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Development and validation of the Washington Resilience Scale

Ahn, Randall Lee, Ph.D.

University of Washington, 1991

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**300 N. Zeeb Rd.
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Development and Validation
of the Washington Resilience Scale

by

Randall Lee Ahn

A dissertation submitted in partial fulfillment
of the requirements for the degree of

Doctor of Philosophy

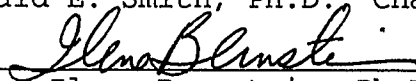
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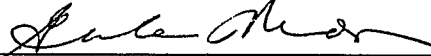
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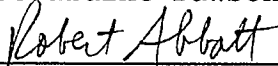
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Abstract

Development and Validation
of the Washington Resilience Scale

by Randall Lee Ahn

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The dissertation research was an attempt to develop and validate a new self-report measure of psychological resilience. The construct of resilience has its roots in the areas of vulnerability and stress-resistance. Prior research indicated that several factors in childhood were predictive of an individual's health and adjustment later in life. In Study 1, the rational-theoretically derived 22 item self-report scale was found to have a high degree of internal consistency and appeared to be free from social desirability contamination. Factor analyses indicated that the new scale tapped six independent dimensions: problem solving ability, familial support, sociability, emotional coping ability, endurance, and goal persistence. This dimensional structure of the resilience measure was supported by confirmatory factor

analyses. Study 2 demonstrated acceptable test-retest reliability for both the individual subscales and the total score over a two week period. Study 3 revealed both convergent and discriminant validity with measures of mental health, social networks, and coping skills. In Study 4, the scale was shown to be a useful predictor of athletic performance under competitive stress conditions, a theoretical consequent of resilience. Confirmatory factor analyses supported the generalizability of the proposed model of resilience to the athletic sample. The importance of the resilience construct, the potential utility of the scale, and directions for future validation studies are discussed.

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For Susan Rook

Chapter 1

Introduction: Psychological Resilience

In all forms of psychological intervention, a clinician's first task involves assessing a client's mental status. Regardless of therapeutic perspective, assessment is necessary either formally or subjectively in order to determine a client's baseline functioning. From this, individualized treatment plans can be formulated by a intervention staff.

In primary prevention programs, assessments are similarly employed for baseline purposes but they are also used as screening instruments prior to intervention. Such instruments help clinicians identify pools of clients who are most likely to benefit from a given treatment. With the time and resource constraints of most prevention programs, assessment is best when it is brief, easily administered and scored, and easily interpreted.

The purpose of the present research was to develop a scale that could be used by clinicians and researchers for both diagnostic and screening purposes. The scale was intended to measure the personal resources or protective factors that theoretically contribute to an

individual's general adaptability, or psychological resilience. The new measure of resilience, was designed to be psychometrically sound, brief, and solid in its theoretical foundation. The following sections are discussions concerning the research findings in the areas of vulnerability and stress-resistance, the theoretical bases of the current project.

Vulnerability and Stress-Diathesis

The rationale behind the present scale development comes from the study of risk factors predisposing an individual to stress related disorders. Volumes of data exist that document associations between stressors of varying intensities and durations and a collection of illnesses. The following examples represent only a few of the conditions which have been related to high stress levels of a chronic nature: coronary heart disease, ulcers, headaches, allergies, asthma, cancer, and arthritis (Greenberg, 1987). Selye's (1983) statement that "... stress plays some role in the development of every disease (p.12)," appears to be indisputable.

The exact mechanism by which stress effects are mediated is not completely understood, but stress-diathesis theorists believe that deleterious effects result from an interaction between an individual's coping

resources and degree of experienced environmental stress. Lazarus and Folkman (1984), for example, provided a complex transactional model linking environmental, cognitive, physiological, and behavioral components in what is now an influential conceptualization of the stress response.

In discussing the dynamics of this response, Selye, (1983) proposed the existence of a *general adaptation syndrome* which can be thought of as an organismic process by which internal homeostasis is maintained. The syndrome is composed of three stages: 1) an alarm reaction during which the organism has contact with a stressor, recognizes it, and may react to it; 2) a stage of resistance during which the organism may fully adapt to the stressor thereby reducing symptomatology; and 3) a stage of exhaustion during which the organism's adaptive energy is depleted due to prolonged exposure to the stressor.

Both of the above conceptualizations imply that vulnerability to disease increases when stress levels overwhelm an organism or when repeated exposure to stress exhausts an organism's adaptive energy and resources. Using a familiar analogy, Selye (1983) suggested that stress disorders are manifested physically by inducing

failure in the body's most vulnerable organ, *the weak link in the chain*. This belief has been corroborated by biochemists who have discovered that various organic compounds and cellular processes activated by stress can contribute to changes in body tissue that are ultimately fatal to body organs (Eysenck, 1983; Selye, 1983).

Resilience and Protective Factors

Protective factors may be thought of as an alternate approach to the study of stress disorders, one that is concerned with positive mental health rather than psychological vulnerability. Researchers first became interested in protective factors when they discovered groups of individuals who did not succumb to high levels of stress with illness as one would expect (Garmezy, 1981; Rutter, 1979). Compared to the study of vulnerability, the research in the areas of resilience and protective factors is sparse, though, the findings tend to be consistent with one another. In Garmezy's (1985) summary of the existing research, he reported that three factors appeared repeatedly in the literature: internal attributes, family environment, and social support.

Internal Attributes. Much of what is known concerning the relationship between internal attributes

and successful outcomes comes from case studies. Robinson and Fields (1983), for instance, described individuals who, as children, experienced severe disadvantage and chaos, but surmounted this and were able to lead productive healthy lives as adults. These resilient individuals were perceived as possessing positive self regard, high self confidence, and an internal locus of control. They seemed to be exceptionally empathic and altruistic. This constellation of attributes appeared in other case reports. Moskowitz (1985), for example, learned that world war two holocaust survivors perceived themselves as possessing a high degree of self confidence, energy, assertiveness, cleverness, self reliance, and altruism. Friends and family members tended to corroborate the survivors opinions with similar impressions of them.

Longitudinal studies yielded findings that were consistent with the above case studies: certain traits tended to be associated with positive outcomes. O'Grady and Metz (1987), for example, found that in high stress situations, children with an internal locus of control were rated as being better adjusted at school than those with an external locus of control. They also found that girls were, in general, more resilient than boys and less

susceptible to emotional problems. In another longitudinal study in which adults were followed, Houlihan and Moos (1986) discovered that high self confidence, an easy going disposition, and active problem solving protected individuals from stress. Finally, in her classic longitudinal study of Hawaiian children of alcoholics, Werner (1985) found that the most resilient children were ones who possessed an easy going temperament, a sense of well-being, good self control, high tolerance for others, good verbal ability, high achievement motivation, and an internal locus of control.

In summary, there appeared to be a number of person variables that were consistently associated with successful adaptation of an individual in spite of high levels of environmental stress. They included the following:

1. Gender -- females were more resilient than males
2. High self-esteem
3. Internal locus of control
4. Easy going temperament
5. Active and energetic
6. Sensitive and empathic toward others
7. Achievement motivated
8. Altruistic orientation

9. Good verbal ability
10. Cooperative and tolerant
11. Assertiveness
12. Self-control

Kobasa and her associates have identified a constellation of attributes which they believe constitutes a "hardy" personality type. Persons who possess high levels of "hardiness" have been described as having high levels of commitment, an internal locus of control, and a positive attitude toward life challenges. Kobasa has contended that individuals with high levels of hardiness tend to be better at coping with stressful situations than those low in hardiness. This contention has received empirical support and hardiness has emerged as an important moderator variable between stress and illness (Kobasa, Maddi, and Puccetti, 1982; Kobasa and Puccetti, 1983; Kobasa, Maddi, Puccetti, and Zola, 1985; Rich and Rich, 1987). Hardiness may be thought of as an aspect of a resilience. However, studying hardiness alone may not be the best approach to understanding moderator effects in the context of stress-illness relations. Smith, Smoll, and Ptascek (1990), for instance, suggested that some moderator variables may work together (conjunctively) or independently of each

other (disjunctively) when influencing stress-illness associations. For this reason, other possible moderators variables need to be addressed, namely family/social support and coping skills. Resilience encompasses all these areas and reflects a broader construct than hardiness alone.

Family Environment. Family studies demonstrated that various characteristics may contribute to the development of resilience in individuals. Typical findings indicated that parental relations, characterized by warmth, affection, lack of criticism, and supportiveness, helped protect children from environmental stress (Hauser, Vieyra, Jacobson, and Wertlieb, 1985). Overcrowded or large family size, paternal criminality, maternal psychiatric disorder, on the other hand, were found to place a child at risk (Rutter, 1979). Houlihan and Moos (1985, 1986) found that availability of family support contributed to resilience, and Garmezy (1985) found that family interactions of resilient children were characterized by parental activity such as concern over the child's competency and support of the child's endeavors.

Besides the warm emotional quality of family relations, researchers noticed some interesting sequelae

of the families which produced resilient individuals. Werner (1985), for instance, found that resilient children did not have siblings within 20 months of their age and that during their first year, they consistently received good care. It appeared that perhaps the first year was a critical period during which good caretaking and attachment were necessary conditions in order for the development of resilience to proceed.

Family environment also seemed to predict the likelihood that an individual would develop a resilient personality in spite of economic hardship. Werner, for example found that children who achieved later competence were those whose parents were not experiencing marital conflict at the time of birth. In single parent families, resilient children tended to have mothers who were steadily employed. Rutter (1979) similarly discovered that homes of resilient children were devoid of severe marital discord. And Garnezy (1985) noted that homes of resilient children were clean, uncluttered, and filled with books.

In summary, a consistent collection of family characteristics has emerged from the literature. Resilience has been associated with the following factors:

1. A good parent-child relationship characterized by warmth, support, and interest in the child
2. A healthy and active caretaker in single parent families
3. Absence of severe marital conflict within two years of birth
4. Clean, uncluttered, uncrowded living conditions
5. A role of required helpfulness in the family

Social Support. Social support was another factor noted by Garmezy which appeared to protect individuals from the harmful effects of stress. Robinson and Fields (1983), for example, noted that resilient individuals possessed good social skills, evidenced in their ability to make people feel comfortable and their ability to make friends easily. Similarly, Moskowitz (1985) found that successful survivors of the holocaust were able to make close attachments with others and were adept at attracting help from others. These findings have been replicated in experimental designs. O'Grady and Metz (1987) found that social support seemed to protect children from experiencing school problems. In particular, children whose families had better support networks had significantly fewer problems with school behavior. Other researchers reported similar findings

with adult samples (e.g. Sarason and Sarason, 1986).

The effect of having at least one good interpersonal relationship seemed to be a protective factor as well. Kobasa and Puccetti (1983) found that hardiness (resilience) in executives was related to perceived boss support. Similarly, Garmezy and his associates (1985) noted that resilient children could identify at least one significant adult in whom they could confide. Not surprisingly, these children appeared to perceive adults and authority figures in a positive way. Finally, Rutter (1979) further corroborated these findings in his observations that a positive school environment, one which possessed sensitive teachers and administrators, served as a protective factor for children.

