. But certain characteristics of international travelers may also make them vulnerable to feeling distressed when they fly. For example, international travelers may be at higher risk for Air Travel Anger. One reason is that because international travel tends to be more expensive, these travelers may be wealthier than other travelers. Thus, for social class reasons they may have higher expectations of certain kinds of polite behavior from other passengers.

Development of the Air Travel Stress Scale

An initial version of the Air Travel Stress Scale (ATSS) was developed to assess the general tendency to perceive common air travel hassles as demanding and challenging. This perception was expressed with a broad, undifferentiated emotional reaction (i.e., feeling upset) to adverse air travel events like flight delays (Bricker & Sarason, 1999; 2001). The first study (Bricker & Sarason, 1999) examined the factor

structure and internal consistency of the ATSS. This study also explored the ATSS's association with two personality traits, namely, trait anxiety and trait anger.

Initially, 26 items were written for the ATSS based on 37 brief interviews with travelers in waiting areas at several US airports. In the interviews, travelers were asked what situations usually caused them to feel upset when traveling through airports and flying on planes.

Participants were 329 volunteers (206 men and 123 women), travelers employed at Seattle and San Francisco offices of a major management consulting company. After being solicited by the company's human resources department and entering a randomly assigned password, respondents completed questionnaires on the study's web site (secured with 40-bit encryption software). Participants completed an electronic informed consent form explaining that their data would be anonymous. In addition to the ATSS, participants also completed: a demographics survey; Brief Symptom Inventory: Anxiety Subscale (BSI-ANX; Derogatis, 1993); State-Trait Anger Expression Inventory: Trait Subscale (STAEI-T: Spielberger, 1988).

In a principal components factor analysis, the scree plot and the eigenvalues provided strong evidence for an 11 item, one-factor solution (loadings ranged from .59 to .74; see Table 1) accounting for 40% of the total variance. This factor (Cronbach alpha = .85) was labeled Air Travel Stress because it measured a broad, undifferentiated emotional reaction (i.e., feeling upset) to adverse air travel events. Given that the items are all phrased in the same way, this one-factor solution was not surprising.

There was a moderate, positive correlation between the ATSS and the BSI-ANX (r = .39, p<.01). Among women, the BSI-ANX was strongly related to the ATSS (r=.52, p<.01) but moderately related for men (r = .29, p<.01). There was a small, positive correlation between the ATSS and the STAEI-T (r = .21, p<.05). The STAEI-T was moderately related to the ATSS among men (r=.32, p<.05) but unrelated among women (r = .18, p=.20).

The second study (Bricker & Sarason, 2001) cross-validated the ATSS's internal consistency and factor structure with a separate sample of business travelers. Participants were 264 (164 men and 100 women) volunteers, travelers employed in the US and Canada. The study results showed the identical one-factor solution with similar Cronbach internal consistency (.83). There was again a small, positive correlation between the ATSS and the STAEI-T (r = .18, p<.05).

These two studies suggested that air travel stress is a coherent personality trait that can be assessed reliably. In these studies, the measure was related to trait anxiety and trait anger. Anger-prone men were significantly more likely to report air travel stress, whereas anxiety-prone women were more likely to report air travel stress.

Table 1. *ATSS scales: one-factor solution from principal axis factor analysis*

Loading	Item
.74	I feel upset if my plane takes off or lands late.
.69	I feel upset if I miss a connecting flight.
.69	I feel upset if I wait for a car rental/hotel/airport shuttle.
.68	I feel upset if I wait in line at a car rental/hotel/airline check-in.
.67	I feel upset if I am given wrong directions.
.66	I feel upset if my baggage is hand inspected by security people.
.64	I feel upset if the airplane is crowded.
.62	I feel upset if the airport is crowded.
.58	I feel upset if I get lost while trying to find a place.
.49	I feel upset if I have trouble finding the gate for my plane.
.49	I feel upset if my baggage is lost.

Revision of the Air Travel Stress Scale

The ATSS appears to assess the general tendency to perceive adverse air travel events like flight delays as demanding and challenging. This perception was expressed with a broad, undifferentiated emotional reaction (i.e., feeling upset; Bricker & Sarason, 1999; 2001). But, as discussed earlier, there are likely to be a variety of specific emotional reactions to such adverse air travel events which each comprise meaningful dimensions of air travel stress. This section describes the effort to revise the ATSS with the primary goal to design two scales: Air Travel Anxiety and Air Travel Anger.

To develop the new dimensions of ATSS and also examine how respondents interpreted the original ATSS, fifty-seven (31 men and 26 women) Seattle Tacoma Airport travelers participated in brief interviews focusing on content validation. In these interviews, participants were first asked the following open-ended questions:

1) What concerns you when you are getting ready for a flight or in a flight situation? What thoughts usually go through your mind? (If a person had trouble describing his/her thoughts, the interviewer would say: What images or memories do have in these situations? What do these situations mean to you? Describe them like a statement or a question. Questions were designed to elicit anticipatory cognitions.)

2) In what kinds of air travel situations have you felt tension, nervousness, or anxiety? (Designed to elicit situations that bring on anxious affect)

3) Describe any times when airlines, airports, their employees, or other passengers did things that were irritating. (Designed to elicit hostile attributions.)

4) Describe any air travel situations in which you felt like yelling or hitting someone. (Designed to elicit aggressive intentions.)

Following the open-ended questions, participants were read aloud each of the 11 items of the ATSS and asked to describe what each statement means in their own words. On a five point scale, participants also rated the items for clarity (i.e., grammar, wording)

and representativeness (i.e., how much does this statement seem to describe an upsetting air travel situation). The ratings for clarity ($\underline{M}$ = 4.1, $\underline{SD}$ = .3) suggest the items were clear to respondents. The ratings of representativeness ($\underline{M}$ = 3.9, $\underline{SD}$ = .5) suggest that the items adequately described upsetting air travel situations.

However, when respondents repeated the items in their own words, one problem was revealed. Participants had multiple interpretations of the word "upset." One person said it meant "crying," twenty-one said it meant "angry," three said it meant "sad," ten thought it was some combination of all these emotions, and the rest of the respondents thought it had something to do with anxiety. The word "upset" appeared to encompass anxiety, anger, and some combination thereof. This word would pose a problem for the ATSS-R because it is designed to separately measure the main dimensions of anxiety and anger. As a result of this finding, the words used to denote anxious affect and angry affect in the ATSS-R were derived from Roget's Thesaurus. Based on an examination of the themes of the responses to the open-ended questions, the items comprising the new constructs of air travel stress were developed and resulted in a 48-item scale. The initial version of the ATSS-R can be found in Appendix A.

The Present Studies

For the dissertation, five studies (Studies 1-5) examined the factor structure, reliability, and construct validity of the ATSS-R. Study 1 explored the factor structure, descriptive properties (e.g., skewness, kurtosis) and internal reliability of the ATSS-R. Study 2 confirmed the factor structure with a separate sample and examined the ATSS-R's retest reliability. Study 3 examined how the ATSS-R is associated with and

distinguished from a variety of potentially related individual difference measures. Study 4 examined the ATSS-R scales' association with stress from an actual flight experience. Study 5 examined demographic differences in air travel stress.

Study 1: Exploration of ATSS-R Factor Structure

Study 1 explored the factor structure and psychometric properties of the ATSS-R using a general sample of air travelers. As was described by Nunnally (1978), factor analysis is the testing of various mathematical models to determine whether the variables tested in the models relate to underlying factors, or, constructs. Air travel stress is a construct because it is an abstract notion that does not exist as an isolated, observable dimension of behavior. The specific items of the ATSS-R were hypothesized to reflect a broader class of measures of Air Travel Anxiety, Air Travel Anger, and Airline/Airport Trust. One of the major tests of a construct's validity is in determining to what extent hypothesized measures of a construct measure the same thing or break up into clusters of variables that measure different things. "The clustering of variables as done in factor analysis constitutes a very important aspect of construct validation. This is particularly true if the construct concerns measures of individual differences" (Nunnally, 1978, p. 328-329). Similarly, Kaufman and Kaufman (1998) state that the "factor structure is probably the most important evidence of a theory-based, multi-scale test's construct validity" (pp. 90—95). The essential question of construct validity is: does the instrument validly measure what it is purported to measure? (Nunnally, 1978). Study 1 used exploratory factor analysis as a first test of the possible underlying constructs of the ATSS-R.

Exploratory factor analysis, the analysis performed in Study 1, was guided by hypotheses about the number and kind of factors that might be derivable from a collection of variables (Nunnally, 1978). Two factor analysis models were tested. First, a model

was tested to determine whether Air Travel Anxiety and Air Travel Anger represent two distinct constructs. Second, a model was tested to determine whether Air Travel Anxiety and Air Travel Anger reflect a single construct that might arguably be called negative affectivity. As discussed in the Introduction, the negative affectivity hypothesis states that negative moods such anxiety, anger, and sadness all reflect a single emotional construct (Watson & Clark, 1984).

Method

Participants

Participants were 615 passengers at the Seattle Tacoma Airport directly recruited by two trained research assistants in May to June 2001. The recruitment rate was 71.4% (615/861) overall. Participation was anonymous. The demographic characteristics of the participants are presented in Table 2. These characteristics were representive of travelers at the Seattle Tacoma Airport (IATA; 2000). The participants were primarily White or Caucasian, married, and spanned a wide age range. Nearly half were business travelers and the other half were primarily leisure travelers.

Procedure

The research assistants were two retired junior high school principals who for the past two years have worked as data collectors in classroom-based surveys of children's cigarette use. One research assistant was male and the other was female. The research assistants wore official airport photo identification and solicited travelers' participation by verbal request. The assistants were trained to use the following script:

"Excuse me: I'm with a study being conducted by the University of Washington. Today I'm conducting a survey of air travelers' experiences that will take ten to fifteen minutes to complete. Would you be willing to participate?"

When a traveler agreed to participate in the study while at the airport, the research assistants give the participant an informed consent form and the survey packet. The research assistants remained present within the general vicinity of the participants so as to answer any questions participants may have had. When a participant completed the survey packet, a research assistant took the packet and thanked the participant for being in the study. Participants who elected to complete the survey at a later time were given a self-addressed stamped envelope and mailed in their survey. There were 41 (6.7% of the total sample) who mailed in their survey. Fifty-two percent (41/79) of those who elected to complete the survey at a later time actually mailed in their survey. T-tests revealed that these 41 participants did not differ ($p>.05$) from the rest of the sample on demographic characteristics. All of the study procedures were approved by the University of Washington Human Subjects Review Committee.

Measures

Two measures were administered for this study:

Demographics: a nine-item survey measuring demographic characteristics of the participants. The demographic characteristics measured were gender, age, ethnicity, marital status, highest education level, and gross household annual income. Three

Table 2. *Demographic characteristics of Study 1's participants*

Characteristic	
Male (%)	52.6
White or Caucasian (%)	84.0
Married or with Partner (%)	61.8
More than High School Education (%)	79.9
Age (*M*)	43.5
Age (Range)	11 to 86 years
Air Travel Patterns for the past 12 months	
Number of domestic roundtrips (*Mdn*)	4.0
Flies for business at least half time (%)	45.6

demographic factors describing a participant's air travel patterns for the past 12 months were also assessed. These factors were: whether a participant tended to fly for business or pleasure, number of domestic roundtrip flights, and number of international roundtrip flights. The Demographics survey is contained in Appendix C.

Air Travel Stress Scale-Revised: a forty-eight item self-report instrument assessing the extent to which an individual is susceptible to experiencing air travel stress. Respondents were asked to rate the extent to which each item is true for him/her on a response scale ranging from -3 (strongly disagree) to +3 (strongly agree). A sample item was "I fear that I will miss a connecting flight." The survey was labeled "Air Travel Experiences Scale" so as not to reveal the intent of the survey and possibly bias participants' responses.

Statistical Analysis

A principal components exploratory factor analysis computation was conducted on the ATSS-R. The analysis explored the factor structure of the ATSS-R. The direct oblimin method was used to rotate the components to obtain the optimal solution. This oblique method of rotation permits the obtained components to correlate and, therefore, follows the assumption that the underlying factors of the ATSS-R are related yet distinct from each other. Finally, Cronbach alpha internal consistencies of the scales were computed. Cronbach's alpha measures how well a set of items measures a single unidimensional latent construct.

Results

The distribution of each of the 48 ATSS-R items was examined and several of the items were severely skewed. Seven items were removed from the item pool because over 50% of subjects' responses to these items fell on one of the two extreme response options. These items appeared to tap the extent to which the respondent experienced extreme levels of anger while traveling and the extent to which a respondent felt positive emotions when positive air travel events occurred. For example, one item read: "I would feel like hitting a flight attendant who stopped serving me alcohol" and another item read "I feel content when there is ample space to store my carry-on bags." It is not surprising that these items tended to yield extreme responses. It is reasonable that very few people would be willing to admit that they would hit a flight attendant. Most people appeared to feel good when good things happen.

Exploratory Factor Analysis

Exploratory principal components factor analysis was then conducted, using oblimin rotation to allow for correlations among the factors (Lee & Comrey, 1979). The analysis revealed four distinct factors with eigenvalues greater than 1.0, three of which were easily interpreted. (The fourth factor was not easily interpreted and had no item loading that exceeded .30. The other items in the analysis loaded on factors with eigenvalues less than 1.0). The three factors were comprised of 23 items that explained 55% of the total variance (see Table 3). As can be seen, these item loadings ranged from .47 to .79.

Table 3. Three factor model of ATSS-R scales: Principal axis factor analysis (oblimin rotation)

Item	Factor loadings		
Air travel anxiety: Anxious reactions to adverse air travel events			
My body feels tense if my flight is delayed.	**.71**	.17	-.12
I feel shaky if the airport is crowded.	**.67**	.03	-.05
I feel shaky if I have to sit on the tarmac/taxiway for a long time.	**.63**	.08	-.09
I worry other passengers may do something harmful on the plane.	**.61**	.06	-.10
I feel panicky when I am running late for a flight.	**.61**	.17	-.06
I fear that I will miss a connecting flight.	**.58**	.13	-.10
I fear that my baggage will be lost/stolen/damaged.	**.56**	.12	-.20
I worry that my flight will be cancelled.	**.56**	.11	-.12
Air travel anger: Angry reactions other passengers			
I want to say mean things when other passengers take up part of my personal space on the plane.	.11	**.69**	-.14
I feel like screaming at passengers who bring aboard a lot of carry-on baggage.	.16	**.68**	-.11
I would feel resentful if I had to sit near loud/talkative passengers.	.23	**.60**	-.07
It would bother me if other passengers tried to board the plane before their row was called.	.20	**.60**	-.01
I feel annoyed when babies/small children are on the plane.	.07	**.54**	-.13
It bothers me when other passengers want special treatment.	.02	**.47**	.00
I would be annoyed if I had to sit near ill passengers.	.24	**.47**	-.05
Airline/Airport Trust: Belief that airline/airport will ensure comfort and security			
Airlines give me the service I deserve.	-.07	-.15	**.79**
I trust the airlines.	-.22	.00	**.77**
I think airlines appreciate their passengers.	-.08	-.14	**.77**
I feel satisfied with airlines service overall.	-.10	-.12	**.74**
I think airline personnel are doing the best job they can.	-.08	-.04	**.72**
Current airport security measures make me feel safe about flying.	-.12	-.05	**.69**
Current airport security measures deter hijackings or bombings.	-.02	-.06	**.63**
I sometimes think airline/airport personnel are unfriendly or unhelpful.*	-.13	-.21	**.60**
Eigenvalue	3.3	2.3	4.3
% variance explained	18.1	14.7	22.3

Two of the three latent constructs identified were in accord with the a priori assignment of items to scales. These two factors were consistent with the hypothesized constructs of Air Travel Anxiety and Air Travel Anger. The Air Travel Anxiety factor has eight items that appear to measure anxious cognitions (i.e., worry), affect, and physical sensations in response to adverse air travel events. The Air Travel Anger factor has seven items that appear to measure hostile intentions and irritation in response to passenger behavior that is perceived to violate social norms.