In summary, evidence appeared in different forms (e.g. case studies, experimental studies, longitudinal correlational studies) which suggested that social support of some kind was beneficial to an individual's psychological adjustment and later competence. The following factors may serve as buffers to stress related disorders:

1. Superior social skills -- ability to make friends and to make people feel at ease
2. At least one healthy intimate interpersonal

relationship

3. A supportive network of friends
4. Positive relations with authorities

Development of the Washington Resilience Scale

Given the research in the area of stress-resistance cited above, it was decided that constructing a scale that would assess an individual's psychological resilience was a useful and attainable goal. Speculation on the benefits of such a scale included its utility as a clinical screening instrument and the heuristic value of its conceptualization of resilience as a construct of general adaptability. In order to achieve these benefits, a series of studies were run to first create the scale, and then to validate it. The results of these studies are reported in the following chapters.

Study 1 involved procedures to generate scale items and presented a factor structure of resilience which, in essence, was a conceptual model of the construct. Study 2 established the test-retest reliability of the new scale. In Study 3, the instrument was correlated with a variety of other relevant measures in order to demonstrate its convergent and discriminant validity. In the final validation procedure, Study 4, the resilience scale was administered to a sample of intercollegiate

athletes in order to determine whether the scale could predict adaptive behavior within a specific stressful environmental context, that of competitive sports. The final chapter is a general discussion which summarizes the psychometric and theoretical aspects of the scale and proposes future validation procedures which could increase the scale's empirical and clinical underpinnings.

Chapter 2

Study 1: Scale Construction

The purpose of Study 1 was to develop a short scale that assessed the construct of psychological resilience. To do so, procedures were employed to generate a large pool of potential scale items from which final items were retained based upon their contributions to the scale's psychometric properties.

Three methods of scale construction were considered prior to item generation: an empirical or external approach, an internal consistency or inductive approach, and an rational-theoretical or deductive approach (Burisch, 1984; Lanyon and Goodstein, 1982). Each method had advantages and disadvantages, especially with regard to the amount of time and resources required to implement them. However, in an analysis of comparative validity, Burisch (1984) concluded that "All three approaches are capable of producing inventories with quite similar degrees of validity. The deductive approach, however, manages to do so with the least construction effort and with very short scales. In addition, the meaning of a deductive scale is normally much easier to communicate than that of an external or inductive scale; at least,

deductive scales can be made to have high communicability, (p. 225)."

With this in mind, items in the present scale were generated deductively, their content based upon prior research findings in the area of stress resistance. Later, the scale was honed via factor analyses and internal reliability checks.

Method

Subjects

The subjects were 802 male and female students enrolled in undergraduate introductory psychology classes at the University of Washington. Students who volunteered to participate received extra course credit.

Questionnaires

Preliminary Resilience Scale. The initial scale consisted of 75 items which theoretically assessed the key factors that emerged from the resilience research mentioned earlier (see Appendix A for the initial pool of items). The questionnaire was answered in a standard Likert format with a seven point scale ranging from "Strongly disagree" to "Strongly agree." Half of the items were reverse scored to control for positional or acquiescence response biases.

Marlowe-Crowne Social Desirability Scale (MC-SDS).

The MC-SDS is an 18 item, true-false scale measure of social desirability (see Crowne and Marlowe, 1960, for the original discussion of the scale). It is commonly employed in test validation procedures in order to assess whether respondents answer questions in a socially desirable manner. By examining correlations between the MC-SDS with other scales, it is possible to infer whether a subject's responses are contaminated in this way.

Procedure

The first step in generating items involved conducting a literature review to survey the research in the area of stress resistance. From this review, a collection of factors emerged that appeared to be related theoretically to the construct of psychological resilience. Proceeding deductively, several items illustrating each factor were generated, resulting in an initial pool of 75 items. The categories, identified in prior research, were the following: self esteem, locus of control, temperament, activity level, sensitivity/empathy, achievement motivation, altruism, cooperativeness, frustration tolerance, assertiveness, emotional self control, coping skills, family warmth, parental interest in child, parental health, parental

marital harmony, quality of household, helpfulness to family, social support, respect for authority, perfectionism, worry, depression, peak performance, and confidence. The items for each category are presented in Appendix A.

During the testing period, subjects received a packet containing the preliminary scale and the Marlowe-Crowne Social Desirability Scale. The subjects were told that the purpose of their participation was to assist in the development of a measure assessing an individual's ability to withstand stress. They were asked to rate themselves on each item and were told they could omit any item(s) which they did not want to answer. The questionnaires were completed anonymously.

Using the data from the undergraduate sample, the scale was refined through successive factor analytic and internal consistency procedures. These procedures resulted in a 22 item scale with six orthogonal factors, the finalized Washington Resilience Scale (WRS) (see Appendix B). The resulting covariance matrix of the finalized scale was submitted to confirmatory factor analytic procedures to determine if the data conformed to the proposed theoretical model of resilience.

Results

Factor Structure

A principal components analysis (PCA) with rotation to a varimax solution yielded six orthogonal factors accounting for 55.8 percent of the total scale variance. The factor structures for males and females were judged by inspection to not differ from the structure derived when males and females were considered together. The factor loadings, means, and standard deviations for the total sample, males and females together, are shown in Table 1. The varimax rotation resulted in the grouping of 22 scale items into six independent factors which were subsequently examined and labeled. Criteria for item inclusion in a subscale was a factor loading of at least $\pm .50$ and no loading exceeding $\pm .34$ on any other factor. Decisions regarding the labeling of factors relied upon an inductive analysis of what they appeared to be assessing and of how they could be incorporated into a meaningful model of resilience. The six factors were thereby defined as Problem Solving, Familial Support, Sociability, Endurance, Emotional Coping, and Goal Persistence.

Table 1
Washington Resilience Scale Factor Structure

<u>Loading</u>	<u>Mean</u>	<u>S.D.</u>	<u>Original Item Number</u>	
<u>Factor 1: Problem Solving</u>				
.78	5.2	1.4	29	I speak up for my rights.
.77	5.4	1.2	31	I don't let people push me around.
.63	5.3	1.2	59	I solve my problems by actively doing something about them.
.57	5.9	1.1	21	I solve my problems more than I avoid them
<u>Factor 2: Familial Support</u>				
-.85	1.7	1.3	*35	My parents ignored me as a child.
.81	5.8	1.6	38	My parents gave me the attention that I needed when I was growing up.
-.74	2.0	1.5	*32	My family didn't need me when I was growing up.
<u>Factor 3: Sociability</u>				
.71	5.5	1.5	46	I get along with people in authority.
-.71	2.2	1.4	*47	I am not an agreeable person.
.70	6.0	1.2	48	I am a cooperative person.

<u>Loading</u>	<u>Mean</u>	<u>S.D.</u>	<u>Original Item</u> <u>Number</u>	
-.54	2.4	1.5	*45	I find it difficult to work with other people.
<u>Factor 4: Endurance</u>				
.74	5.9	1.2	12	I like to keep active.
.70	5.5	1.3	61	I am an energetic person.
-.67	3.5	1.8	*26	I get tired easily.
-.52	2.3	1.5	*15	I have no endurance.
<u>Factor 5: Emotional Coping</u>				
.71	5.0	1.5	68	I can manage my emotions.
.67	5.0	1.6	67	I can feel good about myself in spite of what others think about me.
.64	4.9	1.6	72	I can laugh at my problems.
.62	5.1	1.3	2	I can put up with the hassles people give me.
<u>Factor 6: Goal Persistence</u>				
-.74	3.3	1.7	*62	I like to do enough work to just get by.
-.72	4.1	1.9	*54	I don't try as hard as I can on things.
-.61	4.1	1.6	*74	I'm easily distracted.

N = 802

Table 1 continued

Total Number of Items = 22

Variance explained = 55.8%

* Reverse Scoring

Internal Consistency

Cronbach's *Alpha* was calculated with the 22 items in order to determine the degree of internal reliability present in each factor scale. As shown in Table 2, *Alpha* coefficients were within acceptable limits and suggested that each factor was assessing a unique and internally consistent construct. In addition, an *Alpha* calculated for the total score yielded a coefficient of .82.

Table 2

Resilience Factors *Alpha* Coefficients

<u>Factor</u>	<u>Alpha</u>
Problem Solving	.73
Familial Support	.77
Sociability	.65
Endurance	.65
Emotional Coping	.65
Goal Persistence	.57
Resilience Total	.82

Social Desirability

In order to ascertain whether the WRS scores were confounded with the tendency to respond in a socially

desirable direction, Pearson product-moment correlations were calculated between each factor scale score, the total score, and scores on the Marlowe-Crowne Social Desirability Scale. As shown in Table 3, the subscale coefficients were generally low, suggesting that respondents were completing items in a manner that was not biased towards social desirability. The total score correlated .38 with MC-SDS, indicating that the two scales had about 14 percent shared variance.

This finding is slightly larger than ones obtained when the MC-SDS is correlated with other scales assessing psychological attributes. Tanaka-Matsumi and Kameoka (1986) for example, correlated the MC-SDS with a few popular anxiety scales to determine the extent to which they were contaminated. They found the following:

Zung Self-Rating Anxiety Scale, $r = -.19$

Spielberger State-Trait Anxiety

State anxiety, $r = -.23$

Trait anxiety, $r = -.30$

Taylor Manifest Anxiety Scale, $r = -.29$

Self-esteem scales have been correlated with the MC-SDS. Mearns (1989), for example correlated the MC-SDS with the Rosenberg Self Esteem Scale yielding coefficients between .16 to .25. Correlations between the MC-SDS and self-efficacy scales also yield coefficients similar in

magnitude. Marcus and Forster (1988), for example obtained correlations between the MC-SDS and the Personal Competency Inventory, $r = .44$ and the Coping Confidence Scale, $r = .21$. Mearns (1989) correlated the MC-SDS with the Generalized Expectancy for Success Scale and obtained coefficients between .17 and .21.

Table 3

Social Desirability Correlation Coefficients

<u>Factor</u>	<u>r</u>
Problem Solving	.24
Familial Support	.19
Sociability	.24
Endurance	.24
Emotional Coping	.22
<u>Factor</u>	<u>r</u>
Goal Persistence	.33
Total Resilience	.38

Confirmatory Factor Analyses

In order to determine the dimensional adequacy of the theoretical resilience model suggested by the PCA, confirmatory factor analytic procedures were conducted to assess the theoretical model's goodness of fit in relation to other competing models. Besides the initial theoretical model, two other models of resilience were

proposed as parsimonious and potentially useful conceptualizations. As shown in Figure 1, the most parsimonious model (Model 1) is one in which resilience is proposed to be a unidimensional construct of general adaptability. Scale items in this model function as 22 exemplars of this general construct. Figure 2 depicts another alternative model (Model 2) in which resilience is a second order factor related to two first order factors, family support and internal resources. The model suggested by the PCA (Model 3), shown in Figure 3, also depicts resilience as a second order factor. However in this conceptualization, each of the six derived factors from the PCA function as first order factors.