The third factor, Airline/Airport Trust, appeared to measure a meaningful aspect of air travel stress. According to Rotter (1967), trust is an individual's characteristic belief in the sincerity, benevolence, or truthfulness of others. The kind of trust being measured by this third factor of the ATSS-R could be described as the individual's belief that the airlines and airports can generally be relied on to ensure his/her comfort and safety. It is believed that low levels of Airport/Airline Trust characterize a hostile sentiment toward these two organizations whereas high levels of this trust reflect positive emotions toward those organizations.

In addition to the factor analysis described above, another exploratory factor analysis of the 23 items was conducted, using oblimin rotation, that specified two factors. This analysis tested the possibility that Air Travel Anger and Air Travel Anxiety reflect a single negative affectivity factor that was described in the Introduction to the dissertation. It also tested the possibility that items comprising the Airline/Airport Trust scale reflected a second factor.

The results revealed that the two-factor model (see Table 4) explained 42% of the total variance in the 23 items. The amount of variance explained by this two-factor model was less than the amount of variance explained by the three-factor model since the two-factor model had more eigenvalues that were significantly greater than zero still remaining in the residual covariance matrix. Specifically, the two-factor model had four significantly greater ($P<.001$) than zero eigenvalues whereas the three-factor model had three significantly ($P<.001$) greater than zero eigenvalues.

This first factor was labeled "Global Stress" because it comprised of all the items from the Air Travel Anger factor and all the items from the Air Travel Anxiety factor. The loadings for the Global Stress factor were from .21 to .64. Note that the factor loadings for the Global Stress scale were lower than the factor loadings for both the Air Travel Anxiety and Air Travel Anger scales described in Table 3. The second factor, Airline/Airport Trust, was comprised of the same items as those identified in the Airline/Airport Trust scale in Table 3. The loadings for the Airline/Airport Trust scale were from .59 to .78, very similar loadings as to those of Airline/Airport Trust scale identified in the first factor analysis (compare loadings of Table 3 with Table 4).

Correlations among the ATSS-R factors

The small to moderate relationships among the three factors provided evidence that they each reflect related yet clearly distinct constructs. The correlation between Air Travel Anxiety and Air Travel Anger was .47 ($p<.001$), Air Travel Anxiety and

Table 4. *Two factor model of ATSS-R: Principal axis factor analysis (oblimin rotation)*

Item	Factor loadings	
Global Stress		
My body feels tense if my flight is delayed.	**.64**	-.08
I feel shaky if the airport is crowded.	**.59**	-.04
I feel shaky if I have to sit on the tarmac/taxiway for a long time.	**.58**	-.09
I worry other passengers may do something harmful on the plane.	**.50**	-.08
I feel panicky when I am running late for a flight.	**.61**	-.04
I fear that I will miss a connecting flight.	**.57**	-.08
I fear that my baggage will be lost/stolen/damaged.	**.55**	-.16
I worry that my flight will be cancelled.	**.54**	-.09
I want to say mean things when other passengers take up part of my personal space on the plane.	**.46**	-.13
I feel like screaming at passengers who bring aboard a lot of carry-on baggage.	**.49**	-.09
I would feel resentful if I had to sit near loud/talkative passengers.	**.53**	-.05
It would bother me if other passengers tried to board the plane before their row was called.	**.48**	-.02
I feel annoyed when babies/small children are on the plane.	**.34**	-.13
It bothers me when other passengers want special treatment.	**.25**	.00
I would be annoyed if I had to sit near ill passengers.	**.21**	-.03
Airline/Airport Trust		
Airlines give me the service I deserve.	-.18	**.78**
I trust the airlines.	-.22	**.76**
I think airlines appreciate their passengers.	-.17	**.76**
I feel satisfied with airlines service overall.	-.18	**.74**
I think airline personnel are doing the best job they can.	-.12	**.71**
Current airport security measures make me feel safe about flying.	-.11	**.69**
Current airport security measures deter hijackings or bombings.	-.02	**.63**
I sometimes think airline/airport personnel are unfriendly or unhelpful.*	-.25	**.59**
Eigenvalue	3.79	4.32
% variance explained	19.72	22.12

*Item coding was reversed.

Airline/Airport Trust was -.27 ($p<.001$), and the correlation between Air Travel Anger and Airline/Airport Trust was -.21 ($p<.001$).

In addition, the Global Stress score was calculated by averaging all the items from the Air Travel Anxiety and Air Travel Anger scales. The Global Stress score's correlation with Air Travel Anxiety was .75 ($p<.001$). Note that the size of this correlation is partly determined by the fact that over half (8 out of 15) the items from the Global Stress score are the same items as the Air Travel Anxiety score. The Global Stress score's correlation with Air Travel Anger was .68 ($p<.001$). Note also that the size of this correlation is partly determined by the fact that almost half (7 out of 15) the items from the Global Stress score are the same items as the Air Travel Anger score.

Psychometric Properties of the ATSS-R Scales

Table 5 presents the means, standard deviations, skewness statistics, kurtosis statistics, and internal reliability coefficients for the ATSS-R scales. All ATSS-R scales scores were calculated by averaging the items that comprise their respective scales. The range for all three scales was zero to five, with higher scores reflecting higher levels of the given construct. The means and standard deviations for all three scales suggest the possibility that participants generally reported moderate air travel stress, but there was considerable variability in this stress. Moreover, it is difficult to interpret what represents "moderate" air travel stress because there is only initial evidence for the construct validity of the ATSS-R. The skewness of the Air Travel Anxiety and Airline/Airport Trust scales were slightly to somewhat to the left. The skewness of the Air Travel Anger scale was slightly positive. The scale distributions for the Air Travel Anxiety scale and Air Travel

Anger scales were a little to somewhat flat (platykurtosis). The distribution of the Airline/Airport Trust scale was somewhat peaked (leptokurtosis).

As can also be seen, the coefficients alpha for all the scales showed good internal consistency. These coefficients alphas are particularly satisfactory given that the scales range from six to eight items. Note also that the coefficient alpha for the Global Stress scale was slightly higher than the other ATSS-R scales. This is to be expected because as more items are added to a scale (the Global Stress scale has 15 items), the total scale reliability increases (Nunnally & Wilson, 1975). Overall, the ATSS-R scale distributions were close to normal, with a very good spread around the mean, and had good internal consistency.

Discussion

The results of the exploratory factor analysis provided some initial evidence for the factor structure of the ATSS-R. The items loading on each of the respective factors arguably reflected the content they are believed to measure. For example, the Air Travel Anxiety items all include references to anxious emotions a traveler may experience in the given air travel situation: worry, tension, shakiness, and panic. The exploratory factor analysis also provided evidence for a two-factor model comprising Airline/Airport Trust and Global Stress and a three-factor model comprising Airline/Airport Trust, Air Travel Anxiety, and Air Travel Anger. Both models had factor loadings and total explained variance that was within acceptable limits (Nunnaly, 1978). On the other hand, the two-factor model had lower loadings than the three-factor model. Moreover, the two-factor model explained less of the total variance in the ATSS-R items than the three-factor

Table 5. *ATSS-R Means, Standard Deviations, Skewness, Kurtosis, and Internal Reliabilities*

	M	*SD*	*Skewness*	*Kurtosis*	α
ATSS-R Scale					
Air Travel Anxiety	2.46	.88	-.22	-.09	.79
Air Travel Anger	1.94	1.05	.20	-.64	.75
Global Stress	2.17	.78	-.14	-.21	.82
Airline/Airport Trust	2.61	.81	-.72	.58	.83

Note. Scale scores ranged from 0 to 5.

model. A confirmatory analysis on a separate sample would help provide more evidence of whether or not Air Travel Anxiety and Air Travel Anger should be collapsed into one Global Stress Scale. This confirmatory factor analysis was conducted in Study 2.

The exploratory factor analysis also provided evidence for a scale that appears to reflect one's trust in the airlines and airports. To the extent that a person believes an airline cannot be trusted to ensure his/her comfort and security, it would be reasonable to conclude that person would experience distress while taking a commercial airplane flight. A passenger's trust of airlines and airports is important because ultimately his/her safety is in their hands. The Airline/Airport Trust scale was retained as a third factor of the ATSS-R because trust may be an important aspect of air travel stress.

Study 2: Confirmation of ATSS-R Factor Structure

Study 2 cross-validated the factor structure of the ATSS-R on a different sample of air travelers using confirmatory factor analysis. It is important to conduct this cross-validation because factor structures may poorly replicate across samples (MacCallum, Widaman, Zhang, Hong, 1999). The use of confirmatory factor analysis allows for an a priori test of the presence of three different possible factor structures of the ATSS-R: 1) a model that measures the factors Airline/Airport Trust, Air Travel Anxiety, and Air Travel Anger, 2) a two-factor model that measures Global Stress, Airline/Airport Trust, and 3) a one-factor model which posits that all of the ATSS-R items reflect one construct. As mentioned in the Introduction, the two-factor model would be consistent with the negative affectivity hypothesis (Watson and Clark, 1984), which states that negative moods such as anger and anxiety reflect a single underlying construct.

The second purpose of Study 2 was to examine the six to seven week test-retest reliability of the ATSS-R. To the extent that longstanding personality characteristics lead travelers to appraise air travel situations in consistent ways, their propensity toward air travel stress would probably remain stable over time. It was expected that scores on the ATSS-R scales would remain mostly consistent over time, with a reliability ranging from .70 to .80.

Method

Participants

Participants were 3309 individuals who completed the study surveys via a data collection web site described in the Procedures section. Participation was anonymous.

The demographic characteristics of the participants are presented in Table 6. Participants were primarily female and White/Caucasian and half were married/with partner. In contrast with Study 1 participants, this study's participants included a high percentage of both educated and less educated individuals. The age, ethnicity, and air travel patterns of this sample were similar to those of Study 1.

For the test-retest reliability analysis, participants were 2382 individuals, a subset of the 3309 individuals in the main analysis. These 2382 participants had very similar characteristics as those 3309 in the main analysis. One exception was that these 2382 participants had slightly more business travelers than the sample of 3309 participants.

Procedure

For the purpose of evaluating the factor structure of the ATSS-R with a large, wide cross-section of leisure and business air travelers, data were collected via a web site. The data collection web site was advertised to the general public through the national media. The author made members of the media know of the existence of the website. The main content of the information given to the media is described in the Appendix D page titled: "Media Recruitment Information." The following media sources publicized the web site: Atlanta Journal Constitution, Frequent Flyer Magazine, and MSNBC.

The web site was first publicized on April 10, 2002 and data collection began on this date. The website did not allow anyone to complete the baseline surveys after April 24, 2002. The content of the study were online surveys that asked subjects a variety of questions about their personality, their travel patterns, and their attitudes toward air travel. Participation was anonymous and secured by 128-bit encryption. Participants provided

their email addresses so that they could participate in a brief follow-up survey for the test-retest reliability analysis. The email address was not linked to their survey data. Anyone entering the website address was allowed to participate in the study. After agreeing to an online Information Statement at the beginning of the web site, participants completed the surveys. All participants were entered in a drawing for one of ten $50 cash prizes. Participants who completed the survey multiple times were detected by the recording of the IP address of the computer that submitted the responses. All of the survey responses provided by these 28 participants were deleted.

During the survey, participants who elected to participate in the follow-up survey for the test-retest reliability analysis were asked to provide their email address. Six weeks after the completion of the initial data collection, a follow-up recruitment email was sent to the email address the participants provided. The content of the follow-up email is on the Appendix E page titled "Survey Follow-up Email." To maximize the follow-up rate, this email was sent two times, seven days apart. Thus, the test-retest interval was six to seven weeks.

When participants logged into the web site, they entered their email address and the personalized password they created during the baseline survey. After they entered their password, they completed the ATSS-R. Several demographic questions were also asked to double-check the matching of their baseline and follow-up survey. Participants completing the follow-up survey were entered in a separate drawing for one of ten $100 cash prizes. The follow-up rate for this sample was 72% (2382/3309). All the study

Table 6. *Demographic characteristics of Study 2 participants*

Characteristic	
Male (%)	39.0
White or Caucasian (%)	87.3
Married or with Partner (%)	50.3
More than High School Education (%)	58.4
Age (*M*)	37.0
Age (Range)	12 to 78 years
Air Travel Patterns for the past 12 months	
Number of domestic roundtrips (*Mdn)*	3.0
Flies for business at least half time (%)	42.2

procedures were approved by the University of Washington Human Subjects Review Committee.

Measures

Demographics. The same demographics survey that was used in Study 1.

Air Travel Stress Scale-Revised: A twenty-three item self-report instrument assessing the extent to which an individual is susceptible to experiencing air travel stress. Respondents were asked to rate the extent to which each item is true for him/her on a response scale ranging from -3 (strongly disagree) to +3 (strongly agree). This survey was labeled "Air Travel Experiences Scale."

Statistical Analysis

Confirmatory factor analysis (CFA) was conducted to determine the adequacy of the factor loadings, model fit, and the pattern of intercorrelations among the latent factors. The EQS 5.7b structural equation modeling program (Bentler, 1995) was used. In structural equation modeling, the actual covariance matrix among the variables is compared to the covariance matrix implied by the proposed model. The chi-square reported is a test of the null hypothesis that these two covariance matrices are the same (Bollen, 1989). Thus, in this case, a nonsignificant chi-square is desirable in that it indicates that the actual and the model-implied covariance matrices are not significantly different and that the model is an adequate representation of the data. Because the chi-square statistic is sensitive to sample size, model fit was also evaluated with the Normed Fit Index, Comparative Fit Index, and Goodness of Fit Index, which range from 0 to 1, with 1 indicating perfect fit. A fit of .95 is considered very close, .9 is considered

adequate, and a fit of .8 is marginal (Joreskog & Sorbom, 1984; Bentler, 1990). Model fit was also evaluated with the Root Mean Squared Error of Approximation. A model fit of .04 or better is considered very close and a fit of .06 is considered adequate (Bentler, 1990).

Three confirmatory factor analysis models were tested. The first model determined whether the items were driven by three latent ATSS-R constructs: Air Travel Anxiety, Air Travel Anger, and Airline/Airport Trust. The second model determined whether the items were driven by two latent ATSS-R constructs: Global Stress (the combination of the items for the Air Travel Anxiety and Air Travel Anger scales) and Airline/Airport Trust. In the strongest models, each indicator has a high loading on only one factor. Therefore, in the two-factor and one-factor models, the parameter estimates for non-loading factors were set to zero. The correlation of an indicator of a factor with the indicators of other hypothesized factors is accounted through the correlation between the factors (Kline, 2001). The third model determined whether the items were driven by one latent construct. The goodness-of-fit chi squares for these three models were compared by testing the differences in chi squares.

In order to examine the test-retest reliability of the ATSS-R, correlations were calculated between each pair of time points. According to Cicchetti (1994), when the size of the test-retest consistency is below .70, the level of reliability is unacceptable; when it is between .70 and .79, the level of reliability is fair; when it is between .80 and .89, the level of reliability is good; and when it is .90 and above, the level of reliability is excellent.

Results

Confirmatory factor analysis

The first confirmatory factor analysis evaluated the three-factor model of air travel stress. The first specification of the model revealed that removing one item would improve the fit of the model because the parameter estimate for that item was low. This item was removed for all subsequent model specifications ("I would be annoyed if I had to sit near ill passengers"). After removal of this item, the chi-square goodness of fit was significant, 1102.63 ($df = 152$), $p<.001$, a result that is typically found with large sample sizes (Joreskog & Sorbom, 1984; Bentler, 1990). However, the NFI (.94), CFI (.95), GFI (.96), and RMSEA (.047; 90% CI .045, .050) all met standards for a close fitting model. The parameter estimates of the three-factor model are presented in Table 7. As can be seen, the parameter estimates are similar to the factor loadings observed in Study 1. The parameter estimates were moderate to high, ranging from .42 to .81.

The comparison of the three different models showed that the three-factor model provided a better fit to the data than did the one-factor model (X^2 difference = 6025.54 $df = 5$, $p < .001$) or the two-factor model (X^2 difference = 1003.95 $df = 3$, $p < .001$). Moreover, the one factor model had a poorer fit to the data (NFI = .61, CFI .62, GFI = .78, RMSEA = .127), as did the two-factor model (NFI = .88, CFI = .88, GFI = .89, RMSEA = .071).