Using EQS procedures (Bentler, 1990), goodness of fit tests were conducted for each model. As shown in Table 4, Model 3, the originally proposed theoretical model, had the highest goodness of fit index and the lowest chi square/degrees of freedom ratio.

Table 4

Resilience Models: Goodness of Fit Indices

<u>Model</u>	<u>df</u>	<u>χ^2</u>	<u>χ^2/df</u>	<u>Fit Index*</u>
1	209	1673	8.0	.55
2	208	1222	5.9	.69
3	203	546	2.7	.89

N = 741

* = Bentler-Bonett Non-Normed Fit Index

From these data, then, it was clear that Model 3 was the best *standard* model of resilience proposed. Due to their complexity and lack of sufficient information to guide speculation, non-standard models remained unspecified and uninvestigated. Table 5, 6, and 7 list the standardized solution for each of the three models tested.

Table 5

Model 1 Standardized Solution

$$V1 = .312 F1 + .950 E1$$

$$V2 = .622 * F1 + .783 E2$$

$$V3 = .433 * F1 + .902 E3$$

$$V4 = .491 * F1 + .871 E4$$

$$V5 = .371 * F1 + .929 E5$$

$$V6 = .422 * F1 + .897 E6$$

Table 5 continued.

V7	=	.313*F1	+	.950	E7
V8	=	.319*F1	+	.948	E8
V9	=	.419*F1	+	.908	E9
V10	=	.374*F1	+	.928	E10
V11	=	.512*F1	+	.859	E11
V12	=	.455*F1	+	.891	E12
V13	=	.315*F1	+	.949	E13
V14	=	.545*F1	+	.838	E14
V15	=	.328*F1	+	.945	E15
V16	=	.338*F1	+	.941	E16
V17	=	.602*F1	+	.798	E17
V18	=	.482*F1	+	.876	E18
V19	=	.366*F1	+	.930	E19
V20	=	.527*F1	+	.850	E20
V21	=	.423*F1	+	.906	E21
V22	=	.366*F1	+	.931	E22

Table 6

Model 2 Standardized Solution

V1	=	.337	F2	+	.942	E1
V2	=	.629*F2	+	.778	E2	
V3	=	.434*F2	+	.901	E3	
V4	=	.488*F2	+	.873	E4	
V5	=	.617*F1	+	.787	E5	
V6	=	.429*F2	+	.903	E6	

Table 6 continued.

$$\begin{aligned}
 V7 &= .306 * F2 + .952 E7 \\
 V8 &= .770 * F1 + .638 E8 \\
 V9 &= .423 * F2 + .906 E9 \\
 V10 &= .386 * F2 + .923 E10 \\
 V11 &= .516 * F2 + .857 E11 \\
 V12 &= .463 * F2 + .886 E12 \\
 V13 &= .313 * F2 + .950 E13 \\
 V14 &= .552 * F2 + .834 E14 \\
 V15 &= .332 * F2 + .943 E15 \\
 V16 &= .340 * F2 + .940 E16 \\
 V17 &= .615 * F2 + .789 E17 \\
 V18 &= .485 * F2 + .874 E18 \\
 V19 &= .368 * F2 + .930 E19 \\
 V20 &= .537 * F2 + .844 E20 \\
 V21 &= .428 * F2 + .904 E21 \\
 V22 &= .767 F1 + .641 E22 \\
 F1 &= .340 * F3 + .940 D1 \\
 F2 &= 1.000 * F3 + .000 D2
 \end{aligned}$$

Table 7

Model 3 Standardized Solution

$$\begin{aligned}
 V1 &= .589 F5 + .808 E1 \\
 V2 &= .780 * F6 + .626 E2 \\
 V3 &= .557 * F6 + .831 E3 \\
 V4 &= .622 F2 + .783 E4
 \end{aligned}$$

Table 7 continued.

$$V5 = .620 * F1 + .785 E5$$

$$V6 = .545 * F5 + .839 E6$$

$$V7 = .602 * F5 + .799 E7$$

$$V8 = .768 * F1 + .640 E8$$

$$V9 = .466 * F3 + .885 E9$$

$$V10 = .537 * F4 + .844 E10$$

$$V11 = .525 * F3 + .851 E11$$

$$V12 = .567 * F2 + .824 E12$$

$$V13 = .542 * F5 + .840 E13$$

$$V14 = .671 F6 + .741 E14$$

$$V15 = .555 F4 + .832 E15$$

$$V16 = .450 * F2 + .893 E16$$

$$V17 = .747 * F3 + .665 E17$$

$$V18 = .622 * F2 + .783 E18$$

$$V19 = .585 * F4 + .811 E19$$

$$V20 = .678 F3 + .735 E20$$

$$V21 = .546 * F6 + .838 E21$$

$$V22 = .777 F1 + .629 E22$$

$$F1 = .399 * F7 + .917 D1$$

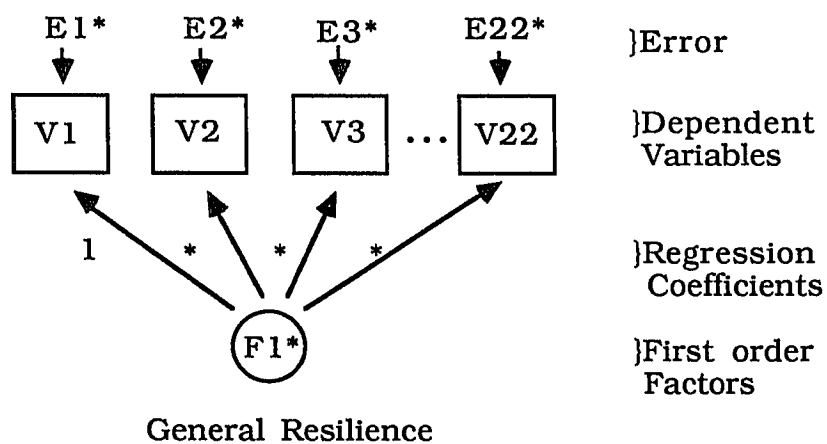
$$F2 = .749 * F7 + .662 D2$$

$$F3 = .807 * F7 + .590 D3$$

$$F4 = .608 * F7 + .794 D4$$

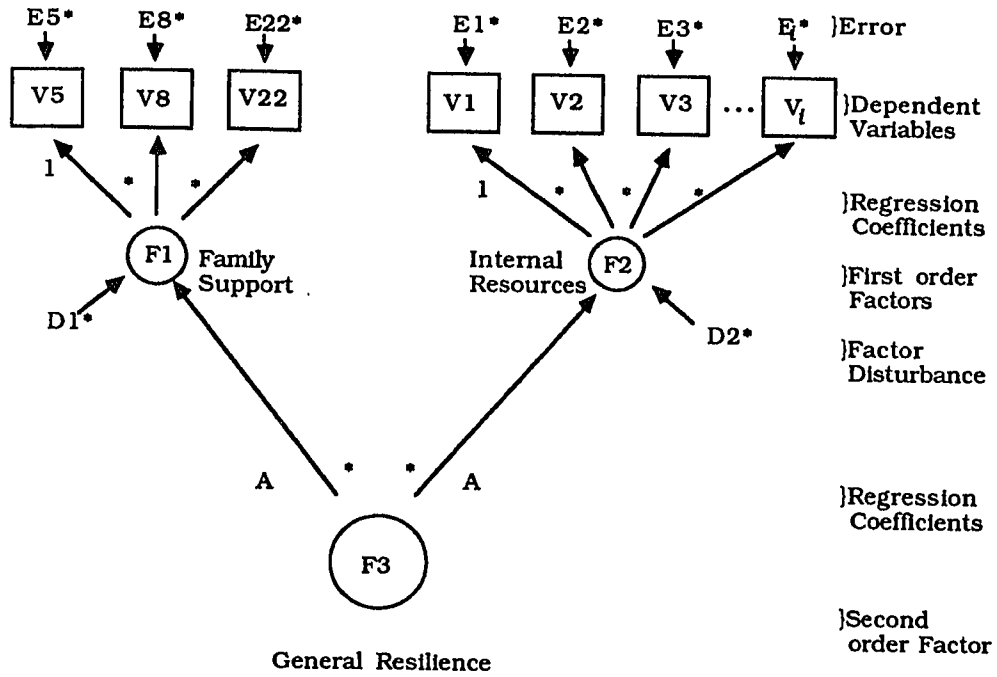
$$F5 = .573 * F7 + .820 D5$$

$$F6 = .706 * F7 + .709 D6$$



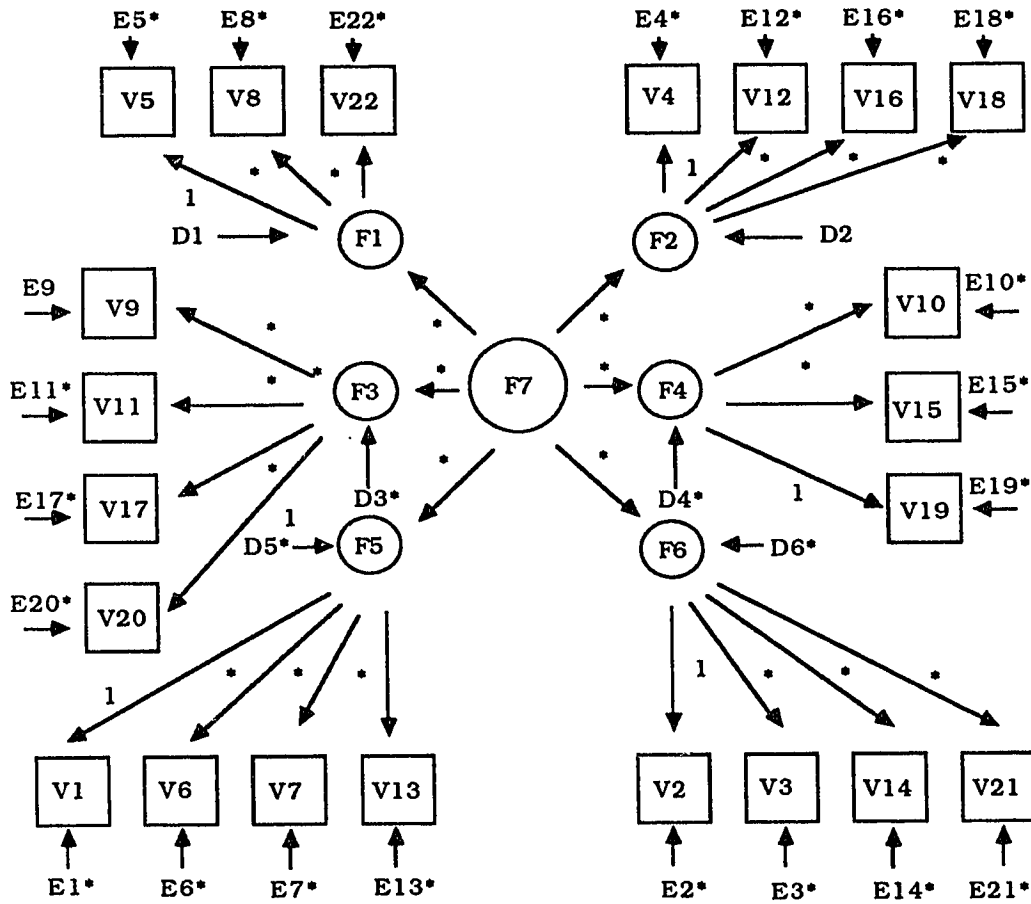
*Estimated free parameter

Figure 1
Model 1: General Resilience



*Estimated free parameter

Figure 2
Model 2: Two Factor Latent Resilience



F1 Familial Support F5 Sociability
 F2 Emotional Coping F6 Problem Solving
 F3 Endurance F7 General Resilience
 F4 Goal Persistence

* Estimated free parameter

Figure 3

Model 3: Six Factor Latent Resilience

Discussion

The new resilience scale was constructed by employing rational-theoretical procedures to produce an initial pool of 75 items. Using exploratory factor analyses and internal reliability checks, a six factor 22 item scale was obtained (see Appendix B). The factors were orthogonal by definition and were identified as Problem Solving, Familial Support, Emotional Coping, Endurance, Sociability, and Goal Persistence. Each of these factors had a high degree of internal consistency when considered separately, and an even higher degree of consistency when the scale was considered as a whole. Finally, correlations between the resulting factors and the scale as a whole with the MC-SDS yielded low to moderate coefficients and this suggested that subjects had answered the scale items without a strong social desirability bias.

In order to determine the suitability of the theoretical model of resilience being assessed, confirmatory factor analytic methods were employed to determine which of three competing models best fit the sample data. Results indicated quite clearly that the standard model of best fit was one in which the construct of resilience functioned as a second order factor with

the six derived factors from the PCA functioning as first order factors.

Chapter 3

Study 2: Test-Retest Reliability

The purpose of Study 2 was to ascertain the test-retest reliability of the WRS over a two week period.

Method

Subjects

The subjects were 52 male and female students enrolled in an undergraduate introductory psychology class at the University of Washington. Students who volunteered received extra credit toward their course grade.

Washington Resilience Scale (WRS)

The WRS developed in Study 1 was composed of 22 items in a Likert format with anchors ranging from "Strongly disagree" to "Strongly agree."

Procedure

Subjects entered the testing room and were told that they would be completing a questionnaire under development that assessed an individual's personal resources. They were asked to complete each item honestly and that they could omit any item(s) which they did not want to answer. Subjects were also informed that they could discontinue participation at any time without

loss of extra credit. Prior to completing the scale, subjects were asked to write a *portion* of their student i.d. number on the cover sheet of the scale for identification purposes. They were informed that once the second administration of the scale was completed, the cover sheets would be destroyed. After two weeks, the subjects returned and were given the scale again with a similar statement made by the test administrator. Once subjects completed the scale a second time, they were completely debriefed by the test administrator and given a chance to ask questions. During debriefing, subjects were told that the purpose of the study was to determine the stability of the newly developed resilience measure over a two week period. They were informed that their responses from both meetings would be correlated and that their questionnaire cover sheets on which they had written a portion of their I.D. number would be destroyed. After data entry procedures were completed by research assistants, cover sheets were destroyed to insure anonymity.

Results

Pearson product-moment correlations were calculated for individual items of the resilience scale, for the scale scores, and for the total scale. As shown in Table

8, reliability coefficients ranged from .30 to .75 for the individual items. Individual items tended to have the lowest coefficients obtained. Scale scores, calculated by adding items for a given factor, had generally larger coefficients. And the largest coefficients were obtained from the total score.

Table 8
Test-Retest Reliability Coefficients
(Estimated over a two week period)

<u>Item</u>	<u>r</u>
1. cooperative person	.61
2. I solve my problems actively	.53
3. people don't push me around	.58
4. feel good about self	.68
5. family didn't need me	.63
6. difficult to work with others	.53
7. not agreeable	.70
8. parents ignored me	.61
9. tire easily	.46
10. easily distracted	.51
11. no endurance	.75
12. can put up with hassles	.27
13. get along with authority	.48
14. solve problems than avoid	.46
15. work to just get by	.73

Table 8 continued.

<u>Item</u>	<u>r</u>
16. laugh at problems	.60
17. energetic person	.70
18. can manage my emotions	.30
19. don't try hard as I can	.55
20. like to keep active	.60
21. speak up for my rights	.71
22. parents gave me attention	.70
<u>Scale Scores</u>	<u>r</u>
Problem solving	.65
Family support	.74
Sociability	.84
Endurance	.74
Emotional Coping	.63
Goal Persistence	.77
Resilience Total	.88

Discussion

Pearson coefficients indicated that the WRS was a reasonably stable measure over a two week period. In particular, the scale scores and the total score had a high degree of reliability and this suggested that the construct of resilience was not subject to gross fluctuations during the intervening two weeks time. This finding supported the notion that resilience is a psychological resource with at least some degree of

constancy. It is not as transient as a mood state, for example. Still, a two week period is a relatively brief amount of time and a more ambitious study could be devised that would cover a longer time period. A longitudinal study over a period of years, for example, would provide invaluable information on the developmental course of resilience and on how individuals access and utilize their resources.

Chapter 4

Study 3: Construct Validity

While statistical procedures to demonstrate a scale's psychometric properties such as test-retest reliability and internal consistency are straightforward, the process by which construct validity is achieved is less clear. There is no standard procedure for obtaining construct validity, no specific set of mathematical formulations, and whether one has demonstrated it is subject to continuing debate. The following section describes one line of reasoning through which construct validity may be established.

Nomological Network of Resilience

Cronbach and Meehl (1959) presented a classic treatise on the nature of construct validity and described a logical procedure for establishing it when new measures are developed. At the heart of their treatise is the recommendation that test developers specify a nomological network (i.e. set of laws) which governs the construct being assessed. Such a network must posit testable relationships between the new scale and observable variables. The observable variables should be accepted indicators of the construct being

assessed. Cronbach and Meehl contended that the logic of validation is no different from that of hypothesis testing. Predicted relationships not supported by correlational research may be interpreted as an indication that the new scale is not truly measuring the construct.

Campbell and Fiske (1959) presented a multi-trait multi-method framework in which Cronbach and Meehl's suggestions could be implemented. Campbell and Fiske suggested that correlating a new measure with different criteria (traits) and different techniques (methods) was a useful way of demonstrating the measure's discriminant and convergent validity. That is, through the analyses of the resulting correlation matrix, the structure of the new scale becomes visible in relation to existing measures and methods. Evaluating a scale's construct validity with Cronbach and Meehl's method can be accomplished by examining whether predicted relationships between the new scale and the observed variables are supported or rejected.

In Study 3, resilience was examined in relation to social support, coping strategies and behavior, and mental health. Individuals possessing a high degree of resilience were expected to possess positive traits and

behaviors indicative of good psychological adjustment. Because the WRS is composed of six factors, it was possible to make predictions regarding the strength and direction of relationships between variables.

Self-report scales assessing social desirability (MC-SDS), coping strategies and behaviors (SCS, WCCL), social support (SSS), and mental health (MHI) were chosen to serve as criteria for evaluation the WRS's convergent and discriminant validity. With the exception of the MC-SDS which was included to determine if subjects' responses were confounded with social desirability, the criteria scales were selected because they were related theoretically to the construct of resilience. If resilience is a general adaptation index, then the WRS should correlate highly with these specific measures of coping and personal resources.

Social Desirability. No WRS factors or the total score were expected to be highly correlated with the Marlowe-Crowne Social Desirability Scale (MC-SDS). This prediction was based upon the findings obtained in Study 1 which demonstrated that correlations between the WRS and MC-SDS were moderate to low. It was important for the WRS to be independent of MC-SDS because if contaminated, the WRS would be of little value. One

factor, Sociability, was expected to obtain a slightly higher correlation with the MC-SDS than the other factors because the skills constituting Sociability may share some variance with behaviors indicative of social desirability -- both are related to an understanding of basic social processes.

Coping Strategies and Behavior. It was expected that all WRS factors and the total score would be positively related to measures of coping. More precisely, factors such as Problem Solving and Emotional Coping were predicted to have stronger correlations with existing measures of coping strategies and behaviors than factors such as Family Support whose influence upon coping is less clear. The Endurance and Goal Persistence factors which assessed individuals' activity and motivation toward goal achievement were predicted to be inversely related to coping strategies that were avoidant or passive in nature.

Social Support. It was predicted that the WRS factors would be positively correlated with measures of social support. In particular, it was expected that the Sociability and Familial Support factors would be more strongly related to social support than the other factors. This prediction was based upon the assumption

that measures of social support shared some variance with Sociability and Familial Support.

Mental Health. The WRS factor scores and total score were predicted to be directly related to indicators of wellness and inversely related to indicators of distress. Beyond this, it was not known how the WRS factor scores would correlate *relative* to one another with various measures of psychological distress such as anxiety or depression; all factors were predicted to be associated with better adjustment.

Method

Subjects

The subjects were 114 undergraduate students enrolled in an introductory psychology class at the University of Washington. Subjects who participated received extra credit toward their course grade.

Questionnaires

Washington Resilience Scale (WRS). The WRS, developed in Study 1, is a 22 item scale with six factors measuring psychological resilience.

Marlowe-Crowne Social Desirability Scale (MC-SDS). The MC-SDS is an 18 item true-false scale measuring social desirability (Crowne and Marlowe, 1960).

Mental Health Inventory (MHI). The MHI is a 38 item measure of psychological distress and well-being (Veit and Ware, 1983). The MHI is composed of five clinical factors (Anxiety, Depression, Loss of Control, Positive Attitude, Emotional Ties) and a lie scale. In addition, combinations of the clinical scales form the basis for two more general indices of mental health, Wellness and Distress.

Social Support Scale (SSS). The SSS is a 22 item measure of an individual's social milieu and perceived quality of social relationships (Smith, Smoll, and Ptacek, 1990; Cauce, Felner, and Primavera, 1982).

Ways of Coping Checklist (WCCL). The WCCL is a 68 item measure of an individual's coping strategies and behaviors (Vitaliano, Russo, Carr, Maiuro, and Becker, 1985). There are six factors which comprise the WCCL, each a different coping response: Problem Focused (PF) strategies, Social Support (SS) seeking behavior, Wishful Thinking (WT), Blaming Others (BO), Avoidance (AV), and Minimization of Threat (MT).

Self-Control Schedule (SCS). The SCS is a 36 item measure of various behaviors and cognitions that individuals employ to control emotional and physiological responses to stress (Rosenbaum, 1980).