Exploratory Factor Analysis

As mentioned in the Statistical Analysis section, the parameter estimates for non-loading factors were set to zero. However, Cattell (1978) has argued that some items are

more factorially complex, meaning that they may load on more than one construct. In the context of this study, such an argument could be made for the Air Travel Anxiety and Air Travel Anger items. Items on each factor may have high cross-loadings, following the negative affectivity hypothesis discussed in the Introduction to the dissertation. In order to test this possibility and readily show the cross-loadings of the 23 ATSS-R items across their three factors, exploratory principal components factor analysis was also conducted using oblimin rotation (Lee & Comrey, 1979). The three factors explained 51% of the total variance (see Table 8). As can be seen, these item loadings ranged from .44 to .81. More pertinent, the cross-loadings were low, ranging from .00 to .22, with the differences between the items' main factor loadings and cross-loadings being at least .40.

Correlations among the ATSS-R factors

The moderate relationships among the three factors provided evidence that they each reflect related yet clearly distinct constructs. The correlation between Air Travel Anxiety and Air Travel Anger was .37 ($p<.001$), Air Travel Anxiety and Airline/Airport Trust was -.29 ($p<.001$), and the correlation between Air Travel Anger and Airline/Airport Trust was -.24 ($p<.001$). In addition, the Global Stress score was calculated by averaging all the items from the Air Travel Anxiety and Air Travel Anger scales. The Global Stress score's correlation with Air Travel Anxiety was .71 ($p<.001$) and with Air Travel Anger it was .62 ($p<.001$).

Psychometric properties of the final version of the ATSS-R scales

Table 9 presents the means, standard deviations, skewness statistics, kurtosis statistics, and internal reliability coefficients for the ATSS-R scales. The range for all

Table 7. *ATSS-R scales: Parameter estimates from the confirmatory factor analysis*

Item	Parameter estimate		
Air travel anxiety: Anxious reactions to adverse air travel events			
My body feels tense if my flight is delayed.	**.76**	.00	.00
I feel shaky if the airport is crowded.	**.53**	.00	.00
I feel shaky if I have to sit on the tarmac/taxiway for a long time.	**.58**	.00	.00
I worry other passengers may do something harmful on the plane.	**.42**	.00	.00
I feel panicky when I am running late for a flight.	**.56**	.00	.00
I fear that I will miss a connecting flight.	**.58**	.00	.00
I fear that my baggage will be lost/stolen/damaged.	**.49**	.00	.00
I worry that my flight will be cancelled.	**.46**	.00	.00
Air travel anger: Angry reactions to other passengers			
I want to say mean things when other passengers take up part of my personal space on the plane.	.00	**.69**	.00
I feel like screaming at passengers who bring aboard a lot of carry-on baggage.	.00	**.64**	.00
I would feel resentful if I had to sit near loud/talkative passengers.	.00	**.55**	.00
It would bother me if other passengers tried to board the plane before their row was called.	.00	**.53**	.00
I feel annoyed when babies/small children are on the plane.	.00	**.54**	.00
It bothers me when other passengers want special treatment.	.00	**.52**	.00
Airline/Airport Trust: Belief that airline/airport will ensure comfort and security			
Airlines give me the service I deserve.	.00	.00	**.81**
I trust the airlines.	.00	.00	**.73**
I think airlines appreciate their passengers.	.00	.00	**.76**
I feel satisfied with airlines service overall.	.00	.00	**.75**
I think airline personnel are doing the best job they can.	.00	.00	**.66**
Current airport security measures make me feel safe about flying.	.00	.00	**.54**
Current airport security measures deter hijackings or bombings.	.00	.00	**.49**
I sometimes think airline/airport personnel are unfriendly or unhelpful.*	.00	.00	**.59**

*Item coding was reversed.

Table 8. *Three factor model of ATSS-R scales: Principal axis factor analysis (oblimin rotation)*

Item	Factor Loading		
Air travel anxiety: Anxious reactions to adverse air travel events			
My body feels tense if my flight is delayed.	**.75**	.17	-.10
I feel shaky if the airport is crowded.	**.70**	-.13	.01
I feel shaky if I have to sit on the tarmac/taxiway for a long time.	**.70**	-.10	.03
I worry other passengers may do something harmful on the plane.	**.67**	.04	.14
I feel panicky when I am running late for a flight.	**.64**	-.13	-.01
I fear that I will miss a connecting flight.	**.60**	-.11	.20
I fear that my baggage will be lost/stolen/damaged.	**.58**	-.21	.18
I worry that my flight will be cancelled.	**.57**	-.12	.17
Air travel anger: Angry reactions to other passengers			
I want to say mean things when other passengers take up part of my personal space on the plane.	-.10	**.74**	.11
I feel like screaming at passengers who bring aboard a lot of carry-on baggage.	-.12	**.68**	.13
I would feel resentful if I had to sit near loud/talkative passengers.	-.13	**.64**	.22
It would bother me if other passengers tried to board the plane before their row was called.	-.08	**.60**	.20
I feel annoyed when babies/small children are on the plane.	-.14	**.56**	.11
It bothers me when other passengers want special treatment.	.00	**.44**	.07
Airline/Airport Trust: Belief that airline/airport will ensure comfort and security			
Airlines give me the service I deserve.	-.10	-.12	**.81**
I trust the airlines.	-.11	-.13	**.78**
I think airlines appreciate their passengers.	-.22	-.04	**.78**
I feel satisfied with airlines service overall.	-.08	-.12	**.76**
I think airline personnel are doing the best job they can.	-.08	-.02	**.75**
Current airport security measures make me feel safe about flying.	-.10	-.02	**.72**
Current airport security measures deter hijackings or bombings.	-.05	-.03	**.63**
I sometimes think airline/airport personnel are unfriendly or unhelpful.	-.19	-.20	**.60**
Eigenvalue	2.2	3.3	4.3
% variance explained	13.3	16.5	21.0

three scales was zero to five, with higher scores reflecting higher levels of the given construct. Similar to Study 1, the means and standard deviations for all three scales suggest the possibility that participants generally reported moderate air travel stress, although it is difficult to interpret what represents "moderate" air travel stress because there is only initial evidence for the construct validity of the ATSS-R.

The skewness of the Airline/Airport Trust scale was slightly to the left. Unlike Study 1, the skewness of the Air Travel Anxiety and Air Travel Anger was normal, being almost zero. All three scales distribution were nearly flat, with a platykurtosis. As can also be seen, the coefficient alphas for all the scales again showed good internal consistency. Overall, the ATSS-R scale distributions were again close to normal, with a very good spread around the mean, and had good internal consistency.

Test-retest reliability

The following correlations were obtained for the six to seven week test-retest reliabilities: $r = .81, p < .001$ for Air Travel Anxiety, $r = .81, p < .001$ for Air Travel Anger, $r = .87, p < .001$ for Airline/Airport Trust, and $r = .81, p < .001$ for Global Stress. Following the guidelines of Cicchetti (1994), the test-retest reliabilities of the ATSS-R suggest that the ATSS-R scales possess good stability over time.

Discussion

The results of the confirmatory factor analysis provided more suggestive evidence that the ATSS-R assesses Air Travel Anxiety, Air Travel Anger, and Airline/Airport Trust. The replication of the item loadings for the Airline/Airport Trust factor provided more evidence that those items reflect a viable construct that comprises one part of the

Table 9. *ATSS-R Means, Standard Deviations, Skewness, Kurtosis, and Internal Reliabilities*

	M	*SD*	*Skewness*	*Kurtosis*	α
ATSS-R Scale					
Air Travel Anxiety	2.16	.89	.06	-.33	.80
Air Travel Anger	2.53	1.02	-.04	-.43	.79
Global Stress	2.40	.75	-.07	-.15	.83
Airline/Airport Trust	2.55	.96	-.32	-.33	.89

Note. Scale scores ranged from 0 to 5.

air travel stress phenomenon. The moderate to high parameter estimates suggest that the items reflect the constructs they were expected to load on.

Several results provided evidence that the ATSS-R' Air Travel Anxiety and Air Travel Anger scales are better conceptualized as distinct scales, rather than as one Global Stress scale. First, comparison of the one-factor, two-factor, and three-factor confirmatory factor analysis models showed that the best fit to the data is the three-factor model (i.e., Air Travel Anxiety, Air Travel Anger, and Airline/Airport Trust). Second, the exploratory factor analysis of this three-factor model showed that the Air Travel Anger and Air Travel Anxiety scales had low cross-loadings. Third, the correlations between these three factors were at most moderate, suggesting that each of the scales are related yet conceptually distinct constructs. Fourth, the three-factor structure observed in Study 1 has been replicated in Study 2 with a separate sample. Despite these results suggesting that the ATSS-R is comprised of three factors, the Global Stress scale will continue to be included in all subsequent dissertation studies. The reason is that future studies may provide more conclusive evidence to support or fail to support the utility of the Global Stress scale. The 22-items derived from the factor analysis will be used in the subsequent studies of the ATSS-R.

Several psychometric properties of the ATSS-R scales were similar in both Study 1 and Study 2. The consistency of the ATSS-R's skewness and kurtosis between Study 1 and 2 suggests that air travel stress is comprised of normally distributed psychological constructs. Moreover, the ATSS-R had good internal reliability in both studies. Finally, the test-retest results suggest that the ATSS-R possesses good stability over time.

Strengths of the study

There are four methodological reasons to be confident in integrity of the ATSS-R's three-factor structure. First, the factor structure observed in the exploratory factor analysis was replicated with confirmatory factor analysis. Second, the factor structure was similar in a sample of airport-based travelers and a broad geographic sample recruited by different means. Third, the factor structure identified in Study 1 was replicated with a large sample size (N = 3309). Fourth, the factor structure was robust to sampling method: Study 1 was a paper-pencil based survey whereas Study 2 was Web-based.

Limitations of the study

The Internet-based nature of this sample limits the generalizability of the findings. Internet access is greater among several demographic groups, especially younger people and those with higher incomes (Dillman, 2000). However, as of September 2001, 54% of the US population was using the Internet (143 million Americans; Victory & Cooper, 2001). Furthermore, the age, ethnicity, and air travel patterns of this sample were similar to those found in other samples of air travelers (compare with Study 1 and Study 2). More pertinent, Internet usage among air travelers is high: 85.1% of air travelers (N = 925; 72% recruitment rate) surveyed at the Seattle-Tacoma International Airport reported that they used the World Wide Web within the past 30 days. To the extent that air travelers were able to participate in this study because they have access to the Internet, this study's sample may be likely to generalize to most air travelers. Beyond the issue of

generalizability, this study's Internet-based data is valuable given the paucity of empirical data on the nature of air travel stress.

Study 3: ATSS-R in Relation to other Individual Difference Measures

Study 3 examined the extent to which the ATSS-R correlated with a variety of potentially related individual differences measures. Finding the relations between the ATSS-R and established constructs is an important step in construct validation. This analysis asked the question: does the new measure correlate with other constructs in sensible ways, in expected magnitudes and directions (Nunnally, 1978, pg. 103). These individual differences measures were chosen because each seemed to suggest a conceptual basis for having more or less vulnerability for air travel anxiety, air travel anger, or airline/airport trust. In addition, Study 3 also addressed whether the different dimensions of air travel stress form stronger relationships with some variables than others. If such differential associations were found, it would provide more evidence for the construct validity of the ATSS-R scales. The background and hypotheses regarding the relationships between these measures and the ATSS-R were discussed in the Introduction to the dissertation.

Method

Participants and Procedure

Participants were drawn from four samples. The first was a sample of 925 (72% recruitment rate) Seattle Tacoma Airport travelers who completed the ATSS-R along with a measure of state stress in January-February 2002. The second was a sample of 345 (73% recruitment rate) Seattle Tacoma Airport travelers who completed the ATSS-R along with measures of trait anger and trait anxiety in July 2001. The data collection procedures for the first and second samples were identical to those described in Study 1.

The third was a sample of 674 individuals who were a subset of Study 2's follow-up sample selected because they reported at the follow-up that they had taken an airplane flight within the past 30 days. These 674 participants completed the ATSS-R at baseline and then six to seven weeks later reported how much stress they had experienced on their most recent flight. The fourth sample was 3309 individuals from Study 2 who completed the remaining measures that will be described in the Measures section.

Measures

Participants completed the final 22-item version of the ATSS-R, along with the following:

State Stress Scale (SSS) is a four-item scale written by the author that assesses stress experienced while at an airport. Two items are "How much do you feel worried right now?" and "How much do you feel angry right now?" Responses to each item were rated by the participants from 0 (not at all) to 5 (very much). The average score was 1.39 (SD = 1.14), with no significant differences between women (M = 1.37) and men (M = 1.41), p>.05. The alpha coefficient for this scale was .85. This scale is contained in the Appendix page F.

Stress of Most Recent Flight A one-item measure of stress experienced during a respondent's most recent flight. The item written for this study read: "How stressful was your most recent commercial airplane flight?" with responses ranging from 1 ("Not at all") to 5 ("Extremely").

Flight Anxiety Modality Questionnaire (FAM; Van Gerwen, Spinhoven, Van Dyck, & Diekstra, 1999) is an 18-item fear of flying scale that measures the thoughts and

physical sensations individuals experience while anticipating or in a flight situation. One item is " I think the particular plane I am on will crash." Responses to each statement are rated from 1 (no reaction) to 5 (very intense reaction). The average score was .95 (*SD* = .80), with women scoring significantly higher (*M* = 1.08) compared to men (*M* = .72), p<.001. The alpha coefficient for this scale was .95.

Driving Anger Scale (DAS; Deffenbacher, Oetting, & Lynch, 1994) is a 14-item scale that assesses the propensity to become angry while driving. Items are rated on a 5-point scale (1 = not at all, 5 = very much) according to the amount of anger experienced when dealing with the situation described (e.g., "Someone runs a red light or stop sign," or, "Someone is weaving in and out of traffic"). The average score was 2.0 (*SD* = .66), with no significant differences between women (*M* = 2.00) and men (*M* = 1.99), p>.05. The alpha coefficient for this scale was .87.

State-Trait Anxiety Inventory-Trait Version (STAXI-T; Spielberger, Gorsuch, & Lushene, 1970) is a twenty-item self-report measure that assesses anxiety as a relatively stable personality variable. One item is "I feel nervous and restless." Responses to each item were rated from 1 (almost never) to 4 (almost always). The average score was 1.62 (*SD* = .39), with no significant differences between women (*M* = 1.62) and men (*M* = 1.62). The alpha coefficient for this scale was .88.

State-Trait Anger Expression Inventory-Trait Version (STAEI-T; Spielberger, 1988) is a ten-item measure of individual differences in the disposition to express anger. One item is "I am quick-tempered." Responses to each item were rated from 1 (almost never) to 3 (almost always). The average score was 1.68 (SD =.46), with no significant

differences between women (M = 1.67) and men (M = 1.70). The alpha coefficient was .81.

PANAS Negative Affect (PANAS-NA; Watson, Clark, & Tellegen, 1988) is a 10-item scale that measures the extent to which the person experiences negative feelings (e.g., irritable, nervous) in general. Responses to each item were rated from 0 (very slightly or not at all) to 4 (extremely). The average score was .81 (SD =.63), with women scoring significantly higher (M = .87) than men (M = .70), $p<.001$. The alpha coefficient for this scale was .87.

Life Orientation Test (LOT; Scheier & Carver, 1985) is an eight-item self-report measure (plus four filler items) assessing generalized expectancies for positive versus negative outcomes. Respondents are asked to indicate their degree of agreement with statements such as "In uncertain times, I usually expect the best," and "I hardly ever expect things to go my way," using a 5-point response scale ranging from 0 (strongly disagree) to 4 (strongly agree). Of the 8 scored items, 4 are worded in a positive direction and 4 are worded in a negative direction. After reversing the scoring for the negatively worded items, item scores were totaled to yield an overall optimism score with high scores representing greater optimism. The average score for the optimism scale was 1.46 (SD = .72), with women scoring significantly higher (M = 1.48) than men (M = 1.43), $p<.05$. The alpha coefficient for this scale was .87.