Procedure

Subjects were informed that the purpose of the study was to develop a measure of an individual's personal resources. They were asked to complete the packet containing the self-report measures. Subjects completed the packets anonymously.

Results and Discussion

Pearson product-moment coefficients were calculated between each measure and the WRS. In Table 9, each scale score as well as the total scale score are presented. In addition, an alternate total scale (INTRES), one that reflects only internal resource (i.e. the sum of all factors except Familial Support) is provided as well. This was calculated in order to determine if the WRS could exist without the Familial Support factor, the sole WRS factor not constituting an internal attribute.

Convergent and Discriminant Validity

One way to evaluate the above findings was to see if each WRS factor had a pattern of correlates that made theoretical sense across measures. The ideal case of discriminant validity occurred when the correlation matrix depicted a range of associations, both strong and weak between the WRS and the other scales. This signified that the new scale shared at least some

variance with the criterion measure but not so much that it completely duplicated it.

Social Desirability. As shown in Table 9, the MC-SDS was significantly correlated with only one WRS factor, Endurance. Correlations coefficients for all factors ranged from $-.05$ to $.24$ and were lower or equal to the correlations obtained in Study 1 with the MC-SDS. The consistency of these findings obtained with two separate samples, suggested that subjects responses to the WRS were not seriously contaminated by social desirability. The correlation coefficient of the alternate total score (intres), calculated without the Family Support factor, was highly significant, $r = .35$, $p < .001$ and differed from the correlation coefficient of the Total score with the factor included, $r = .23$, ns.

From these findings, it appeared that the Family Support factor either guards against social bias or masks it. If the factor masks social desirability then the validity of the WRS is questionable. However, this seems unlikely since each individual factor, with the exception of Endurance, correlated with the MC-SDS within acceptable limits. Because the Familial Support factor correlated inversely with the MC-SDS, it had the effect of lowering the correlation coefficient of the Total

Table 9

Correlates of Resilience

<u>Scale</u>	Resilience Scale (factors and total)							
	<u>PS</u>	<u>FS</u>	<u>SOC</u>	<u>END</u>	<u>EC</u>	<u>GP</u>	<u>TOTAL</u>	<u>INTRES</u>
MC-SDS	.12	-.05	.17	.24*	.21	.21	.23	.35**
SCS	.36**	.09	.35**	.34**	.34**	.15	.44**	.56**
SSS	.14	.06	.05	.17	.24*	.11	.26**	.25**
WCCL								
PF	.26*	.03	.25*	.28*	.28*	-.04	.27*	.33**
SS	-.01	.04	.11	.18	-.03	.09	.10	.13
WT	-.08	-.08	-.02	-.08	-.09	-.33**	-.17	-.22
BO	-.11	-.08	-.09	-.08	-.16	-.22	-.18	-.22
AV	-.05	-.07	-.19	-.13	-.03	-.36**	-.21	-.25*
MT	.21	.00	-.01	.07	.34**	-.19	.10	.15
TOT	.06	-.04	.04	.08	.08	-.29*	-.01	.03
MHI ¹								
AN	.17	.17	.17	.20	.41**	.19	.34**	.38**
DE	.06	.12	.17	.18	.46**	.24*	.32**	.36**
LC	.13	.15	.24*	.28*	.42**	.20	.38**	.42**
PA	.20	.13	.21	.27*	.42**	.07	.34**	.40**
ET	.12	.10	.17	.30*	.31*	.24*	.32**	.38**
LI	.06	.07	.11	.05	.14	.03	.12	.13
WE	.19	.13	.21	.30*	.42**	.12	.36**	.42**
DI	.15	.17	.21	.24*	.45**	.22	.38**	.42**
TOT	.18	.16	.23	.28*	.47**	.19	.40**	.45**

MC-SDS -- Marlowe-Crowne Social Desirability Scale

SCS -- Self-Control Scale

SSS -- Social Support Scale

WCCL -- Ways of Coping Checklist

PF -- Problem Focused Strategies

SS -- Social Support Seeking Behavior

WT -- Wishful Thinking

BT -- Blaming Others

AV -- Avoidance

MT -- Minimization of Threat

TOT -- Ways of Coping Checklist Total

MHI -- Mental Health Inventory

1 all scales scored in the direction of better adjustment

AN -- Anxiety

DE -- Depression

LC -- Loss of Control

PA -- Positive Attitude

ET -- Emotional Ties

LI -- Lie Scale

WE -- Wellness Factor

DI -- Distress Factor

TOT -- Mental Health Inventory Total

1 Tailed significance: *p < .01 **p < .001

score with the MC-SDS. If one views this as a means of guarding against bias, then interpretation of the Total score rather than the Intres score makes better sense. Examining the correlations between the scale scores and both total scores with the Lie scale of the MHI revealed that subjects appeared to have answered items honestly without attempting to fake a mental health profile.

Coping Strategies and Behavior. As expected, the correlation coefficients between the WRS and the SCS were

positive and statistically significant. In particular, the Problem Solving, Sociability, Endurance, and Emotional Coping factors and the Total score were found to be highly associated with the SCS. The remaining factors, Family Support and Goal Persistence, were not significantly correlated with the SCS, though the direction of their association was positive as predicted. The relative magnitudes of the correlations obtained were as expected in that the Family Support factor had the lowest coefficient among all the factors.

Examining the correlations between the WRS and the WCCL revealed that the Problem Focused subscale of the WCCL had an identical pattern of correlations to those obtained with the SCS, though the associations were smaller in magnitude. This indicated that Problem Focused subscale and the SCS share a good deal of variance and it is likely that they either tap the same construct or are related to another (latent) construct in a similar way. Correlations between the WRS and three WCCL subscales, Wishful Thinking, Blaming Others, and Avoidance yielded negative coefficients with all of the WRS factors and the Total score. This was expected since the WRS taps qualities which reflect an active approach to handling stressful situations (e.g. Problem solving,

Emotional Coping, Endurance, Goal Persistence) whereas the three WCCL subscales, though they may be effective coping strategies, all seem to be directed toward specific cognitions that distract an individual from confronting a stressor actively. It is not likely that a highly resilient individual will employ such strategies. For example, an individual who is highly goal persistent is not the type to employ wishful thinking or avoidance strategies.

The results of these correlations indicated that as predicted, the WRS was associated with coping behaviors and certain types of coping strategies. In particular, a pattern emerged suggesting that the construct of resilience is related to coping strategies that reflect an active approach to handling stressful situations. This is an important finding because while many different coping strategies may be useful, resilience is delineated by the ones which actively engage the environment in some way. Resilient individuals are those who effectively cope through persistent goal directed behavior.

Social Support. There were three criteria assessing different aspects of social support and support seeking behavior: the Social Support Scale (SSS), the Support Seeking subscale of the WCCL, and the Emotional Ties

subscale of the MHI. Contrary to predictions, none of these scales correlated highly with the Familial Support or Sociability Factor of the WRS. Only the Emotional Coping factor and Total score significantly correlated with the SSS. No factor or total score associated highly with the Support Seeking subscale of the WCCL. However, three WRS factors, Endurance, Emotional Coping, and Goal Persistence as well as the Total score correlated significantly with the Emotional Ties subscale of the MHI.

These results indicated that the Familial Support and Sociability factors assess constructs that are not related to the total number of members in a social network (SSS) or the behavior of seeking support (WCCL). One reason for this may be that the Familial Support factor measures an individual's *perceptions* of his family environment or his connectedness to significant others in his family rather than network structure or social behavior. *Perceptions* of a family environment may not be linearly related to aspects of the structure of social networks (e.g. number of members). The former addresses the *quality* of relations, the latter, *quantity*. The Sociability factor apparently does not share much variance with social support either, though reasons for

this are less clear. It is possible, though, that the Sociability factor reflects temperament. Individuals who obtain high scores of the Sociability factor can be described as easy-going and cooperative. Temperament may not be related to the number of social ties or even to social support seeking behavior if, for example, easy-going and cooperative people are also shy.

In order to understand these the lack of significant findings with regard to social support and the Familial support and Sociability scales, it was decided post hoc to correlate the two WRS scales with a subscale of the SSS composed of only family related items. Results indicated that the WRS Familial support factor ($r = .30$, $p \leq .001$) was related to familial aspects of the SSS, however the Sociability scale was not ($r = .00$, n.s.). These results suggested that the Familial support scale addressed only a specific aspect of social support, one that involves perceptions of relatives. The Sociability scale, on the other hand, apparently assesses something else unrelated to social support, possibly temperament as mentioned above.

Mental Health. As expected, all the correlation coefficients between the clinical subscales of the MHI and the WRS were positive. Three WRS factors, Endurance,

Emotional Coping, and Goal Persistence and the Total score were the best predictors of mental health. Besides the Total score, the Emotional Coping factor emerged as an especially good predictor of Depression, Anxiety, Control, and Positive Attitude. It also correlated highly with the MHI global scales of Wellness and Distress in the expected directions.

These findings supported the notion that resilience is a construct which is directly related to mental health. The more resilient individuals are, the healthier they appear to be on clinical scales of depression, anxiety, and behavioral/emotional control, and emotional ties.

Summary

Study 3 attempted to determine the construct validity of resilience through the testing of its nomological net. It was expected that scales sharing similar theoretical factors with resilience would be correlated with the WRS factors and/or the WRS Total score. And it was also expected that the WRS would represent a unique measure, one that did not replicate a pre-existing scale. From the correlation matrix presented, it was shown that the WRS factors and Total score measured various aspects of coping strategies and

behaviors, social support, and mental health. No criterion scale was correlated completely with all of the WRS factors and no one WRS factor predicted all criteria scales.

In some ways the resulting correlation matrix was unsatisfying because while there was some evidence of convergence and discrimination among the criteria scales, it was not the ideal matrix hypothesized by Campbell and Fiske where each factor clearly discriminates and converges with specific criteria. Still the current results do indicate that with few exceptions, the WRS measures what it purports to measure, if not by the Total score, then with a constellation of factors.

Chapter 5

Study 4: Athletic Validation

A good validation study typically involves procedures which demonstrate a new scale's relationship with behavioral indicators of the construct being measured. An athletic sample was chosen for this task because the types of behavioral indicators (i.e. performance statistics) that are usually gathered over the course of a season are precisely the kinds of behaviors that resilience theoretically should influence.

Resilience as a construct is meaningful to the athlete since it may contribute to the mental aspects of skill acquisition and performance enhancement. It may also play a role in injury reduction and avoidance of burnout. Smith, Smoll, and Ptacek (1990) for example, suggested that in situations of high life stress, the co-occurrence of certain risk factors, notably low levels of social support and coping skills, was associated with an increased likelihood of an athlete sustaining an injury. The WRS factors may operate in the conjunctive manner suggested by Smith, et. al. (1990), in potentiating stress related disorders.

A highly resilient athlete was predicted to be one

who was successful in situations of elevated stress and one who was consistent over time. Resilient individuals were viewed as players who were not likely to fold under pressure or concede defeat and who, in match situations, were driven to deliver steady performances.