Life Experiences Survey (LES; Sarason, Johnson, & Siegel, 1978) is a 50-item measure of life stress that assesses the incidence of various important life change events (e.g., "death of a family member," "serious illness") that have occurred during the past 12

months. Ratings reflecting Severity are made on a 7-point Likert scale ranging from extremely negative (-3) to extremely positive (+3). Averaging the Likert Severity ratings of those events designated as negative by the participant gives a rating of the severity of negative life changes. Severity of negative life changes was used in this study because prior research has shown that the negative life change score is significantly related to a number of stress-related measures (e.g., Dixon, Heppner, & Anderson, 1991; Sarason et al., 1978). The average score was -.01 (SD = .19), with no significant differences between women (M = -.01) and men (M = -.02). The alpha coefficient was .72.

Survey of Recent Life Experiences (SRLE; Kohn & MacDonald, 1992) a list of 41 hassles rated for frequency in the past month. Two items are "Not enough time to meet your obligations" and "Getting ripped off or cheated in the purchase of goods." Responses to each item were rated from 1 (not at all part of my life) to 4 (very much part of my life). The average score was 1.68 (SD = .35), with women scoring higher (M = 1.71) than men (M = 1.63), $p<001$. The alpha coefficient was .90.

COPE (COPE; Carver, Scheier, & Weintraub, 1989) is a fifty-two item multidimensional coping inventory to assess the different ways in which people usually respond to stress. For this study, five scales of the COPE were chosen for their potential relevance to the ATSS-R scales: Substance Abuse, Active Coping, Venting, Acceptance, and Positive Reinterpretation. Responses to each item were rated from 1 (I usually don't do this at all) to 4 (I usually do this a lot).

The average score for Substance Abuse was 1.33 (*SD* = .63), with no significant differences between women (*M* = 1.31) and men (*M* = 1.35), p>.05. The alpha coefficient was .93.

The average score for Active Coping was 3.02 (*SD* = .67), with women scoring significantly lower (*M* = 3.0) than men (*M* = 3.06), p<.05. The alpha coefficient was .81.

The average score for Venting was 2.40 (*SD* = .78), with women scoring significantly higher (*M* = 2.49) than men (*M* = 2.26), p<.001. The alpha coefficient was .71.

The average score for Acceptance was 3.02 (*SD* = .67), with no significant differences between women (*M* = 3.21) and men (*M* = 3.22), p>.05. The alpha coefficient was .58.

The average score for Positive Reinterpretation was 2.61 (*SD* = .80), with women scoring significantly higher (*M* = 2.65) than men (*M* = 2.55), p<.01. The alpha coefficient was .75.

Social Desirability Scale (SDS: Reynolds, 1982) is a thirteen-item measure of individual differences in the disposition toward giving socially desirable responses. One item is "I am always a good listener". Responses to each item were rated as "No" (coded as 0) or "Yes" (coded as 1). Scores were calculated by summing the number of "Yes" responses to the items, giving a range of scores from 0 to 13. The average score was 6.42 (*SD* = 2.80), with women scoring significantly lower (*M* = 6.21) than men (*M* = 6.78), p<.001. The alpha coefficient for this scale was .71.

Statistical Analysis

To help assess the construct validity of the ATSS-R, this instrument was correlated with the individual differences measures described in the Measures section. Interpretations of the size of the correlations were made in line with Cohen's (1988, pg. 79-80) criteria, wherein effect sizes accounting for 1-8% of variance (i.e., r = .1 to .29) are considered small, 9-24% of variance (r = .3 to .49) are moderate, and at least 25% of variance (r = .5 to 1.0) are large. Correlations between the ATSS-R and the individual differences measures, with negative affectivity partialed out, were also computed in order to determine the extent to which the ATSS-R reflects negative affectivity. Tests for differences between correlations (Bruning & Kintz, 1997) were run to see if the strength of relationships between the dimensions of air travel stress and other variables correlated differentially. The tests were guided by the hypotheses about differences between the correlations that were discussed in the Introduction to the dissertation. In addition, the effect size of the differences between these correlations were calculated with the q effect size index where q = .10 to .29 reflects a small effect, q = .30 to .49 reflects a medium effect, and q = .50 or more signifies a large effect (Cohen, 1988, pg. 110-116).

Results

Table 10 displays the correlations between the ATSS-R scales and the other individual differences measures. The results show that Air Travel Anxiety was strongly associated with state stress, while it was moderately associated with the stress of one's most recent flight, fear of flying, and driving anger. Air Travel Anxiety was also related in the expected direction to the measures of general personality traits. Specifically, Air Travel Anxiety was moderately associated with higher levels of trait anxiety, trait anger,

negative affectivity, and recent hassles. It was also moderately associated with lower levels of optimism and weakly associated with active coping. Air Travel Anxiety was weakly related to the impact of major life events, venting, acceptance, and positive reinterpretation although the direction of these correlations was consistent with predictions. Air Travel Anxiety was weakly related to social desirability.

Air Travel Anger was moderately associated with higher levels of state stress, driving anger, whereas it was weakly associated with the fear of flying. Air Travel Anger was also related in the expected magnitude and direction with trait anger and trait anxiety. Air Travel Anger was weakly related to the stress of one's most recent flight, negative affectivity, optimism, the impact of major life events, recent hassles, and the five coping styles. Air Travel Anxiety was weakly related to social desirability.

Global Stress was strongly associated with state stress and driving anger, whereas it was moderately associated with the stress of one's most recent flight and fear of flying. Global Stress was also moderately associated with trait anxiety, trait anger, negative affectivity, optimism, and recent hassles. Finally, Global Stress was weakly associated with the impact of major life events and the five coping styles.

Airline/Airport Trust was moderately associated with lower levels of state stress and the stress of one's most recent flight. In contrast, Airline/Airport Trust was weakly associated with all of the remaining individual differences measures. Airline/Airport Trust was weakly related to social desirability.

Partial correlations between the ATSS-R scales and individual differences measures, controlling for negative affectivity

Table 10. *Correlations between ATSS-R scales and individual differences measures*

ATSS-R Scales	State Stress *n*=925	Stress of Most Recent Flight *n*= 672	Fear of Flying *n*=3309	Driving Ang *n*=3309	Trait Anx *n*=345	Trait Ang *n*=345	Negtv Affect *N*=3309	Optmsm *n*=3309	Negative Life Events Impact *N*=3309	Recent Hassles *n*=3309	Subst Abuse *n*=3309	Venting *n*=3309	Accept *n*=3309	Positive Reinterp *n*=3309	Active Coping *n*=3309	Social Desir *n*=3309
Air Travel Anxiety	.63*	.38*	.44*	.36*	.35*	.30*	.42*	-.35*	.16*	.37*	.18*	.24*	-.13*	-.07**	-.25*	-.19*
Air Travel Anger	.36*	.13*	.10*	.50*	.24*	.43*	.21*	-.25*	.18*	.24*	.18*	.23*	.00	-.17*	-.11*	-.18*
Global Stress	.58*	31*	.34*	.50*	.35*	.44*	.38*	-.35*	.19*	.35*	.20*	.27*	-.07**	.14*	-.19*	-.21*
Airline/ Airport Trust	-.32*	-.39*	-.16*	-.14*	-.02	-.17*	-.15*	.24*	-.18*	-.20*	-.13*	-.13*	.06**	.20*	.02	.12*

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

It could be argued that the pattern of correlations between the ATSS-R and the individual differences measures reflect the possibility that the ATSS-R is a proxy measure of negative affectivity. In order to test for this possibility, negative affectivity (PANAS-NA) was partialed out of the correlations between the ATSS-R and the individual differences measures. These results are shown in Table 11. (Note that the results do not include three measures (i.e., state stress, trait anxiety, and trait anger) presented in Table 10 because these measures did not come from data sets that also included a measure of negative affectivity. Thus it was not possible to control for negative affectivity in the correlations between the ATSS-R and these three measures.) The results also show the bivariate correlations between the PANAS-NA and the individual differences measures (bottom row of Table 11).

Several observations can be made by comparing Table 10 with Table 11. First, most of the correlations that were moderate (i.e., r = .3 to .49; Cohen, 1988) remained moderate and nearly all of the correlations that were small (i.e., r = .1 to .29; Cohen, 1988) remained small and significant after controlling for negative affectivity. For example, the correlation between Air Travel Anxiety and the stress of one's most recent flight was reduced from .38 to .32 (i.e., a reduction from 14% to 10% shared variance) after controlling for negative affectivity. However, there were substantial reductions in the correlation between the ATSS-R and optimism as well as recent hassles. For example, the correlation between Air Travel Anxiety and recent hassles was reduced from .37 to .14 (i.e., a reduction from 14% to 2% shared variance) after controlling for negative

affectivity. One explanation for these results is that, as shown in the last row of Table 11, negative affectivity was highly correlated with optimism and recent hassles (-.56 and .62, respectively). Therefore, controlling for negative affectivity may have removed a large portion of the variance that optimism and recent hassles had shared with the ATSS-R scales. Finally, six out of the forty-six correlations (13%) that were significant before controlling for negative affectivity became non-significant after controlling for negative affectivity. All six of these correlations that became non-significant were small before controlling for negative affectivity.

Tests for the significance of the differences in the associations between the ATSS-R and the individual differences measures

While the above describes the pattern of relationships between the ATSS-R and a variety of conceptually-related individual differences variables, it does not address whether the different dimensions of air travel stress form stronger relationships with some variables than with others. If such differential associations were found, it would provide more evidence for the construct validity of a new scale (Bruning & Kintz, 1997). Tests for differences between correlations (Bruning & Kintz, 1997) were run to see if the strengths of relationships between the dimensions of air travel stress and other variables correlated differentially.

The first set of tests for differences between the correlations examined whether Air Travel Anxiety was more related to fear of flying than to driving anger and whether Air Travel Anxiety was more associated with fear of flying than were Air Travel Anger and Airline/Airport Trust. The tests revealed that Air Travel Anxiety was more strongly

correlated with fear of flying than with driving anger, t(3306)=4.30, P<.001, a small effect size (q=.095). Moreover, Air Travel Anxiety was significantly more associated with fear of flying than was Air Travel Anger (t(3306)=19.45, P<.001, a medium effect size (q=.372)) and Airline/Airport Trust (t(3306)=23.93, P<.001, a large effect size (q=.633)).

The second set of tests for differences between the correlations examined whether Air Travel Anger was more related to driving anger than to fear of flying and whether Air Travel Anger was more associated with driving anger than were Air Travel Anxiety and Airline/Airport Trust. The results showed that Air Travel Anger was more strongly correlated with driving anger than with fear of flying, t(3306)=21.26, P<.001, a medium effect size (q=.449). Moreover, Air Travel Anger was significantly more associated with driving anger than were Air Travel Anxiety (t(3306)=8.48, P<.001, a small effect size (q=.172)) and Airline/Airport Trust (t(3306)=26.99, P<.001, a large effect size (q=.690)).

The third set of tests for differences between the correlations examined whether Air Travel Anxiety was more related to trait anxiety than to trait anger and whether Air Travel Anxiety was more associated with trait anxiety than were Air Travel Anger and Airline/Airport Trust. The results showed that the association between Air Travel Anxiety and trait anxiety was not significantly different than the association between Air Travel Anxiety and trait anger, t(342)=1.06, P=.14. However, Air Travel Anxiety was significantly more correlated with trait anxiety than were Air Travel Anger (t(342)=1.95, P<.05, a small effect size (q=.120)) and Airline/Airport Trust (t(342)=4.21, P<.001, a medium effect size (q=.365)). Moreover, Air Travel Anxiety was also more related to

Table 11. *Partial correlations between ATSS-R scales and individual differences measures, controlling for negative affectivity*

ATSS-R Scales	Stress of Most Recent Flight *n*= 672	Fear of Flying *n*=3309	Driving Ang *n*=3309	Optmsm *n*=3309	Negative Life Events Impact *n*=3309	Recent Hassles *n*=3309	Subst Abuse *n*=3309	Venting *n*=3309	Accept *n*=3309	Positive Reinterp *n*=3309	Active Coping *n*=3309	Social Desir *n*=3309
Air Travel Anxiety	.32*	.36*	.30*	-.14*	.08**	.14*	.10**	.09**	.05	.01	-.17**	-.11*
Air Travel Anger	.07*	.06**	.43*	-.13*	.14*	.16*	.13*	.13*	.03	-.10*	-.03	-.16*
Global Stress	.23*	.21*	.40*	-.16*	.11**	.18*	.13*	.13*	.01	-.05	-.11**	-.18*
Airline/ Airport Trust	-.35*	-.10**	-.10**	.17*	-.10*	-.11*	-.10**	-.07**	.02	.19*	.02	.07**
Correlations between negative affectivity and individual differences measures												
Negative Affectivity	.30*	.32*	.31*	-.56*	.30*	.62*	.21*	.28*	-.25*	-.22*	-.22*	-.24*

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

negative affectivity than were Air Travel Anger ($t(3306)=12.50$, $P<.001$, a small effect size ($q=.235$)) and Airline/Airport Trust ($t(3306)=24.5$, $P<.001$, a large effect size ($q=.599$)).

The fourth set of tests for differences between the correlations examined whether Air Travel Anger was more related to trait anger than to trait anxiety and whether Air Travel Anger was more associated with trait anger than were Air Travel Anxiety and Airline/Airport Trust. The results showed that the association between Air Travel Anger and trait anger was greater than the association between Air Travel Anger and trait anxiety, $t(342)=12.9$, $P<.01$, a small effect size ($q=.215$). In addition, Air Travel Anger was significantly more correlated with trait anger than were Air Travel Anxiety ($t(342)=2.41$, $P<.01$, a small effect size ($q=.150$)) and Airline/Airport Trust ($t(342)=7.82$, $P<.001$, a large effect size ($q=.632$)) .

Finally, Air Travel Anxiety was more strongly related to active coping than was Air Travel Anger ($t(3306)=7.41$, $P<.001$, a small effect size ($q=.145$)) and Airline/Airport Trust ($t(3306)=9.63$, $P<.001$, a small effect size ($q=.255$)). Unexpectedly, Airline/Airport Trust was significantly more associated with positive reinterpretation than were Air Travel Anxiety ($t(3306)=9.87$, $P<.001$, a small effect size ($q=.273$)) and Air Travel Anger ($t(3306)=13.9$, $P<.001$, a medium effect size ($q=.375$)).

Discussion

The pattern of associations obtained in Study 3 provided evidence for the construct validity of the ATSS-R. Two of the ATSS-R scales were most correlated with conceptually similar measures. Specifically, of all the ATSS-R scales, Air Travel

Anxiety was most strongly correlated with fear of flying and trait anxiety whereas Air Travel Anger was most strongly correlated with driving anger and trait anger. Unexpectedly, of all the ATSS-R scales, Airline/Airport Trust was most strongly associated with positive reinterpretation. Perhaps if one feels he/she cannot trust the airlines and airports to keep him/her safe, looking on the bright side of a situation may be an adaptive coping response. There is also some evidence that an active coping style may somewhat ameliorate air travel anxiety perhaps because some adverse air travel events (e.g., a flight cancellation) can be dealt with in a problem-focused manner. More research is needed to better understand why these relationships existed. The results also did not generally support the notion that the ATSS-R is a proxy measure of negative affectivity. However, there were notable exceptions to this general pattern so therefore Study 4 further explored the extent to which negative affectivity may be a component of the ATSS-R.

One pattern observed in the correlations was that the situation-specific stress measures were more highly correlated with the ATSS-R scales than were the general individual differences measures. This pattern may be because the situation-specific measures were more proximal in the sense that they share properties that are conceptually similar to air travel stress. For example, people who become angry when they drive were more likely to become angry when they are in another transportation situation, in this case, an air travel situation. In contrast, it could be said that the general individual differences measures were more distal in the sense that they share broader properties with air travel stress. For example, general life events stress is more distal than the particular

circumstances of air travel stress. This may explain why the impact of major life events was weakly correlated with the ATSS-R scales.

Several associations between the ATSS-R and situation-specific measures provided some support for the construct validity of the ATSS-R. The moderate to strong association between the ATSS-R scales and stress levels reported while at an airport (i.e., state stress) provide some cross-sectional support for the notion that the propensity to experience air travel stress may lead travelers to experience stress when they are in a specific air travel situation. Further support of this notion came from the short-term prospective (six to seven week) association between the ATSS-R and stress reported for one's most recent flight. An important next question to further examine the ATSS-R's construct validity would be to see to what extent the ATSS-R predicts stress for a specific air travel experience after controlling for more general personality variables that are known to be associated with stress in general (e.g., negative affectivity). This question was explored in Study 4.

The correlations between the Global Stress scale and the individual differences measures appeared to reflect the fact that the Global Stress scale is the amalgamation of the Air Travel Anxiety and Air Travel Anger scales. Some correlations with the other individual differences measures appeared to reflect the average of the correlations between Air Travel Anxiety and Air Travel Anger. For example, the correlation between fear of flying and Global Stress was .34 whereas the correlation between fear of the flying and Air Travel Anxiety and Air Travel Anger were .44 and .10 respectively. However, other correlations between the Global Stress scale and the individual differences measures

were sometimes similar to the correlations obtained with the Air Travel Anxiety scale and sometimes similar to the correlations with the Air Travel Anger scale. For example, the correlation between driving anger and Air Travel Anger was .50 while it was .49 with Global Stress. Similarly, the correlation between recent hassles and Air Travel Anxiety was .37 while it was .35 with Global Stress.

In general, the Airline/Airport Trust scale had consistently small correlations with the individual differences measures. Airline/Airport Trust was weakly associated with trait anxiety. Unexpectedly, Airline/Airport Trust was moderately related to state stress and the stress of one's most recent flight. Despite this pattern of correlations between Airline/Airport Trust and related constructs, future studies on the construct validity of the Airline/Airport Trust scale is advised. Similar to what has been observed in prior studies of trust (Gurtman, 1992), perhaps the Airline Airport/Trust is related to the tendency to trust people in general, resentfulness, vindictiveness, and a lack of feelings toward others. Perhaps it is also related to the tendency to have high expectations from others. That is, to the extent that Airline/Airport Trust measures a traveler's expectations that airline and airport personnel should do their job well, the perceived failure of these personnel to their job well may make that traveler feel like the airlines and airports cannot be trusted. Future research could explore these associations.

Study 4: ATSS-R's Prediction of Stress from an Actual Flight Experience

Study 3's correlations with individual differences measures provided some suggestive evidence for the construct validity of the ATSS-R. A common next step for providing further evidence of construct validity of a measure is to show that it relates to reactions to a relevant situation. This was the purpose of Study 4. The primary aim of this study was to determine whether each of the ATSS-R scales were uniquely associated with stress reactions to a specific air travel experience.

Study 4 addressed this primary aim with two sets of analyses. First, initial evidence came from examining the cross-sectional association between each of the ATSS-R scales and state stress reported while at an airport. This analyses is important yet it did not control for individual differences measures believed to be related to state stress (e.g., negative affectivity). A potentially important aspect of supporting the construct validity of the ATSS-R is to examine to what extent the ATSS-R scales predict stress from a recent flight over and above negative affectivity and optimism, two personality traits that are known predictors of stress (Aspinwall & Taylor, 1992; Marco & Suls, 1993; Scheier & Carver, 1992). The ATSS-R's construct validity could also be supported by showing the extent to which it predicts the stress of a recent flight over and above measures of general and situation-specific stress. Thus, the second set of analyses examined the short-term prospective relationship between the ATSS-R scales and the overall stress of a recent commercial airplane flight over and above general personality traits (i.e., negative affectivity and optimism), general life stress and daily hassles, and stress in related situations (i.e., fear of flying and driving anger).

Method

Participants

Participants for each of two sets of analyses were drawn from two different samples. For the first set of analyses, participants were 925 air travelers at the Seattle-Tacoma International Airport who completed the study questionnaires in January-February 2002. The participation rate for this sample was 72% (925/1286). The demographic characteristics of this sample are presented in Table 12. These characteristics of the participants are similar to air travelers at the Seattle-Tacoma Airport (IATA, 2000.) For the second set of analyses, participants were 674 individuals who were a subset of Study 2's web-based follow-up sample selected because they reported at the follow-up that they had taken an airplane flight within the past 30 days. The demographics of this sample are reported in Table 13. Also relevant, 71.2% of this sample had taken 1-2 flights within the past 30 days.

Procedure

For the first set of analyses, the data collection procedures were identical to Study 1, except that the data collection occurred from the beginning of January 2002 to the end of February 2002.

For the second set of analyses, the data collection procedures were described in Study 2. As reported in Study 2, the follow-up interval was six to seven weeks. In the follow up data collection, participants reported that their most recent flight had occurred from zero days to four weeks prior. Thus, the interval from when participants completed the ATSS-R at baseline until the time they took their most recent flight ranged from two

weeks (six week follow-up minus four weeks since most recent flight = two weeks) to seven weeks (seven weeks follow-up minus zero days since most recent flight = seven weeks).

Measures

In the first set of analyses, participants completed the ATSS-R, along with the following:

State Stress Scale (SSS) is a four-item scale written by the author that assesses stress experienced while at an airport. Two items are "How much do you feel worried right now?" and "How much do you feel angry right now?" Responses to each item were rated by the participants from 0 (not at all) to 5 (very much). The average score was 1.84 (SD = 1.06), with no significant differences between women (M = 1.89) and men (M = 1.80), $p>.05$. The alpha coefficient for this scale was .83.

In the second set of analyses, participants completed the ATSS-R at the baseline data collection, along with the following:

PANAS Negative Affect (PANAS-NA; Watson, Clark, & Tellegen, 1988), which was described in Study 3.

Life Orientation Test (LOT; Scheier & Carver, 1985), which was described in Study 3.

Life Experiences Survey (LES; Sarason, Johnson, & Siegel, 1978), which was described in Study 3.

Survey of Recent Life Experiences (SRLE; Kohn & MacDonald, 1992), which was described in Study 3.

Table 12. *Demographic characteristics of Seattle-Tacoma International Airport Sample*

Characteristic	
Male (%)	54.3
White or Caucasian (%)	80.6
Married or with Partner (%)	58.0
More than High School Education (%)	84.4
Age (*M*)	41.0
Age (Range)	10 to 85 years
Air Travel Patterns for the past 12 months	
Number of domestic roundtrips (*Mdn*)	3.0
Flew internationally at least once (%)	46.7
Flies for business at least half time (%)	50.8

Table 13. *Demographic characteristics of Web-Based Follow-up Sample*

Characteristic	
Male (%)	39.2
White or Caucasian (%)	88.1
Married or with Partner (%)	49.2
More than High School Education (%)	61.2
Age (*M*)	41.0
Age (Range)	16 to 78 years
Air Travel Patterns for the past 12 months	
Number of domestic roundtrips (*Mdn*)	4.0
Flew internationally at least once (%)	45.9
Flies for business at least half time (%)	51.0

Flight Anxiety Modality Questionnaire (FAM; Van Gerwen, Spinhoven, Van Dyck, & Diekstra, 1999), which was described in Study 3.

Driving Anger Scale (DAS; Deffenbacher, Oetting, & Lynch, 1994), which was described in Study 3.

In the second set of analyses there was also a follow-up data collection, occurring six to seven weeks later, in which participants completed the following:

Stress of Most Recent Flight: A one-item measure of stress experienced during a respondent's most recent flight. The item read: "How stressful was your most recent commercial airplane flight?" with responses ranging from 1 ("Not at all") to 5 ("Extremely"). The average score was 1.97 (SD = 1.05), with women scoring significantly higher than men (M = 2.05) and men (M = 1.87), $p < .01$.

Statistical Analyses

In the first set of analyses, a multiple regression equation was computed to examine the extent to which each of the three ATSS-R scales predicted State Stress. The predictors were Air Travel Anxiety, Air Travel Anger, and Airline/Airport Trust. To also examine the unique contribution of Global Stress, another equation was computed in which the predictor variables were Global Stress and Airline/Airport Trust.

In the second set of analysis, a hierarchical multiple regression equation was computed to examine the extent to which each of the three ATSS-R scales prospectively predicted the overall stress of a recent commercial airplane flight over and above general personality traits (i.e., negative affectivity and optimism), general life stress and daily hassles, and other aspects of stress in related situations (i.e., fear of flying and driving

anger). In the first step of the hierarchical regression equation, the predictors were negative affectivity and optimism. In the second step of the equation the predictors added were general life stress and recent hassles. In the third step of the equation the predictors added were fear of flying and driving anger. In the fourth step of the equation, the predictors added were Air Travel Anxiety, Air Travel Anger, and Airline/Airport Trust. To also examine the unique contribution of Global Stress, another equation was computed in which the predictor variables at the fourth step were Global Stress and Airline/Airport Trust.

Results

Regressions Predicting State Stress

The first regression equation (reported in Table 14) revealed that each ATSS-R scale was uniquely associated with state stress. The beta weights revealed that the Air Travel Anxiety scale was most associated with state stress, followed by Airline Airport Trust, and Air Travel Anger. The second regression equation (reported in Table 15) revealed that the Global Stress scale was also uniquely associated with state stress. However, the total amount of variance explained by both the Global Stress scale and Airline Airport Trust ($R^2 = .35$) was 7% less than the first equation ($R^2 = .42$; $p<.01$).

Regressions Predicting Stress from a Recent Flight

The second set of equations were hierarchical multiple regressions in which the ATSS-R scales prospectively predicted stress from a most recent flight over and above general personality traits (i.e., negative affectivity and optimism), general life stress and daily hassles, and stress in related situations (i.e., fear of flying and driving anger). The first

equation from this analysis (reported in Table 16) revealed that the general personality traits, general life stress, and situation-specific stress accounted for 16% of the total variance in the stress from a most recent flight. The beta weights revealed that only negative affectivity and the fear of flying were significant predictors. The Air Travel Anxiety, Air Travel Anger, and Airline/Airport Trust scales contributed an additional 12% of the variance above and beyond the variables entered in the prior steps of the equations. Each of these three ATSS-R scales was significantly associated with the stress of the most recent flight. The beta weights revealed that Airline/Airport Trust added the most variance in the last step of the equation, followed by Air Travel Anxiety and Air Travel Anger. The second equation from this final analysis (reported in Table 17) revealed similar results. Specifically, the Global Stress and Airline/Airport Trust scales together predicted 10% of the variance above and beyond the variables entered in the prior steps.

Discussion

Results across the two samples provided further evidence for the construct validity of the ATSS-R by suggesting that the tendency to experience air travel stress does consistently relate to stress reported for a specific flight experience. This study showed that each of the ATSS-R scales were cross-sectionally associated with state stress reported while at an airport. Also noteworthy, the Air Travel Anger scale was least associated with state stress. This is probably because the Air Travel Anger scale and Air Travel Anxiety scale were somewhat collinear, meaning that they shared some variance. They were correlated .39 ($P<.001$). Indeed, a follow-up analysis showed that the Air

Table 14. *Three-Factor ATSS-R Prediction of State Stress (N=925)*

Variable	β	R^2 total	F	Sig F
Air Travel Anxiety	.64**			
Air Travel Anger	.08*			
Airline/Airport Trust	-.13*			
		.42	F (3, 921) = 217.92	$p < .001$

*$p<.01$; **$p<.001$.

Table 15. *Two-Factor ATSS-R Prediction of State Stress (N=925)*

Variable	β	R^2 total	F	Sig F
Global Stress	.53**			
Airline/Airport Trust	-.13*			
		.35	F (2, 922) = 252.02	$p < .001$

*$p<.01$; **$p<.001$.

Table 16. *Hierarchical Multiple Regression with Three-Factor ATSS-R Predicting Stress of Most Recent Flight in Prospective Sample (N=674)*

Variable	β	R^2 change	F change	Sig F
Step 1				
Negative Affectivity	.27**			
Optimism	-.05			
		.09	F (2,672) = 34.06	$P < .001$
Step 2				
Life Stress	-.04			
Recent Hassles	.01			
		.00	F (2, 670) = .40	$P = .67$
Step 3				
Driving Anger	.01			
Fear of Flying	.27**			
		.07	F (2, 668) = 26.23	$P < .001$
Step 4				
Air Travel Anxiety	.18**			
Air Travel Anger	.10*			
Airline/Airport Trust	-.32**			
		.12	F (3, 665) = 36.40	$P < .001$

R^2 total = .28, F (9, 665) = 28.41, $p < .001$.

*p<.01; **p<.001.

Table 17. *Hierarchical Multiple Regression with Two-Factor ATSS-R Predicting Stress of Most Recent Flight in Prospective Sample (N=674)*

Variable	β	R^2 change	F change	Sig F
Step 1				
Negative Affectivity	.27**			
Optimism	-.05			
		.09	F (2,672) = 34.06	$P < .001$
Step 2				
Life Stress	-.04			
Recent Hassles	.01			
		.00	F (2, 670) = .40	$P = .67$
Step 3				
Driving Anger	.01			
Fear of Flying	.27**			
		.07	F (2, 668) = 26.23	$P < .001$
Step 4				
Global Stress	.17*			
Airline/Airport Trust	-.32**			
		.10	F (2, 666) = 46.91	$P < .001$
R^2 total = .26, F (8, 666) = 29.70, $p < .001$.				

*p<.01; **p<.001.

Travel Anger scale was more strongly associated with state stress (i.e., Air Travel Anger's beta weight was .26) when Air Travel Anxiety was not included in a regression equation compared to when Air Travel Anxiety was included in a regression model (i.e., Air Travel Anger's beta weight was .08).

Each of the ATSS-R scales were also prospectively associated with stress from one's most recent commercial airplane flight, over and above negative affectivity, optimism, general life stress, recent hassles, driving anger, and fear of flying. The ATSS-R scales together predicted more variance than the prior steps of the regression equations. The prospective analysis also showed that fear of flying was a significant predictor of stress from one's most recent flight. This finding suggests that fear of flying may be another component of what may make flying stressful. This possibility should be explored in future analyses.

Across the two samples, the Global Stress scale consistently predicted stress for a specific air travel experience. However, there was evidence that the Global Stress scale explained less variance in state stress than the separate Air Travel Anxiety and Air Travel Anger scales combined. This finding provides some evidence that the Global Stress scale may be less predictive of stress from a specific air travel experience than both the Air Travel Anxiety and Air Travel Anger scales.

The ATSS-R explained a modest amount of the variance in stress reported for a specific air travel experience. More variance may have been explainable had their been validated measures of stress for a specific air travel experience. Because there were no existing measures of stress reported for a specific air travel experience, these measures

were created for this research. Further development of these measures would be important for future studies. An issue to consider for the future is to create a multi-item scale of stress experienced during one's most recent flight. One view argues that if a construct being measured is sufficiently narrow or is unambiguous to the respondent, a single-item measure may suffice (Sackett & Larson, 1990; Wanous, Reichers, & Hudy, 1997). Although is also arguable that the overall stress level of one's most recent flight could be assessed with a single, unambiguous, and specific item, a multi-item scale is preferable because it is possible to estimate the internal reliability of the measure and provides a more in-depth assessment of the construct (Nunnally, 1978).

Study 5: Demographic Differences in the ATSS-R

The purpose of Study 5 was to identify demographic differences in air travel stress. Such an investigation would provide further evidence for the construct validity of the ATSS-R by showing that specific dimensions of air travel stress are related to demographic factors in conceptually meaningful ways. Moreover, one practical benefit of this investigation may be to suggest readily identifiable markers that a person is at higher or lower risk for experiencing air travel stress. The Introduction to the dissertation discussed six demographic factors that may be associated with air travel stress and hypothesized why some factors would be more related to certain ATSS-R scales than others. These hypotheses were explored in Study 5 with a cross-sectional sample and then replicated with a prospective sample of air travelers.

Method

Participants

Participants for the cross-sectional analyses were 925 air travelers at the Seattle-Tacoma International Airport who completed the study questionnaires in January-February 2002. The participation rate for this second sample was 72% (925/1286). The demographic characteristics of this sample are presented in Table 18. These characteristics of the participants were similar to air travelers at the Seattle-Tacoma Airport (IATA, 2000.)