Method

Subjects

The subjects were 109 intercollegiate women tennis players. Subjects were drawn from institutions ranging in size from small junior colleges to NCAA Division I universities as follows:

49% NCAA Division I

29% NCAA Division II

10% NAIA

12% Other (small colleges)

The samples were obtained along the west coast from San Diego to Seattle. Participation was voluntary.

Assessment Packet

Washington Resilience Scale (WRS). Subjects completed the 22 item, six factor scale developed in Study 1.

Social Support Scale (SSS). The adapted version used by Smith et. al (1990) in Study 3.

Athletic Coping Skills Inventory (ACSI). The ACSI is a 28 item measure of sport specific coping skills.

There are seven factors comprising the ACSI: Peaking under pressure (Pres), Freedom from Worry (Wor), Preparation (Prep), Stress management (Stmt), Resourcefulness (Res), Coachability (Coac), and Concentration (Conc).

Performance Statistics

Winning percentage. Winning percentage referred to the percent of matches won over the course of the season.

Coefficient of variation (Coefvar): Consistency. Consistency over the course of the season was calculated by the following formula:

$$\text{Coefvar} = \frac{\text{sd game wins/set}}{\text{M game wins/set}}$$

As Coefvar approaches 0, consistency increases (Wert, Neidt, Ahmann, 1954).

Straight set wins (WWPCT) and losses (LLPCT). These statistics were calculated as a simple percentage: the number of matches won or loss over total number of matches played.

First set win (FSTWIN). This statistic was the percentage of matches in which the first set was won by the athlete.

Matches won given a first set win (Momentum). This was another percentage: the number of match wins given a

first set win over total matches.

Come from behind wins (Comeback). This statistic was calculated as the number of come from behind match wins (i.e. match wins after losing the first set) over total matches.

Injury data

Statistics on the types of injuries sustained by the athletes and the amount of time spent disabled by injuries were gathered from each team's trainer.

Coach Rating Scale (CRS)

Coaches rated athletes' resilience on a 14 item measure. The scale was developed by first assessing coach perceptions of mentally tough athletes and then constructing a scale of prototypic traits that reflected the coaches responses. This particular method was proposed by Buss and Craik (1983a, 1983b) as a means of validating a new scale. See Appendix C for the Coach Rating Scale.

Procedure

Prior to the start of the 1988-89 regular tennis season, athletes were asked to complete the assessment packet containing the self-report measures. Both athletes and coaches were told that the purpose of the study was to gain information about the relations between

an athlete's personality and mental skills and their performance and injury rate over the course of a season. Participation in the study was voluntary and an athlete's decision to be included in the sample was known only to the research staff. At the end of the season, performance statistics and trainer reports were gathered and coaches were asked to complete the CRS.

Results

Initial analyses proceeded with the intent of identifying linear relationships between the resilience scale factors and the criterion variables. When zero order and multiple correlations failed to describe the relationship between the variables, it was decided that comparing extreme groups of subjects (i.e. those who obtained high and low resilience scores) was the best way to examine the scale's criterion validity. Extreme groups were created by selecting subjects at the upper and lower end of each distribution of WRS scale scores and the total score. Each extreme group represented approximately between 15 to 25% of the distribution of scores. As in Study 3, the results for each resilience factor is presented first with discussion of the total resilience score following thereafter. All t-tests are one tailed because in all cases a significant positive

correlation between the WRS scales and performance was predicted.

Inter-correlation of Variables

Performance variables. Season statistics were analyzed in a number of different ways to explore how resilience was related to behavioral outcomes. For this reason, it should be kept in mind that many of the performance statistics are highly correlated; Table 10 presents their Pearson product-moment coefficients.

Table 10

Inter-correlation of Performance Variables

	WINPCT	CONS	WWPCT	LLPCT	FSTWIN	MOMENT
WINPCT						
CONSISTENCY (Coeff. Var.)	-.90					
WWPCT	.93	-.89				
LLPCT	-.93	.89	-.88			
FSTWIN	.92	-.89	.94	-.93		
MOMENTUM	-.22	.16	-.03	.27	.03	
COMEBACK	.40	-.24	.08	-.39	.21	-.62

Resilience Factors. In addition, it should also be noted that even though the resilience scale factors were derived by a varimax rotation in Study 1, the scale scores are moderately correlated. Correlation coefficients for the resilience subscales are presented

below in Table 11.

Table 11

Inter-correlation of Resilience Factors

	PS	FS	SOC	END	EC	GP
PS						
FS	.20					
SOC	.26	.15				
END	.54	.39	.34			
EC	.56	.23	.38	.39		
GP	.46	.21	.41	.61	.49	
TOTAL	.76	.46	.60	.78	.76	.78

Injury Data

Unfortunately the quality of the trainer reports which were gathered at the close of the 88-89 season, varied considerably and data analyses proved impossible. In many cases trainers did not keep detailed records of when they saw athletes and in other cases, trainers simply did not comply with the study demands. No conclusions can be made at this time regarding the relationship of resilience to athletic injury.

Problem Solving

As shown in Table 12, extreme groups of high and low scores on the WRS were significantly different on most of the criterion variables. The most compelling result was

the finding that extreme groups differed in their performance statistics with highly resilient individuals obtaining, on the average, better won-lost records. On the ACSI, extreme groups differed significantly on all self-report indicators of athletic coping skills, such as playing well under pressure, experiencing less worries, and being resourceful.

Table 12

Problem Solving Means

<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
WINPCT	.56	.66	1.55	36	.07
CONSISTENCY	.50	.40	1.72	34	.04
WWPCT	.45	.57	1.76	37	.04
LLPCT	.36	.27	1.41	37	.08
FSTWIN	.56	.64	1.26	37	.11
MOMENTUM	.93	.93	.08	36	.47
COMEBACK	.09	.09	.02	37	.49
CRS	72.07	73.44	.30	30	.38
ACSIPRES	8.79	10.96	2.45	50	.01
ACSIWOR	10.50	8.57	2.10	50	.02
ACSIPREP	8.58	11.32	3.63	50	.00
ACSISTMT	9.71	11.29	2.42	50	.01
ACSIREP	9.92	12.89	4.43	49	.00
ACSICOAC	8.75	9.43	2.10	50	.02

<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
ACSICONC	10.13	11.79	2.20	49	.02
ACSITOT	66.26	76.67	4.12	48	.00
SNTOTAL	43.47	48.12	1.27	30	.07

Family Support

Extreme groups on the Familial Support factor did not differentiate individuals on the performance variables or on the ACSI as well as the Problem Solving factor -- though the means were in the expected direction. The one significant result was found in comparing groups on the ACSI's Resourcefulness factor. Athletes who perceived their families as being supportive were assessed as being more resourceful than athletes who perceived their families as being unsupportive. Finally athletes in the high familial support group were more likely to report having a greater social network than athletes in the low familial support group.

Table 13

Family Support Means

<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
WINPCT	.59	.62	.44	59	.33
CONSISTENCY	.48	.42	.93	56	.18
WWPCT	.46	.54	1.00	56	.16
LLPCT	.37	.30	.98	56	.16
FSTWIN	.56	.62	.90	56	.19

Table 13 continued.

64

<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
MOMENTUM	.94	.92	.69	55	.24
COMEBACK	.11	.08	1.21	56	.12
CRS	78.58	72.91	1.21	44	.12
ACSIPRES	9.96	10.05	.13	84	.45
ACSIWOR	9.79	9.16	.88	84	.19
ACSIPREP	9.54	10.23	.93	84	.18
ACSISTMT	11.21	10.54	1.28	83	.10
ACSIREs	10.65	12.08	2.18	82	.02
ACSICOAC	8.88	9.24	1.29	84	.10
ACSICONC	10.61	11.35	1.17	83	.12
ACSITOT	70.27	72.78	1.02	80	.15
SNTOTAL	44.40	49.90	1.62	54	.06

Sociability

Like the Familial Support factor, extreme groups derived from the Sociability factor differed from each other in the expected direction but without achieving statistical significance. The groups, on the other hand, were distinguishable on all factors of the ACSI with the exception of the playing under pressure.

Table 14

Sociability Means

<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
WINPCT	.52	.59	.95	37	.17
CONSISTENCY	.49	.45	.50	37	.31

Table 14 continued.

<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
WWPCT	.45	.51	.74	36	.23
LLPCT	.38	.31	1.02	36	.11
FSTWIN	.51	.62	1.45	36	.08
MOMENTUM	.89	.94	1.63	24	.06
COMEBACK	.07	.07	.14	36	.45
CRS	81.21	76.00	.99	26	.17
ACSIPRES	9.52	9.65	.18	53	.43
ACSIWOR	10.38	8.85	1.96	53	.03
ACSIPREP	9.62	11.81	2.94	53	.00
ACSISTMT	9.72	11.15	2.28	53	.01
ACSIRES	10.61	13.12	4.10	51	.00
ACSICOAC	8.76	9.31	1.78	53	.04
ACSICONC	10.10	11.92	2.99	53	.00
ACSITOT	68.93	75.56	2.68	51	.01
SNTOTAL	45.69	49.94	1.12	27	.14

Endurance

Extreme groups on the Endurance factor were found to be different on only some of the conceptualizations of the performance variables. In Table 15, for example, while the means were as expected, only the straight set wins/losses variables (i.e. WWPCT, LLPCT) and the first set win variable (FSTWIN) were significantly different. The groups differed significantly on most of the ACSI with the exception of the playing under pressure and

coachability factors.

Table 15
Endurance Means

<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
WINPCT	.62	.71	1.19	25	.12
CONSISTENCY	.44	.36	1.12	23	.14
WWPCT	.47	.63	2.20	25	.02
LLPCT	.35	.23	1.82	25	.04
FSTWIN	.56	.70	1.79	25	.04
MOMENTUM	.93	.94	.30	17	.39
COMEBACK	.11	.09	.79	25	.22
CRS	76.00	80.67	.82	19	.21
ACSIPRES	9.11	10.35	1.17	37	.13
ACSIWOR	11.22	8.35	2.89	36	.00
ACSIPREP	9.42	12.00	2.76	37	.00
ACSISTMT	10.05	11.40	1.87	37	.04
ACSIRES	10.11	13.25	3.91	36	.00
ACSICOAC	9.11	9.20	.22	37	.41
ACSICONC	9.92	11.85	2.32	36	.01
ACSITOT	69.44	76.40	2.07	34	.02
SNTOTAL	45.00	47.25	1.75	21	.29

Emotional Coping

Extreme groups on the Emotional Coping factor significantly differed on most of the performance

variables and on the ACSI factors. Emotional Coping emerged here as an important component to the construct of resilience. As shown in Table 16, athletes who reported being better able to handle their emotions had better performance records than athletes who did not rate themselves as good copers.