Participants for the prospective analyses were the 2382 individuals from Study 2 who completed demographic measures at baseline and the ATSS-R six to seven weeks

Table 18. *Demographic characteristics of Seattle-Tacoma International Airport Sample*

Characteristic	
Male (%)	54.3
White or Caucasian (%)	80.6
Married or with Partner (%)	58.0
More than High School Education (%)	84.4
Age (*M*)	41.0
Age (Range)	10 to 85 years
Air Travel Patterns for the past 12 months	
Number of domestic roundtrips (*Mdn*)	3.0
Flew internationally at least once (%)	46.7
Flies for business at least half time (%)	50.8

Table 19. *Demographic characteristics of Web-Based Follow-up Sample*

Characteristic	
Male (%)	38.2
White or Caucasian (%)	89.1
Married or with Partner (%)	53.2
More than High School Education (%)	63.2
Age (*M*)	39.0
Age (Range)	12 to 78 years
Air Travel Patterns for the past 12 months	
Number of domestic roundtrips (*Mdn*)	4.0
Flew internationally at least once (%)	39.9
Flies for business at least half time (%)	47.0

later. The follow-up rate was 72%. The demographics of this sample are reported in Table 19.

Procedure

For the cross sectional analyses, the data collection procedures were identical to Study 1, except that the data collection occurred from the beginning of January 2002 to the end of February 2002.

For prospective analyses, the baseline and follow-up data collection procedures were described in Study 2. As reported in Study 2, the follow-up interval was six to seven weeks.

Measures:

For the cross-sectional analysis, participants completed the ATSS-R and the following:

Demographics. A nine-item survey that included assessments of participants' gender, age, income, usual purpose of flying (i.e., business versus pleasure), number of domestic (within the US) roundtrips within the past 12 months, number of international (outside the US) roundtrips within the past 12 months.

For the prospective analysis, participants completed a demographics survey (described in the paragraph above) at baseline and the ATSS-R at the follow-up.

Statistical Analyses

In both the cross-sectional and prospective analyses, six Multivariate Analyses of Variance (MANOVA) were calculated to detect differences in the ATSS-R scales' scores for each of the six demographic measures. For the first analysis, the comparison variable was gender. For the second analysis, the comparison variable was age. Four identical 15-

year interval age groups (10-24, 25-39, 40-54, 55-69) were created for both the cross-sectional and prospective analysis in order to make the two analyses readily comparable. For the third analysis, the comparison was whether or not the participant's gross household income was above $40,000. This amount was the median income level for both the cross-sectional and prospective sample. For the fourth analysis, the comparison was whether the participant flew mostly/always for business or mostly/always for pleasure. For the fifth analysis, the comparison variable was the participant's frequency of roundtrip domestic flights within the past 12 months. The domestic flight frequencies were divided into four quartiles (0-2, 3-4, 5-8, 9+ roundtrips). These four quartiles were the same in both the cross-sectional and prospective sample. For the sixth analysis, the comparison variable was whether or not the participant had flown at least one roundtrip international flight within the past 12 months. This grouping was chosen because in both the cross-sectional and prospective sample the median number of roundtrip international flights for the past 12 months was one.

The outcome variables were: Air Travel Anxiety, Air Travel Anxiety, Global Stress, and Airline/Airport Trust. Effect sizes were calculated with the partial η^2. This effect size coefficient can be interpreted as the percentage of the outcome variable's variance that is explained by the comparison variable (Pedhazur, 1997). Posthoc comparisons were conducted using the Bonferonni procedure (Edwards, 1985), in which the alpha level of each pairwise comparison is divided by the total number of comparisons. These posthoc comparisons were conducted for the age group analysis and domestic flight frequency analysis because they included more than two groups. As

suggested by (Perneger, 1998), all Bonferonni comparisons conducted with the first (cross-sectional) sample were confirmed in a separate (prospective) sample.

Results

A one-way (gender) MANOVA on the ATSS-R scales (Table 20) revealed a significant multivariate effect for gender in both the cross-sectional ($F(4, 920) = 19.24$, partial $\eta^2 = .063$, $P<.001$) and prospective sample ($F(4, 2377) = 51.78$, partial $\eta^2 = .100$, $P<.001$). In both samples, women reported higher levels of Air Travel Anxiety, lower levels of Air Travel Anger, and higher levels of Airline/Airport Trust. Only in the prospective sample did women report higher levels of Global Stress.

A one-way (age group) MANOVA on the ATSS-R scales (Table 21) revealed a significant multivariate effect for the four age groups in both the cross-sectional ($F(4, 920) = 10.62$, partial $\eta^2 = .037$, $P<.001$) and prospective sample ($F(4, 2377) = 12.44$, partial $\eta^2 = .026$, $P<.001$). In both samples, Bonferonni post hoc tests revealed that participants aged 55-69 reported significantly less Air Travel Anxiety than all of the younger age groups ($P<.01$). In both samples there were no significant differences in Air Travel Anger scores among the four age groups. Also in both samples, 55-69 year-olds reported higher levels of Airline/Airport Trust than all of the younger age groups ($P<.05$).

There were inconsistent results across the two samples for the comparisons of Global Stress scores. Specifically, the Bonferonni post hoc comparison tests showed that, in the cross-sectional sample, the only significant comparison was that the 55-69

Table 20. *Gender differences in ATSS-R scales for cross-sectional and prospective sample*

Measure	Men		Women		
	M	SD	M	SD	F Value
Air Travel Anxiety					
Cross-Sectional Sample	1.78	.87	2.02	.87	15.75***
Prospective Sample	1.87	.89	2.30	.90	101.28***
Airline Travel Anger					
Cross-Sectional Sample	2.32	.93	2.13	.94	8.04**
Prospective Sample	2.62	.99	2.43	1.01	14.90***
Global Stress					
Cross-Sectional Sample	2.01	.76	2.07	.80	1.18
Prospective Sample	2.25	.77	2.43	.77	24.45***
Airline/Airport Trust					
Cross-sectional Sample	3.23	.89	3.38	.78	6.30*
Prospective Sample	2.50	.97	2.62	.95	6.08*

*$P<.05$, **$P<.01$, ***$P<.001$

Table 21. *Age differences in ATSS-R scales for cross-sectional and prospective sample*

Measure	Age 10-24		Age 25-39		Age 40-54		Age 55-69		F Value
	M	SD	M	SD	M	SD	M	SD	
Air Travel Anxiety									
Cross-Sectional Sample	2.08	.89	1.93	.80	1.92	.92	1.65	.87	5.88***
Prospective Sample	2.17	.93	2.21	.94	2.10	.90	1.89	.89	7.64***
Airline Travel Anger									
Cross-Sectional Sample	2.21	.95	2.25	.92	2.26	.92	2.19	.92	.27
Prospective Sample	2.39	1.06	2.48	1.03	2.54	.98	2.54	.97	1.54
Global Stress									
Cross-Sectional Sample	2.13	.78	2.07	.74	2.07	.81	1.88	.76	2.89*
Prospective Sample	2.34	.81	2.35	.78	2.36	.77	2.22	.76	3.27*
Airline/Airport Trust									
Cross-sectional Sample	3.28	.78	3.17	.85	3.29	.84	3.56	.78	7.22***
Prospective Sample	2.51	.94	2.47	.98	2.54	.92	2.74	.95	11.52***

*$P<.05$, **$P<.01$, ***$P<.001$

Table 22. *Income differences in ATSS-R scales for cross-sectional and prospective sample*

	Under 40K		Over 40K		
Measure	M	SD	M	SD	F Value
Air Travel Anxiety					
Cross-Sectional Sample	1.93	.89	1.83	.86	3.85*
Prospective Sample	2.21	.93	2.06	.91	12.22***
Airline Travel Anger					
Cross-Sectional Sample	2.15	.92	2.31	.94	6.11**
Prospective Sample	2.37	1.02	2.58	.99	18.02***
Global Stress					
Cross-Sectional Sample	2.03	.78	2.04	.78	.033
Prospective Sample	2.36	.80	2.35	.76	.06
Airline/Airport Trust					
Cross-sectional Sample	3.33	.81	3.25	.86	1.99
Prospective Sample	2.73	.95	2.48	.95	30.20***

*$P<0.05$, **$P<0.01$, ***$P<.0001$

Table 23. *Pleasure and Business traveler differences in ATSS-R scales for cross-sectional and prospective sample*

	Pleasure		Business		
Measure	M	SD	M	SD	F Value
Air Travel Anxiety					
Cross-Sectional Sample	1.93	.89	1.80	.88	3.84*
Prospective Sample	2.22	.93	1.97	.92	23.41***
Airline Travel Anger					
Cross-Sectional Sample	2.24	.93	2.23	.93	.249
Prospective Sample	2.42	1.01	2.60	.99	10.61***
Global Stress					
Cross-Sectional Sample	2.07	.78	1.97	.77	2.29
Prospective Sample	2.39	.79	2.30	.76	3.05
Airline/Airport Trust					
Cross-sectional Sample	3.35	.83	3.21	.88	4.27*
Prospective Sample	2.68	.97	2.45	.97	19.88***

*$P<0.05$, **$P<0.01$, ***$P<.0001$

year-olds scored less than the 10-24 year-olds on Global Stress (P<.05). In contrast, in the prospective sample, the only significant comparison was that the 55-69 year-olds scored less than the 25-39 year-olds on Global Stress (P<.05).

A one-way (income) MANOVA on the ATSS-R scales (Table 22) revealed a significant multivariate effect for the two income groups in both the cross-sectional ($F(4, 920) = 6.68$, partial $\eta^2 = .024$, P<.001) and prospective sample ($F(4, 2377) = 21.91$, partial $\eta^2 = .046$, P<.001). In both samples, participants reporting gross household incomes greater than $40,000 reported significantly lower levels of Air Travel Anxiety, significantly higher levels of Air Travel Anger than participants reporting household incomes of $40,000 or less. In both samples, there were no significant differences between the two income groups on Global Stress. The inconsistency between the two samples was that, in the prospective sample, participants earning more than $40,000 reported lower levels of Airline/Airport Trust whereas this same comparison was not significant in the cross-sectional sample.

A one-way (business vs. pleasure) MANOVA on the ATSS-R scales (Table 23) revealed a significant multivariate effect for whether some flew for business or pleasure in both the cross-sectional ($F(4, 917) = 3.67$, partial $\eta^2 = .017$, P<.05) and prospective sample ($F(4, 2370) = 24.00$, partial $\eta^2 = .062$, P<.001). In both samples, business travelers scored significantly lower on Air Travel Anxiety and Airline/Airport Trust. However, business and pleasure travelers did not differ on Global Stress although this nonsignificant result was consistent across both samples. The inconsistent result for this

analysis was that business travelers scored significantly higher on Air Travel Anger in the prospective sample, whereas this same comparison was not significant in the cross-sectional sample.

A one-way (domestic flights) MANOVA on the ATSS-R scales (Table 24) revealed a significant multivariate effect for the four domestic flight frequency groups in both the cross-sectional ($F(4, 918) = 7.67$, partial $\eta^2 = .027$, $P<.001$) and prospective sample ($F(4, 2372) = 43.99$, partial $\eta^2 = .087$, $P<.001$). In both samples, more frequent domestic travelers reported significantly lower Air Travel Anxiety. Bonferonni tests revealed that, in both samples, participants who took at least 9 roundtrips in the past 12 months scored significantly lower on Air Travel Anxiety than the three other, less frequent domestic traveler groups ($P<.01$). Only in the prospective sample did more frequent travelers score significantly higher on Air Travel Anger, significantly lower on Global Stress, and significantly lower on Airline/Airport Trust. For the prospective sample, participants who took at least 9 roundtrips in the past 12 months scored significantly higher on both Air Travel Anger and Airline/Airport Trust than the three other, less frequent domestic traveler groups ($P<.01$). Also for the prospective sample, participants who took at least 9 roundtrips significantly lower on Global Stress than only the participants who flew 0-2 roundtrips per year ($P<.01$).

A one-way (international flights) MANOVA on the ATSS-R scales (Table 25) revealed a significant multivariate effect for whether someone flew internationally in the

Table 24. *Domestic roundtrip air travel differences in ATSS-R scales for cross-sectional and prospective sample*

	0-2 roundtrips		3-4 roundtrips		5-8 roundtrips		9+ roundtrips		
Measure	M	SD	M	SD	M	SD	M	SD	F Value
Air Travel Anxiety									
Cross-Sectional Sample	1.99	.88	1.86	.90	1.88	.85	1.71	.88	4.27**
Prospective Sample	2.33	.88	2.21	.91	2.10	.94	1.88	.90	20.54***
Airline Travel Anger									
Cross-Sectional Sample	2.22	.93	2.21	.91	2.34	.93	2.22	.94	.57
Prospective Sample	2.42	1.02	2.45	.98	2.47	1.01	2.67	1.00	6.22***
Global Stress									
Cross-Sectional Sample	2.09	.77	2.01	.77	2.02	.78	1.93	.78	2.16
Prospective Sample	2.44	.77	2.40	.77	2.34	.79	2.27	.75	4.44**
Airline/Airport Trust									
Cross-sectional Sample	3.35	.83	3.34	.77	3.35	.81	3.18	.95	1.46
Prospective Sample	2.62	.99	2.64	.94	2.63	.97	2.40	.94	6.45***

*$P<.05$, **$P<.01$, ***$P<.001$

Table 25. *International roundtrip travel differences in ATSS-R scales for cross-sectional and prospective sample*

Measure	No Int'l Roundtrips M	SD	1 or More Int'l Roundtrips M	SD	F Value
Air Travel Anxiety					
Cross-Sectional Sample	1.86	.89	1.92	.86	.97
Prospective Sample	2.22	.94	1.99	.89	27.84***
Airline Travel Anger					
Cross-Sectional Sample	2.19	.96	2.29	.90	3.82*
Prospective Sample	2.44	1.00	2.59	1.02	9.49**
Global Stress					
Cross-Sectional Sample	2.00	.79	2.07	.76	2.15
Prospective Sample	2.40	.78	2.31	.77	5.49*
Airline/Airport Trust					
Cross-sectional Sample	3.38	.83	3.20	.86	9.97**
Prospective Sample	2.62	.95	2.50	.98	6.88*

*$P<.05$, **$P<.01$, ***$P<.001$.

past 12 months in both the cross-sectional ($F(4, 920) = 3.65$, partial $\eta^2 = .013$, $P<.05$) and prospective sample ($F(4, 2373) = 19.96$, partial $\eta^2 = .041$, $P<.001$). In both samples, international travelers scored significantly higher on Air Travel Anger and significantly lower on Airline/Airport Trust. There were two results for this analysis that did not replicate across the two samples: international travelers scored significantly lower on Air Travel Anxiety and Total Airline/Airport Trust in the prospective sample whereas this same comparison was not significant in the cross-sectional sample.

Discussion

The results suggested a number of consistent demographic differences in air travel stress that may further support the construct validity of the ATSS-R and suggest readily-identifiable markers of those who may experience more air travel stress.

As expected, the results from both samples showed that women reported higher levels of Air Travel Anxiety, lower levels of Air Travel Anger, and higher levels of Airline/Airport Trust. These results were consistent with the sociocultural model of gender which suggests that appropriate roles for women include more free expression anxiety and trust whereas more appropriate roles for men are to more freely express anger (Eagly, 1987; Eagly & Wood, 1991). The results also suggest the possibility, articulated by Feingold (1994), that it is more socially desirable for women to express more anxiety, trust, and less anger. One interpretation of these results could be that being a woman may be a risk factor for air travel anxiety, whereas being a man may be a risk factor for air travel anger and distrust of the airports/airlines. It is also possible that women have lower thresholds for reporting anxiety.

The results from both samples also showed that participants aged 55-69 reported significantly less Air Travel Anxiety and higher levels of Airline/Airport Trust than all of the younger age groups. These results suggest that older travelers experience less air travel stress in general. These findings could be viewed as helping to diminish the stereotype that older people are ill, grouchy, and complain a lot (Crockett & Hummert, 1987; Kite, Deaux, & Miele, 1991). As an illustration of this phenomenon, Nosek, Banaji, & Greenwald (2002) recently found that both younger and older participants (age range was 8 to 71) were more likely to pair old faces, than young faces, with a negative emotional valence in a web-based implicit attitudes test. In contrast with these negative stereotypes, the stress of air travel appears to be less of a problem for older people than younger people perhaps because they are more experienced and accepting of the challenges of air travel. Also consistent with Twenge's (2002) hypothesis that younger people experience more anxiety than older people, this study suggests that younger travelers experience more air travel anxiety than older travelers.

Regarding income, participants in both samples who reported gross household incomes greater than $40,000 appeared to have lower levels of Air Travel Anxiety. These results were consistent with the social causation (e.g., Hollinghead & Redlich, 1958) and social selection theories (e.g., Wender, Rosenthal, Kety, Schulsinger, & Welner, 1974) discussed in the Introduction to the dissertation. Those with incomes greater than $40,000 reported higher levels of Air Travel Anger than participants reporting household incomes of $40,000 or less. One explanation for this finding that could be explored in future research is that people with higher incomes may expect other passengers to have

certain kinds of polite and courteous behavior and they have little tolerance for rude behavior. In both samples, the results suggest there are no differences between the two income groups on Global Stress. These non-significant results maybe an artifact of the Global Stress scale's construction. That is, the Global Stress scale contains both the Air Travel Anxiety and Air Travel Anger scale items and each of these two scales' had findings in the opposite directions. When both scales were put together into one scale (i.e., the Global Stress scale) these findings may have cancelled each other out.

Several demographic factors relating to an individual's air travel patterns appeared to be related to air travel stress. In both samples, business travelers scored significantly lower on Air Travel Anxiety, a result that is consistent with the interpretation that business travelers may know more adaptive ways to respond to the adverse air travel events assessed by the Air Travel Anxiety scale than pleasure travelers. In both samples business travelers also scored significantly lower on Airline/Airport Trust, a result that is consistent with the explanation that business travelers probably expect more from the airports and airlines because they depend on them for their livelihood. Minor failures of the airlines and airports to ensure a passenger's comfort and safety (e.g., a baggage screener allowing a potentially harmful object to pass through security) may erode business travelers' trust in the airlines and airports. The consistent non-significant differences between business and leisure travelers on Global Stress was ambiguous. One interpretation is that because the Air Travel Anxiety was lower in business travelers whereas Air Travel Anger was either higher or not significantly different (depending on the sample) in the business travelers perhaps putting them

together in one scale (i.e., Global Stress) cancelled out the differences between business and pleasure travelers.

In both samples, participants who took at least 9 roundtrips in the past 12 months scored significantly lower on Air Travel Anxiety than the three other, less frequent domestic traveler groups. Perhaps because of their more recent and frequent exposure to air travel environments, these travelers have learned ways to deal with the situations that lead to air travel anxiety. Future research could explore this possibility. The results also suggest that eight or less yearly roundtrip domestic flights could be used a rough marker of those will tend experience higher levels of air travel anxiety.

A final demographic characteristic explored in this study was whether or not the participant flew internationally within the past 12 months. In both samples, international travelers scored significantly higher on Air Travel Anger. One reason may be that because international travel tends to be more expensive, these travelers may be wealthier than other travelers. For example, data from the cross-sectional sample showed that 45% of those who flew internationally at least once in the past 12 months had incomes above $40,000 whereas 32% of those who did not fly internationally at least once in the past 12 months had incomes above $40,000 ($p<.001$). For social class reasons they may have expectations of certain kinds of polite behavior from other passengers. International travelers also scored significantly lower on Airline/Airport Trust. This finding is consistent with the data that airports and airlines in Western Europe and parts of Asia are perceived by travelers as having higher security and service standards than airports and airlines in the United States (IATA, 2000). Thus, by comparing his/her usual experience

with airlines and airports in the US with those in these countries, an international traveler may view the domestic airports and airlines as less capable of ensuring his/her comfort and safety.

Finally, the inconsistent results observed across the two samples could be explored in future research. Some comparisons that were significantly different in the prospective sample were not significantly different in the cross-sectional sample. One possible explanation for these inconsistencies is that the prospective sample, being drawn from a nationwide media recruitment, was more heterogeneous in some unmeasured factors than the cross-sectional that was drawn at one airport. Analyses using samples of other travelers may help shed more light on these inconsistent comparisons.

General Discussion

The purposes of this research were to develop a measure of air travel stress and examine its reliability and construct validity. The results revealed three components of air travel stress: anxious reactions to adverse air travel events, angry reactions to other passengers, and trust that the airlines/airports will ensure one's comfort and safety. Each of these three components was shown to have good internal reliability and good retest reliability over a six to seven week interval. These three dimensions were moderately correlated with each other, suggesting that they each assess related yet distinct components of air travel stress.

The data across the studies provide evidence for the construct validity of the ATSS-R. First, both the exploratory and confirmatory factor analysis provided evidence that the ATSS-R items clustered together on the factors they were intended to measure. Second, the ATSS-R's correlations with individual differences measures were not uniform, suggestive of differential relationships. The Air Travel Anxiety and Air Travel Anger scales were most correlated with conceptually similar measures, including fear of flying and driving anger. Third, most of the variance shared between the ATSS-R and the other individual differences was not explained by negative affectivity. Fourth, all of the ATSS-R measures were predictive of stress reported for a specific air travel experience, over and above general and specific individual differences measures known to predict stress. Fifth, there were suggestive demographic differences in air travel stress.

The data also support the hypothesis that air travel stress sensitivity exists independently of sensitivity to other kinds of stressors. The correlations in Study 3

suggest that air travel has a small to moderate relationship with negative life event stress and recent hassles. One implication is that a person who experiences high air travel stress may not necessarily experience stress in general. Similarly, the moderate correlations between air travel stress and driving anger suggest that the stress reactions to air travel may be distinct from the stress reactions to other common forms of travel such as the automobile. These results are consistent with Sarason's (1975) argument that test anxiety can exist independently of other types of anxiety. The results also support the argument that to more have a richer understanding of stress reactions it may be important to examine the specific situations perceived to be eliciting stress.

Air travel stress also appears to have unique emotional components. These components include air travel anxiety and air travel anger. These results are contrary to Watson and Clark's (1984) argument that self-report stress measures simply reflect a single underlying negative affect construct. Study 1 and 2 provided suggested evidence that the air travel anger and air travel anxiety scales were separate constructs. Moreover, Study 3 and 4 suggested that most of the variance shared between the ATSS-R and the other individual differences measures could not be explained by negative affectivity. These results are consistent with prior investigations showing that negative affectivity does not adequately explain the shared variance between self-report measures of affect (see, for example, Kluger, Levinsohn, & Aiello, 1994). One possible implication is that the people who experience air travel stress are not simply those individuals who are high in negative affect—i.e., those who generally experience significant distress in any given

situation even in the absence of any overt stress. By contrast, the data suggest that air travel may elicit distinct emotional reactions from a variety of travelers.

The idea that air travel stress is a multidimensional construct has implications for whether the Global Stress scale should be considered a component of the ATSS-R. Sarason and Sarason (1990) argued that since psychometric data reveal that there are various scales of a common test anxiety measure (i.e., the Reactions to Test Scale; Sarason, 1984) it is logical to make comparisons among them concerning their predictive value, as opposed to treating the measure as one global test anxiety factor. The same could be said of the Globe Stress ATTS-R scale. Although the Global Stress scale had good internal and retest reliability, a number of results suggest that this scale can be divided into two scales, namely, Air Travel Anxiety and Air Travel Anger. First, the factor analysis showed that the items of Global Stress scale had lower factor loadings and explained less of the total variance than the Air Travel Anxiety and Air Travel Anger scales. Second, the Global Stress scale had an inadequate fit to the data in confirmatory factor analysis. Third, the Global Stress scale explained less variance in state stress than the separate Air Travel Anxiety and Air Travel Anger scales combined. Fourth, the non-significant demographic differences in Global Stress were ambiguous. Overall, these findings support the recommendation that the Global Stress scale should not be included as an ATSS-R scale.

The findings from this series of studies have implications not only for ATSS-R instrument development, but also for air travel stress management. First, air travel stress management interventions could assess the ATSS-R's three dimensions of air travel

stress in reliable, reasonably brief ways. This assessment could identify dimensions of stress that may need attention in an intervention. Second, effects of interventions designed to lower air travel stress could be assessed with the ATSS-R. Finally, the observed demographic differences in air travel stress suggest that interventions targeting a specific demographic group (e.g., business travelers) could be tailored to the particular components of air travel stress that tend to rate higher for that demographic group.

Limitations and Directions for Future Research

There were some methodological limitations of the studies. The first key limitation is that all of the data were correlational, thus preventing any causal interpretations from being drawn. Second, because all of the data were self-report there was no external validation. Future research should consider further validating the ATSS-R by correlating it with physiological measures of stress (e.g., galvanic skin response) or behavioral observations of ATSS-R respondents who are taking an airplane flight. Moreover, people may misreport their anxiety, anger, and trust perhaps to present themselves in a socially desirable way. This possibility was not too likely because the correlation between the ATSS-R and social desirability was low. A third limitation is that the ATSS-R does not likely assess all of the most important components of air travel stress. Future research could add a dimension that measures one's angry reactions toward airline and airport personnel. Other possible components include fatigue and boredom experienced at the airport and on the plane.

One area for future research is to develop new ways to test the extent to which the ATSS-R predicts stress during an actual air travel experience. A more fine-grained

analysis could involve participants completing the ATSS-R at baseline and then for each time they fly within the next few months they could complete brief assessments of stress levels on a website. Such a study could show how the ATSS-R predicts changes in the stress of specific air travel experiences over time.

A different scientific question that goes beyond the scope of the current investigations is to ask the extent to which air travel stress may have changed before and after the September 11,2001 airplane terrorist attacks in the United States. In these attacks, terrorists commandeered US jetliners that crashed into the World Trade Center, the US Pentagon, and an open field in rural Pennsylvania (Schmemann, 2001). A future study could examine whether it is possible that these events may have changed a traveler's tendency to experience air travel stress.

Two interesting associations between the ATSS-R and coping are worthy of future investigation. First, the results suggest that using substances to cope appears to be weakly related to higher levels air travel stress. A future study could explore the possibility that the propensity to experience air travel stress is strongly related to using substances while in a specific air travel situation, as compared to using substances as a general coping style. Moreover, because the substance abuse coping scale did not measure specific substance use, future investigations could also examine whether air travel stress specifically predicts the use of substances such as cigarettes, a substance with great public health significance (USDHHS, 1994). Such investigations may also prove useful for the development of interventions designed to reduce air travel stress, and thereby reduce alcohol use at airports and on planes. Alcohol use has been cited as a possible etiological

factor in recent physical assaults of passengers and airline/airport personnel (Federal Aviation Administration, 2002).

A second interesting finding was that higher levels of Air Travel Anxiety were weakly related to lower levels of active coping. A future study could explore the possibility that the propensity to experience air travel stress is more strongly related to engaging in active coping while in a specific air travel situation, as compared to engaging in active coping in general. Such a study could not only enhance the conceptual understanding of how air travel stress is related to an active coping style, but may also be of practical benefit for teaching travelers ways to reduce their air travel stress.

Finally, it should be noted that air travel stress, like all constructs, is only a concept, and therefore there is no way to know for certain that the ATSS-R actually measures air travel stress. As noted by Nunnally (1978), reliability and construct validity analyses at best can only provide "circumstantial evidence" for the for the usefulness of a measure. Researchers should be encouraged to use the ATSS-R only if in the course of numerous future investigations the ATSS-R yields interesting findings and tends to fit the construct name that has been assigned to it.

In summary, these studies identified three components of air travel stress. These components were anxious reactions to adverse air travel events, angry reactions toward other travelers, and trust of the airports/airlines to ensure one's comfort and safety. These components of air travel stress could be assessed reliably. These measures also formed understandable relationships with individual differences measures including fear of flying, driving anger, and recent hassles. The studies also provided evidence that the

ATSS-R predicts stress for a specific air travel experience after controlling for a number of individual differences measures that are related to stress. The ATSS-R is a potentially useful instrument in air travel stress management interventions.

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Appendix A: Initial Version of Air Travel Stress Scale-Revised (ATSS-R)

Instructions: A number of statements which people have used to describe their experiences of air travel are given below. At the right of each statement, please circle the rating that BEST indicates the extent to which you agree with that statement. There are no right or wrong responses.

Rating Scale:

0	1	2	3	4	5
Completely Disagree	Mostly Disagree	Somewhat Disagree	Somewhat Agree	Mostly Agree	Completely Agree

1) I am frustrated by the ways airlines treat their passengers.
2) Before a flight I think about how much I will enjoy myself on the plane.
3) I feel shaky if the airport is crowded.
4) I think airlines are honest about why flights are delayed/cancelled.
5) Current airport security measures make me feel safe about flying.
6) I feel panicky when I am running late for a flight.
7) Airline personnel treat me fairly.
8) I would be annoyed if another passenger were also assigned my seat.
9) My body feels tense if my flight is delayed
10) I feel content when there is ample space to stow my carry-on bags.
11) I feel shaky if I have to sit on the tarmac/taxiway for a long time.
12) I feel satisfied with airlines' service overall.
13) I sometimes think airport security agents single me out for extra searches.
14) I feel annoyed when babies/small children are on the plane.
15) I would feel resentful if I had to sit near loud/talkative passengers.
16) I think airlines appreciate their passengers.
17) I would feel short of breath if I were cramped between people on the plane.
18) I would feel restless if I had to sit in the airplane for a long time.
19) Current airport security measures deter hijackings or bombings.
20) I think airline personnel are doing the best job they can.
21) I feel happy when airline/airport personnel give me correct information.
22) I would be annoyed if I had to sit near ill passengers.
23) Airlines' service fails to meet my expectations.
24) It bothers me when other passengers want special treatment.
25) I fear that my baggage will be lost/stolen/damaged.
26) I feel relaxed when the airplane is nearly empty.
27) I want to say mean things when other passengers take up part of my personal space on the plane.
28) I trust the airlines.
29) Airlines give me the service I deserve.
30) I worry that my flight will be cancelled.

31) I would want to yell at airline gate agents if they forced me to check my carry-on baggage.
32) I worry other passengers may do something harmful on the plane.
33) It would bother me if other passengers tried to board the plane before their row was called.
34) I feel like screaming at passengers who bring aboard a lot of carry-on baggage.
35) I feel calm if my flight is on-time.
36) I sometimes think airline/airport personnel are unfriendly or unhelpful.
37) I think other passengers behave well.
38) I fear that I will miss a connecting flight.
39) I would want to hit an airline agent who would not let me board because the airplane door had just closed.
40) I worry about whether my flight will arrive on time.
41) I feel relaxed when airline procedures are familiar to me.
42) I would feel like hitting a flight attendant who stopped serving me alcohol.
43) I might argue with an airline agent if I was not able to get my preferred seat on the plane.
44) I feel pleasant if I check in early for a flight.
45) I would be bitter if I had little time to get to a connecting flight.
46) I am very nice to other passengers and airline/airport personnel.
47) After a flight I think about how long I will have to wait for my bags at the baggage claim.
48) My heart races if my baggage is hand inspected by airport security.

Appendix B: Final Version of Air Travel Stress Scale-Revised (ATSS-R)

Instructions: A number of statements which people have used to describe their experiences of air travel are given below. At the right of each statement, please circle the rating that BEST indicates the extent to which you agree with that statement. There are no right or wrong responses.

Rating Scale:

0	1	2	3	4	5
Completely Disagree	Mostly Disagree	Somewhat Disagree	Somewhat Agree	Mostly Agree	Completely Agree

1) I feel shaky if the airport is crowded.
2) Current airport security measures make me feel safe about flying.
3) I feel panicky when I am running late for a flight.
4) My body feels tense if my flight is delayed
5) I feel shaky if I have to sit on the tarmac/taxiway for a long time.
6) I feel satisfied with airlines' service overall.
7) I feel annoyed when babies/small children are on the plane.
8) I would feel resentful if I had to sit near loud/talkative passengers.
9) I think airlines appreciate their passengers.
10) Current airport security measures deter hijackings or bombings.
11) I think airline personnel are doing the best job they can.
12) It bothers me when other passengers want special treatment.
13) I fear that my baggage will be lost/stolen/damaged.
14) I want to say mean things when other passengers take up part of my personal space on the plane.
15) I trust the airlines.
16) Airlines give me the service I deserve.
17) I worry that my flight will be cancelled.
18) I worry other passengers may do something harmful on the plane.
19) It would bother me if other passengers tried to board the plane before their row was called.
20) I feel like screaming at passengers who bring aboard a lot of carry-on baggage.
21) I sometimes think airline/airport personnel are unfriendly or unhelpful.
22) I fear that I will miss a connecting flight.