Table 16

Emotional Coping Means

<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
WINPCT	.53	.71	2.71	31	.01
CONSISTENCY	.48	.39	1.21	27	.12
WWPCT	.49	.62	1.78	30	.04
LLPCT	.37	.23	1.98	30	.03
FSTWIN	.56	.68	1.49	30	.07
MOMENTUM	.93	.91	.55	30	.29
COMEBACK	.08	.09	.74	30	.23
CRS	74.09	71.59	.50	26	.31
ACSIPRES	7.86	11.36	4.34	47	.00
ACSIWOR	10.75	8.29	2.71	46	.00
ACSIPREP	9.52	11.21	2.23	45	.01
ACSISTMT	9.33	11.61	3.34	47	.00
ACSIREs	10.67	12.57	2.50	47	.01
ACSICOAC	8.90	9.46	1.90	47	.03
ACSICONC	9.24	12.50	4.83	47	.00

Table 16 continued.

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<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
ACSITOT	66.20	77.00	4.37	46	.00
SNTOTAL	42.07	48.00	1.59	32	.07

Goal Persistence

Extreme groups on the Goal Persistence factor, consistent with the other resilience factors differed on the performance variables related to won-loss records. Like the other factors, they also differed significantly on the ACSI factors (see Table 17).

Table 17

Goal Persistence Means

<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
WINPCT	.57	.69	1.66	29	.05
CONSISTENCY	.47	.40	1.24	28	.11
WWPCT	.48	.60	1.60	29	.06
LLPCT	.33	.25	1.04	29	.15
FSTWIN	.59	.66	.94	29	.18
MOMENTUM	.93	.92	.52	28	.30
COMEBACK	.10	.08	.80	29	.21
CRS	74.43	76.75	.38	17	.35
ACSIPRES	9.64	11.14	1.62	42	.06
ACSIWOR	9.57	7.50	2.68	41	.01
ACSIPREP	8.18	12.05	4.86	42	.00
ACSISTMT	9.64	11.86	3.02	42	.00

Table 17 continued.

69

<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
ACSIRES	10.10	14.24	6.94	40	.00
ACSICOAC	8.82	9.32	1.36	42	.09
ACSICONC	9.38	12.68	4.46	41	.00
ACSITOT	65.26	78.57	4.41	38	.00
SNTOTAL	43.25	50.36	1.83	24	.04

Resilience Total

When extreme groups derived from the total resilience score were compared, they differed significantly on most of the criterion variables -- more so than any one factor. Again, won-loss records were better for high resilient athletes than their low resilient counterparts. The ACSI scores also were significantly different as was expected given the trends already found in the individual factor results.

Table 18

WRS Total Means

<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
WINPCT	.56	.70	2.12	37	.02
CONSISTENCY	.50	.39	1.82	36	.04
WWPCT	.44	.60	2.36	38	.01
LLPCT	.40	.28	1.77	38	.04
FSTWIN	.53	.65	1.70	38	.05
MOMENTUM	.93	.94	.42	27	.39
COMEBACK	.10	.08	1.13	38	.13

Table 18 continued.

<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
CRS	74.07	75.33	.28	30	.39
ACSIIPRES	9.07	10.69	2.02	52	.02
ACSIWOR	10.44	7.92	2.85	51	.00
ACSIIPREP	8.21	12.08	5.19	52	.00
ACSISTMT	9.79	11.77	3.09	52	.00
ACSIRE	9.96	14.12	7.53	51	.00
ACSICOAC	9.07	9.54	1.45	52	.08
ACSICONC	9.33	12.69	5.22	51	.00
ACSITOT	65.88	78.81	5.42	49	.00
SNTOTAL	41.50	47.93	1.76	28	.05

Comparing the WRS and CRS

As shown in Table 19, extreme groups derived from the CRS did not significantly differ on any of the performance variables. This suggested that the WRS and CRS were assessing different attributes. Coaches either may not have focused on the same traits that were found to predict later success or else they unwittingly may have biased their impressions in some way. Like the WRS, the CRS was highly correlated with the ACSI, though the magnitude of the WRS coefficients was much stronger. The CRS also had fewer significant correlations than the WRS. Nevertheless, the CRS appeared to assess many of the same attributes of the ACSI but not more than the WRS. From these data, it is clear that the athletic self-report

from the WRS was superior to coach ratings from the CRS not only in predicting performance but also in assessment of athletic coping skills. This finding is striking since coaches completed their ratings after the tennis season and presumably they could have biased their ratings according to each athlete's performance over the course of the season. These data indicate that the WRS is more strongly associated with performance than the CRS, even though the CRS was administered post hoc.

Table 19

CRS Means

<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
WINPCT	.56	.62	.80	37	.22
CONSISTENCY	.47	.43	.67	35	.25
WWPCT	.47	.54	.80	34	.21
LLPCT	.38	.31	.98	34	.18
FSTWIN	.57	.61	.57	34	.29
MOMENTUM	.94	.92	.84	33	.20
COMEBACK	.08	.09	.38	34	.35
ACSIPRES	9.45	10.35	.99	38	.16
ACSIWOR	8.30	9.85	1.83	38	.04
ACSIPREP	8.70	11.95	3.94	38	.00
ACSISTMT	10.35	11.10	1.15	38	.13
ACSIRES	11.70	13.00	1.71	38	.05

Table 19 continued.

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<u>Variable</u>	<u>Low</u>	<u>High</u>	<u>t</u>	<u>df</u>	<u>p</u>
ACSICOAC	9.05	9.15	.30	38	.38
ACSICONC	9.85	11.74	2.10	37	.02
ACSITOT	67.40	77.47	3.13	37	.00
SNTOTAL	44.94	50.10	1.40	26	.09

Confirmatory Factor Analyses

In order to determine whether the structure of resilience hypothesized in Study 1 was replicated in Study 4, confirmatory factor analyses were run on the three models previously specified with the athletic sample. The results of these analyses indicated that the original model (model 3) suggested by the exploratory factor analyses in Study 1, was again confirmed. As shown in Table 20, Model 3 had the highest fit index and the lowest chi-square/degrees of freedom ratio of all the models.

Table 20

Athletic Resilience Models: Goodness of Fit Indices

<u>Model</u>	<u>df</u>	<u>χ^2</u>	<u>χ^2/df</u>	<u>Fit Index*</u>
1	209	482	2.3	.46
2	208	401	2.0	.62
3	203	321	1.6	.76

N = 109

Table 20 continued.

* = Bentler-Bonett Non-Normed Fit Index

Discussion

The results of Study 4 demonstrated that high and low resilience groups differed on a number of important variables in a demanding situation that requires the ability to deal effectively with stress. Collegiate tennis players with a high degree of emotional coping and goal persistence, as well as high scores on the Total resilience measure had better won-loss records than individuals with fewer skills and resources. Thus, as predicted, it was demonstrated that WRS scores were related to observed behaviors (i.e. performance statistics) in a stressful situation. It was also shown that extreme scores on the resilience scale were related to scores on the ACSI, a sport-specific measure of coping skills. This finding was important because it suggested that the resilience scale assesses psychological skills that are theoretically linked to adaptive behaviors. In addition, these findings indicated that although the WRS was developed with a general undergraduate sample, the scale appeared to assess the construct of resilience in a more specific athletic sample.

Finally, the confirmatory factor analyses provided further evidence that the six factor/latent resilience

model is the best conceptualization of resilience (of the three investigated) as measured by the WRS. It also demonstrated that the resilience scale was a relevant and potentially useful instrument for assessing psychological constructs in athletic samples.

Chapter 6

General Discussion

The results obtained from the four studies indicated considerable success in constructing a psychometrically sound scale derived from a theoretical conceptualization of resilience. Study 1 was conducted to generate a new scale assessing psychological resilience (stress-resistance). Scale item generation proceeded in a rational-theoretical manner after which the preliminary scale was factor analyzed and run through a series of checks on its internal consistency. What emerged was a 22 item, six factor scale. The orthogonally defined factors were labeled as Problem Solving, Familial Support, Emotional Coping, Endurance, Social Support, and Sociability. All factors were found to have good internal reliability and the total scale proved to have a higher degree of internal consistency than any one factor.

From the exploratory factor analyses, it was possible to speculate about the theoretical structure of resilience. It should be noted that the 22 items of the WRS came from an original pool of 75. Our conceptualization of resilience is one which rests not only on a theory of resilience but also on the

computational elegance of the PCA solution. Three standard models of resilience were proposed that could explain research findings in the area. Confirmatory factor analyses demonstrated that a six factor model with a latent second order factor (i.e. general resilience) was the best fitting model of the three. Model specification and tests of goodness of fit were limited to standard models. A standard linear structural equation model is one in which causal relations between observable variables (i.e. scale items) and latent variables (i.e. 1st order factors) are defined by simple regression coefficients. Covariances between observed variables are assumed to be negligible as are covariances between first order factors. Nonstandard models differ from standard ones in that covariances between variables and factors may be specified (if known) and included in the structural equations modeling. Nonstandard models differ in another important aspect from standard models. Causal relationships, specified in standard models, are unidirectional, from factors to variables (e.g. Factor A influences Variable 1). In nonstandard models, it is possible to specify a more complex set of causal relationships in which variables may function as both a cause and effect (e.g. Factor A influences Variable 1

which in turn influences Factor B). Nonstandard models tend to become increasingly problematic as the complexity of interrelationships of variables grow. In some cases, they become untestable due to violations of various structural equation modeling tenets. In the future, nonstandard models will likely replace the current standard resilience model confirmed by our analyses. Such new models must ultimately incorporate elements in a way that describes the complexities of mental skills acquisition and social/familial dynamics -- there are still many unknowns that inhibit a theorist's ability to construct hypotheses linking variables and specifying covariances. At the moment, resilience can best be thought of as a general adaptation ability that involves complex dynamic interrelated phenomena.

Study 2 was a test of the stability of WRS scores over time. Results indicated that the scale was reliable over a two week period. Correlation coefficients for each of the six factors ranged from moderate to high levels while the total scale score had the highest coefficient of stability obtained. These results indicate that the stability of the WRS is acceptable and that the construct of resilience can reasonably be considered not a transient or erratic trait.

Nevertheless, it is important that in future studies, the stability of resilience be assessed over longer periods of time. A longitudinal study would be ideal because, unlike a construct like intelligence which is thought to be relatively invariant over time, resilience can increase or decrease dramatically with changes in factors such as familial support, social relations, or coping skills. Change in these areas, though, typically is not apparent in two weeks -- a relatively brief amount of time, but undoubtedly there can be movement and fluctuation in these areas across a period of years. Documenting changes in these factors could provide more information on how they influence resilience and how they may ultimately contribute to well-being through moderator effects.

Study 3, designed to assess the scale's convergent and discriminant construct validity suggested that the WRS shared variance with existing measures of mental health and coping skills, but not so much that it duplicated those assessments. The correlation matrix obtained with a new sample was consistent with predicted statistical relations. Specifically, it was argued that if resilience is an index of potential resources from which an individual can draw upon in times of duress then

it should be related positively to mental health and coping skills, and negatively to maladaptive behavior.