Appendix C: Demographics Survey

Instructions: Please answer the following demographic questions. Fill in the appropriate blanks and circle your responses.

1. Age:

_____

2. Gender:

Male Female

3. Ethnicity:

White/Caucasian Asian/Pacific Islander African American

Native American Chicano/Latino Other: _____

4. Marital Status:

Never Married Married Divorced/Separated

Widowed Same Sex Partner

5. Your highest education level:

Some Middle/High School High School Diploma/GED Some College

Associate Arts Bachelor's Some Graduate School

Master's Doctorate Other:

_____

6. Your gross household annual income (US Dollars):

Under $20,000 20,001-40,000 40,001-60,000

60,001-80,000 80,001-100,000 100,000+

7. In the past 12 months, did you tend to fly for business or for pleasure?

Always Business Mostly Business Half Business/Half Pleasure

Mostly Pleasure Always Pleasure

8. Number of times in the past 12 months you have flown roundtrip to destinations inside the USA: _____

9. Number of times in the past 12 months you have flown roundtrip to destinations outside the USA: _____

Appendix D: Media Recruitment Information

Jonathan Bricker, a University of Washington psychology doctoral candidate, is conducting a study to scientifically examine the extent to which attitudes toward airline travel change over a brief period of time. The study will test how attitudes toward airline travel are related to their personalities. On a practical level, he hopes the study will eventually contribute to improving peoples' experience of air travel.

The study is a series of self-report surveys on a secured a website. The study has two parts: a 20-30 minute baseline survey and a 5-minute follow up survey. All subjects who complete the baseline survey will be entered in a drawing for one of ten $50 cash prizes and all participants completing the follow-up will be entered in a separate drawing for one of ten $100 cash prizes. All data collected are anonymous. He will ask for the email addresses of those who are willing to participate in the follow-up survey, but those addresses will not be linked to the data they provide. The email addresses will only be used so that Mr. Bricker can contact participants for the follow-up survey.

Everyone is invited to participate, travelers and non-travelers alike. If you are interested, you can participate on the secured website, www.survey123.com. Participation is voluntary and subjects may choose to withdraw from the study at any time.

Appendix E: Survey Follow-up Email

Hello-

This is a request that you complete a five-minute follow up survey at the web address: www.survey123.com. You recently completed the baseline survey and agreed to have me contact you via email for a brief follow-up survey that enters you in a drawing for one of ten $100 prizes. Participation is voluntary and you may choose to withdraw from the study at any time. Please remember that I cannot guarantee the confidentiality of any information sent by email.

Thank You,

Jonathan Bricker
University of Washington

Appendix F: State Stress Scale

Instructions: Below each question, circle the response that indicates how you feel right now, that is, at this moment. There are no right or wrong answers.

Rating Scale:

0----------1---------- 2----------3----------4----------5
Not at all Almost none A little Somewhat Much Very Much

1) How nervous do you feel right now?
2) How irritable do you feel right now?
3) How much are you worrying right now?
4) How angry do you feel right now?

Curriculum Vitae

Jonathan B. Bricker

University of Washington
Psychology Department
Seattle WA, 98195-1525
(206) 667-5074
jbricker@u.washington.edu

Education:

Ph.D., Clinical Psychology, to be completed August 2003
University of Washington, Seattle, Washington
Dissertation Chair: Irwin G. Sarason, Ph.D.
Dissertation: Development of the Air Travel Stress Scale
Clinical Internship: Veterans Affairs, Puget Sound Health Care System, Seattle Division

M.S., Clinical Psychology, 1999
University of Washington, Seattle, Washington
Thesis: Something Stressful in the Air: Personality and Air Travel Stress

B.A., Highest Honors, Majors in Psychology and English Literature, 1997
University of California, Berkeley
Honor's Thesis: Leaving Home: A Short-Term Prospective Study of Stress and Social Support in the Transition from High School to College

Research Experience:

5/99 to Present — ***Research Associate***
Project: "Parent Protective Factors For Youth Smoking."
Fred Hutchinson Cancer Research Center, Seattle, WA
Supervisor: Arthur V. Peterson, Ph.D.
Funding Source: National Cancer Institute
Conduct studies of psychosocial predictors of smoking initiation. Dataset is from a 15-year longitudinal study of 20 Washington state school districts. Collaborate with biostatisticians and psychologists on the writing of scientific papers, review scientific

literature, analyze data with SPSS and EGRET, and participate in weekly lab meetings.

9/97 to Present

Lead Investigator
Project: "Studies in Air Travel Stress."
University of Washington, Seattle, WA
Supervisor: Irwin G. Sarason, Ph.D.
Funding Sources: University of Washington and NBBJ Design, Seattle, WA
Propose and conduct studies on the measurement and prediction of air travel stress. Survey several populations of leisure and business travelers. Train research assistants in data collection and data entry. Analyze data using SPSS and EQS. Write proposals, literature review, and findings from the studies.

4/96 to 5/97

Lead Investigator
Project: "Honor's Thesis."
University of California, Berkeley
Supervisor: Philip A. Cowan, Ph.D.
Proposed and collected data for a short-term longitudinal assessment of how stress and social support affect emotional and academic adjustment in the transition from high school to college. Entered and analyzed data using SPSSv7. Wrote literature review and report of the study.

Research Funding:

5/01

Project: "Studies in Air Travel Stress."
Source: NBBJ Design (Airport Architects), Seattle, WA.
Amount: $7,000

Studies to measure and predict air travel stress.

1/01

Project: "Improving the Air Travel Stress Survey."
Source: Psychology Department, University of Washington, Seattle, WA.
Amount: $800
A study to revise the items for the Air Travel Stress Survey.

Clinical Experience:

9/01 to 8/02

Group Co-Leader
Private Practice, David Kosins, PhD, Seattle, WA.
Supervisor: David Kosins, Ph.D.
Co-lead cognitive behavioral skills support groups for panic disorder and social anxiety disorder. Panic treatment followed the Craske and Barlow model. Social anxiety treatment followed the Hope, Heimberg, Juster, and Turk model. Patients were primarily Caucasian, twenty to forty years old, with middle socioeconomic backgrounds.

8/01 to 5/02

Practicum Student
Addictions Treatment Center, Seattle VA Medical Center, Veterans Affairs Puget Sound Health Care System, Seattle, WA.
Supervisor: Carl Rimmele, Ph.D.
Conduct and write intake evaluations for the substance use assessment clinic. Co-lead interactional support groups and psychoeducational groups (e.g., relapse prevention, coping). Receive individual supervision and participate in treatment team meetings weekly. Patients are primarily middle-aged male veterans, with lower socioeconomic backgrounds diagnosed with chronic substance use disorders and concurrent mild to moderate psychiatric and/or medical disorders.

3/00 to Present

Behavioral Health Specialist
Collaborative Care for the Treatment of Anxiety and Panic in the Primary Care Setting
Study funded by the National Institute of Mental Health
Harborview Medical Center and Roosevelt Clinic, University of Washington, Seattle, WA.
Supervisors: Peter Roy-Byrne, M.D., Michelle Craske, Ph.D., and Holly Hazlett-Stevens, Ph.D.
Provide Craske and Barlow's Panic Control Treatment, a cognitive behavioral therapy for panic disorder and agoraphobia. Provide patients individual therapy in primary care medical offices. Receive therapy adherence ratings and individual therapy supervision. Consult with primary care doctors on patients' co-

morbid medical conditions. Patients are ethnically diverse, generally from lower socioeconomic backgrounds. In addition to panic disorder, patients present with a variety of diagnostic categories: anxiety, mood, and substance use disorders, personality disorders, and co-morbid medical conditions.

9/98 to 9/01

Staff Therapist

Psychological Services and Training Center, University of Washington, Seattle, WA. Supervisors: George Parks, Ph.D., David Kosins, Ph.D., Adam Lehman, Ph.D., and Corey Fagan, Ph.D

Provided individual psychotherapy to clients suffering from substance addictions, anxiety disorders, depression, and a variety of life stressors. Administered MMPI-II, MCMI, & WAIS. Received case supervision from clinical psychologists with one hour of supervision for every hour of therapy. Received supervision in Motivational Interviewing, Aaron and Judy Beck's Cognitive Therapy, and psychodynamic therapy. Client population consisted of undergraduates and persons from the larger Seattle community.

9/98 to 8/99

Practicum Student

Addictive Behaviors Research Center, Psychology Department, University of Washington, Seattle, WA.
Supervisors: Alan Marlatt, Ph.D. and Jason Kilmer, Ph.D.

Received didactic training in models of addiction. Conducted and wrote substance use assessments and feedback using a Motivational Interviewing model. Provided skills-based individual therapy for substance abuse. Received individual and group supervision. Client population consisted primarily of undergraduates in the Greek System.

6/95 to 6/97

Telephone Counselor and Suicide Prevention Educator

Alameda Crisis Services, Berkeley, CA.
Supervisor: Chrissy Brewer, M.A.

Used a crisis intervention model to provide short-term interventions to callers experiencing a variety of life crises. Attended clinical meetings to discuss client issues with clinic supervisors. Provided weekly education sessions to high school students on the prevention of suicide. Caller population consisted of ethnically diverse persons residing in Alameda County.

8/94 to 5/95 ***Peer Sexual Health Educator***
University Health Service, UC Berkeley, Berkeley, CA.
Supervisor: Roberta Freidman, M.A.
Educated clinic patients on practices for preventing and minimizing the negative health consequences of sexually transmitted diseases. Gave educational presentations at campus organizations on disease prevention, contraception, and safer sex methods. Patient population consisted of ethnically diverse undergraduates and graduate students.

Specialized Clinical Training:

9/00 to 12/00 ***Structured Clinical Interview for DSM-IV***
University of Washington, Psychology Department
Instructors: Advanced Graduate Students
Twenty hours of didactic and practicum training in the use of Structured Clinical Interview for the DSM-IV in the multi-axial assessment of mental disorders.

8/99 ***Assessment and Treatment of Suicidal Behaviors***
University of Washington, Behavioral Research and Therapy Clinics
Instructor: Marsha Linehan, Ph.D.
Twenty hours of didactic and practicum training in the assessment and treatment of suicidal behaviors. Training in crisis management and long-term treatment strategies for clients with suicidal behavior.

4 to 5/99 ***Basic and Advanced Skills in Motivational Interviewing***
University of Washington, School of Social Work
Instructors: Christopher Dunn, Ph.D. and David Rosengren, Ph.D.
Seventeen hours of didactic and practicum training in the use of Motivational Interviewing for the treatment of alcohol abuse/addiction.

Teaching Experience:

Guest Lecturer, "Smoking Cessation Preparation and Relapse Prevention using Motivation-Enhanced Cognitive Behavioral Therapy (ME-CBT)"
Lecture presented to counselors in training for a youth smoking cessation trial, Fred Hutchinson Cancer Research Center.
July, 2002.

Guest Lecturer, "Stress, Social Support, and Life Transitions: Implications for College Students"
Lectures presented to Abnormal Psychology courses, University of Washington.
March 6, 1998, May 14, 1998, and March 3, 1999.

Teaching Assistantships:

Abnormal Psychology, University of Washington
Autumn Quarter 1998, Winter Quarter 1999, Spring Quarter 1999, & Autumn
Quarter 1999.

Personality Psychology, University of Washington
Spring Quarter 1998.

Introduction to Psychology, University of Washington
Autumn Quarter and Winter Quarter 1998.

Assisted several professors in undergraduate psychology courses. Designed and taught weekly discussion sections with supervision by course professors. Prepared exams, graded exams, and attended lectures. Held weekly office hours, provided feedback to students about assignments, and conferred with professors about students' progress.

Peer-Reviewed Publications and Manuscripts in Review:

Publications:

Bricker, J.B., Leroux, B.G., Peterson, A.V., Kealey. K.A., Sarason, I.G., Andersen, M.R., & Marek, P.M. (in press). Nine-year prospective relationship between parent smoking cessation and children's daily smoking. *Addiction.*

Peterson, A.V., Kealey, K.A., Leroux, B.G., Bricker, J.B., Marek, P.M., Sarason, I.G., & Andersen, M.R. (conditionally accepted). Nine-year prediction of children smoking by number of smoking parents. *Addictive Behaviors.*

Rajan, K.B., Leroux, B.G., Peterson, A.V., Bricker, J.B., Andersen, M.R., & Marek, P.M. (in press). Influence of older siblings on children's smoking. *Journal of Adolescent Health*

Andersen, M.R. Leroux, B.G., Marek, P.M., Bricker, J.B., Peterson A.V., Kealey, K.A., & Sarason, I.G. (2001). Mothers' attitudes and concerns about their children smoking: Do they influence kids? *Preventive Medicine,* 34: 198-206.

Manuscripts in Review:

Bricker, J.B., Leroux, B.G., Peterson, A.V., Andersen, M.R., & Rajan, K.B. Parent antismoking actions: Do they mediate the prospective relationship between parents' smoking cessation and their children's smoking? *Psychology of Addictive Behaviors.*

Bricker, J.B., Leroux, B.G., Rajan, K.B., Peterson, A.V., Andersen, M.R. The timing of parent smoking cessation and the prevalence of their children's smoking. *Addiction.*

Andersen, M.R., Bricker, J.B., Rajan, K.B., Leroux, B.G., & Peterson A.V. Mothers' attitudes and actions: How do mothers influence their kids to prevent smoking? *Preventive Medicine.*

Peer-Reviewed Presentations:

Bricker, J.B., & Sarason, I.G. (2002). Comparison of air travel anxiety before and after the Sept 11, 2001 terrorists attacks. Paper presented at the *Anxiety Disorders Association of America*, Annual Convention, Austin, TX.

Bricker, J.B., & Leroux, B.G. (2002). Do parent antismoking actions mediate the prospective relationship between parents' smoking cessation and their children's smoking? Paper presented at the *Society of Behavioral Medicine*, Annual Convention, Washington, DC.

Bricker, J.B., Leroux, B.G., & Rajan, K.B. (2002) The timing of parent smoking cessation and the prevalence of their children's smoking. Poster presented at the *Society of Behavioral Medicine*, Annual Convention, Washington, DC.

Andersen, M.R., Bricker, J.B., & Rajan, K.B. (2002) Can parental anti-smoking practices prevent
adolescent smoking? Paper presented at the *Society of Behavioral Medicine*, Annual Convention, Washington, DC.

Bricker, J.B., & Sarason, I.G. (2001). Psychometric properties of the Air Travel Anxiety Scale. Paper presented at *American Psychological Association,* Annual Convention, San Francisco, CA.

Bricker, J.B., & Sarason, I.G. (2001). Timing of parent smoking cessation and children's 12th grade smoking. Paper presented at *American Psychological Association,* Annual Convention, San Francisco, CA.

Bricker, J.B., & Leroux, B.G. (2001). A nine-year prospective analysis of the relationship between parent smoking cessation and children's 12th grade smoking. *Society of Behavioral Medicine*, Seattle, WA.

Bricker, J.B., & Sarason, I.G. (2000). Clinical implications of air travel anxiety. Invited paper presented at "Stress, the Business Traveler, and Corporate Health: An International Travel Health Symposium," *The World Bank*, Washington, DC.

Bricker, J.B., & Sarason, I.G. (1999). Something stressful in the air: A web-based study of personality and air travel anxiety. Paper presented at the *American Psychological Society*, Annual Convention, Denver, CO.

Bricker, J.B. (1999). Personality correlates of air travel anxiety. Paper presented at *University of Washington*, Department of Psychology Research Festival, Seattle, WA.

Bricker, J.B, Sarason, I.G., & Cowan, P.A. (1998). A short-term longitudinal study of stress and social support during the transition to college. Poster presented at the *American Psychological Association*, Annual Convention, San Francisco, CA.

Manuscripts in Preparation:

Bricker, J.B., Leroux, B.G., & Peterson A.V. Do changes in parent smoking status during the child smoking acquisition period prospectively predict child smoking?

Bricker, J.B., & Sarason, I.G. The Air Travel Stress Scale: Validity and reliability of an individual-differences metric.

Bricker, J.B. Comparison of air travel anxiety before and after the Sept 11, 2001 terrorists attacks.

Professional Societies and Honors:

Anxiety Disorders Association of America, Student Member
Society of Behavioral Medicine, Student Member
American Psychological Association, Student Affiliate