In particular, it was discovered that three factors of the WRS, Endurance, Emotional Coping, and Goal Persistence were especially good predictors of mental health. Of these factors, Emotional Coping appeared to be the most important aspect associated with clinical scales of depression, anxiety, control, and positive attitude. Highly resilient individuals are more likely to have better adjustment scores on clinical measures than less resilient individuals.

Results of Study 3, also indicated that the WRS was highly associated with measures of coping strategies and coping behavior. Furthermore, the pattern of correlates suggested that resilience is positively related to active coping strategies and negatively related to strategies which are avoidant. This suggests that resilience refers to an adaptation style to stressful situations that is characterized by active engagement of the environment.

Study 4, the last validation procedure, was an attempt to demonstrate the resilience scale's usefulness in predicting behavior within a specific sample. Athletes were chosen for this study because resilience (ability to respond to stress) is thought to be related

to success in sports in which athletes are repeatedly exposed to stressful encounters. Resilience is also thought to be related to an athlete's resistance to stress induced injuries. As mentioned earlier, Smith et. al. (1990) discovered athletes low in social support and coping skills had a higher likelihood of sustaining injury over the course of a season.

The most compelling finding obtained in Study 4 was the observed difference in high and low resilient athletes and their won-loss records. In general, the WRS was able to predict which groups of athletes would have better records prior to the start of the season. Highly resilient athletes had higher winning percentages than less resilient athletes.

Interestingly, a coach's perception of a resilient athlete did not correlate with the characteristics assessed by the WRS's self report. This meant that coaches may have focused on a different constellation of abilities within the athlete in their ratings. However, results indicated that the abilities identified by coaches may not always be the best predictors of athletic performance. Coaches, though, are fairly good at assessing athletic coping skills but the WRS is a superior predictor for both athletic performance and

athletic coping skills.

Study 4 was also designed to assess the potential role of resilience in reducing the likelihood of injury. Unfortunately trainers were not able to provide the quality of information needed to conduct a good analyses of the resilience scale's ability to predict injury rates. As the study proceeded, it was learned that trainers often did not document all of their contacts with athletes. Trainers reported being overworked as they typically had to service other team sports besides tennis and they simply could not keep detailed records. This prevented a meaningful analyses of the injury data.

Study 4 provided preliminary evidence of the WRS's ability to generalize beyond the heterogeneous population of college undergraduates to a very specific sample of highly skilled athletes. Moreover it was demonstrated through confirmatory factor analyses that the resilience model derived in Study 1 was also the best fitting model for the athletic sample. This may be an indication of the model's robustness.

Clinical Implications

From the results in Study 3, one implication that arose was the possible use of the WRS as a quick screening instrument for assessing an individual's

constitution, reserve, and likelihood of achieving mastery over environmental challenge. Furthermore, given the theoretical structure of resilience (i.e. six factors), the scale could provide a clinician with direction in formulating a specific treatment plan to remediate, for example, an individual's coping skills or perceptions of familial relations.

For the scale to be useful to therapists, the next line of studies to be conducted will have to include clinic samples to see if the scale is sensitive to treatment outcome. This will be strong evidence in support of the scale's validity and will also provide justification for therapists to employ it. Because of the scale's brevity and good psychometric properties, the WRS could be administered to other samples besides clinical ones to determine the diversity of its utility. A high school, for instance, is one setting that comes to mind and it is easy to envision a guidance counselor using the scale to identify adolescents at risk. For each population that is assessed by the scale, it is recommended that studies be run with large homogeneous samples to establish group norms. The results of these studies will give the clinician more precision in predicting an individual's outcome compared with a normal

distribution and demonstrated outcome at various standard scores.

The WRS was developed with the intent of providing a new instrument that would be useful both clinically and experimentally. Results of the four reported studies indicated that the WRS possesses good psychometric properties and that it can be utilized to predict behavior in sport setting as a measure of mental skills. Future validation studies will shed more light on the WRS's potential. Moreover, such studies will increase our understanding of the elements which constitute general adaptability and thereby advance both theory and practice of assessing and treating stress-related disorders.

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Appendix A

Preliminary Resilience Scale Items

Self Esteem

1. I am a good person.
2. I can feel good about myself in spite of what others think of me.
3. I am a failure as a person.
4. I don't like myself as a person.

Locus of Control

5. I control my own destiny.
6. The successes in life are due to luck.
7. If something goes wrong, then I tend to blame myself.
8. Others run my life.

Temperament

9. I am an easy-going person.
10. I am difficult to get to know.
11. I can laugh at my problems.
12. I am often tense about things.

Activity Level

13. I like to keep active.
14. I am an energetic person.
15. I have no endurance.
16. I get tired easily.

Sensitivity/Empathy

17. I find it difficult to sympathize with others.

18. If someone is upset or hurt, then I get upset too.
19. It's difficult for me to take other people's perspective.
20. I usually know what others are thinking even when they don't say anything.

Achievement Motivation

21. I want to be the best in whatever I do.
22. I don't try as hard as I can on things.
23. It's important to me to set and reach high goals for myself.
24. I like to do enough work to just get by.

Altruism

25. I help others even when it does not benefit me.
26. I don't believe in charity.

Cooperativeness

27. I find it difficult to work with other people.
28. I am a cooperative person.
29. I like to work in groups rather than by myself.
30. I am not an agreeable person.

Frustration Tolerance

31. I don't get along with people who are different from me.
32. I can put up with the hassles that people give me.
33. It takes a lot before I get angry at someone.
34. Little things can get me angry.

Assertiveness

- 35. I keep my opinions to myself.
- 36. I speak up for my rights.
- 37. I don't let people push me around.
- 38. If someone offends me, then I usually ignore it.

Emotional Self Control

- 39. I can manage my emotions.
- 40. I act impulsively without thinking.

Coping Skills

- 41. I solve my problems by actively doing something about them.
- 42. I find that when I have a problem, I just wait until it goes away.
- 43. When things upset me, I just try not to think about them.
- 44. I solve my problems more than I avoid them.

Family Warmth

- 45. I had at least one parent who was warm and supportive of me.
- 46. None of my parents loved me.

Parental Interest in Child

- 47. My parent(s) ignored me as a child.
- 48. My parent(s) gave me the attention that I needed when I was growing up.

Parental Health

- 49. At least one of my parents was physically and mentally healthy when I was growing up.
- 50. None of my parents had a steady job when I was

growing up.

Marital Harmony

- 51. My parent(s) argued a lot when I was growing up.
- 52. My parents loved each other when I was growing up.

Quality of Household

- 53. Our house/apt. was clean and orderly when I was growing up.

Helpfulness to Family

- 54. I had to help out my family when I was growing up.
- 55. My family didn't need me when I was growing up.

Social Support

- 56. I have a lot of close friends.
- 57. I currently have a good intimate relationship with someone.
- 58. When I need support, I don't know to whom to turn.
- 59. I solve my problems on my own.

Respect for Authority

- 60. I get along with people in authority
- 61. I resent authority figures.

Perfectionism

- 62. I can afford to make mistakes.
- 63. If I fail at something, it doesn't bother me.
- 64. Each mistake that I make means that I'm a failure as a person.
- 65. If I make a mistake, then I feel bad about myself.

Worry

- 66. I tend to worry a lot.
- 67. I find that I'm preoccupied with my fears.
- 68. Few things scare me.
- 69. I feel safe.

Depression

- 70. I am depressed.
- 71. I am happy.

Peak Performance

- 72. Once I get focused on something, it's difficult to break my concentration.
- 73. I'm easily distracted.

Confidence

- 74. I believe that I can do anything if set my mind on it.
- 75. I don't try hard on things because I know that I'll fail.

Appendix B

Washington Resilience Scale

Gender: **Male** **Female**

DIRECTIONS: First circle whether you are a **male** or **female** in the upper right hand corner. Then, read each statement carefully and rate yourself by circling the appropriate choice according to the extent to which you agree or disagree with the statement.

	Strongly Disagree						Strongly Agree
1. I am a cooperative person.	1	2	3	4	5	6	7
2. I solve my problems by actively doing something about them.	1	2	3	4	5	6	7
3. I don't let people push me around.	1	2	3	4	5	6	7
4. I can feel good about myself in spite of what others think of me.	1	2	3	4	5	6	7
5. My family didn't need me when I was growing up.	1	2	3	4	5	6	7
6. I find it difficult to work with other people.	1	2	3	4	5	6	7
7. I am not an agreeable person.	1	2	3	4	5	6	7
8. My parent(s) ignored me as a child.	1	2	3	4	5	6	7
9. I get tired easily.	1	2	3	4	5	6	7
10. I'm easily distracted.	1	2	3	4	5	6	7
11. I have no endurance.	1	2	3	4	5	6	7
12. I can put up with the hassles that people give me.	1	2	3	4	5	6	7
13. I get along with people in authority.	1	2	3	4	5	6	7

	Strongly Disagree							Strongly Agree
14. I solve my problems more than I avoid them.	1	2	3	4	5	6	7	
15. I like to do enough work to just get by.	1	2	3	4	5	6	7	
16. I can laugh at my problems.	1	2	3	4	5	6	7	
17. I am an energetic person.	1	2	3	4	5	6	7	
18. I can manage my emotions.	1	2	3	4	5	6	7	
19. I don't try as hard as I can on things.	1	2	3	4	5	6	7	
20. I like to keep active.	1	2	3	4	5	6	7	
21. I speak up for my rights.	1	2	3	4	5	6	7	
22. My parent(s) gave me the attention that I needed when I was growing up.	1	2	3	4	5	6	7	

Appendix C

Coach Rating Scale

Coaches: Please complete a rating sheet for each athlete that participated in the 1988-89 season by estimating how much a player possesses the following abilities and traits.

Athlete's name: _____

	<u>not</u> <u>at all</u>						<u>very</u> <u>much</u>
1. Competitiveness	1	2	3	4	5	6	7
2. Confidence	1	2	3	4	5	6	7
3. Ability to Concentrate	1	2	3	4	5	6	7
4. Motivation	1	2	3	4	5	6	7
5. Poise	1	2	3	4	5	6	7
6. Maturity	1	2	3	4	5	6	7
7. Self control	1	2	3	4	5	6	7
8. Persistence	1	2	3	4	5	6	7
9. Flexibility	1	2	3	4	5	6	7
10. Endurance	1	2	3	4	5	6	7
11. Ability to solve problems	1	2	3	4	5	6	7
12. Family support	1	2	3	4	5	6	7
13. Sociability	1	2	3	4	5	6	7
14. Ability to handle emotions	1	2	3	4	5	6	7

Biographical Note

Randall Ahn was born on January 22, 1961 in Los Angeles, California. He was awarded his B.A. in Psychology from the University of California, Los Angeles in 1982, his M.S. in Psychology in 1987 from the University of Washington, and his Ph.D., also in Psychology, at the University of Washington in 1991. His areas of interest include child clinical psychology, sport psychology, and stress and coping.