A RELIABILITY ASSESSMENT OF THE

SCL-90-R USING A LONGITUDINAL

NATURAL DISASTER BEREAVED SAMPLE

by

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ii

TABLE OF CONTENTS

iii

LIST OF TABLES

LIST OF FIGURES

vi

CHAPTER I:

INTRODUCTION

The assessment of instrument reliability is an important aspect of nursing research. Unreliable instruments can result in either Type I or II error (Polit & Hungler, 1983). Instruments that are found to be unreliable also have important practice implications regarding client diagnosis and intervention. For example, incorrect psychiatric labels may permanently and negatively affect those labeled (Goffman, 1973). In addition, diagnostic errors based on faulty instrumentation may impede treatment. As Kerlinger (1964) states, "high reliability is no guarantee of good results, but there can be no good scientific results without reliability" (p. 443).

The Symptom Checklist-90-Revised (SCL-90-R) is a multidimensional self report symptom inventory designed to measure psychological distress (Derogatis, 1981). Four types of scores can be derived from the 90-item checklist: 1) nine primary symptom dimension subscale scores, 2) a total score for the number of symptoms reported by the subject, 3) an overall severity index, and 4) an overall global symptom index of psychological distress. The SCL-90-R has been used with a wide variety of populations; however, little research has been published using the SCL-90-R with bereavement populations (Derogatis, 1983). An area of spe-

cial interest is the disaster bereaved because of their reluctance to seek help following such a traumatic event (Lindy, Grace & Green, 1981).

The purpose of this study was to establish the internal consistency reliability and long-term stability of the SCL-90-R for a disaster bereaved population. Currently, disaster investigators have a limited number of instruments available to them to quantify health outcomes. While the SCL-90-R would appear to be one instrument of choice, internal consistency reliability and long-term stability have not been established for its use with disaster populations.

REVIEW OF THE LITERATURE

Reliability

Defining Reliability

For the purpose of this study, reliability refers to both the item-total correlations and the consistency of scores obtained from the same population sample when re-examined with the same test at different times (Anastasi, 1976). Measurement reliability concerns the extent to which measurements are repeatable, even when used with different population samples (e.g., psychiatric outpatients, disaster bereaved, cancer patients) at different times (Nunnally, 1978).

Reliability and Error of Measurement

Any random influence which tends to make measurement differ from occasion to occasion or circumstance to circumstance is a source of measurement error and would affect the reliability to the extent the measure is repeatable (Nunnally, 1978). The concept of reliability provides a basis for or underlies computation of measurement error. When the error of measurement is known, predictions can be made regarding the range of fluctuation likely to occur with a subject's score as a result of chance or other factors, such as change in employment or marital status (Anastasi, 1976).

Any type of measurement involves some measurement error according to Nunnally (1978). Sources of error are systematic biases and random error. Mean scores of every subject would be affected by systematic bias. An example of systematic bias would be that all competency scores were inadvertently reported one point higher than their actual value. Random error is a factor that can contribute to study limitations. For example, if a person taking a test was distracted by a phone ringing and inadvertently marked the wrong test number, error would be considered random. As Nunnally (1978) states: "Random errors are important in all studies, because to the extent they are present, limits are placed on the degree of lawfulness that can be found in nature" (p.190).

Measurement theory assumes that each study subject has a true score or a score they would receive even if there were no measurement errors. However, obtained scores randomly differ from true scores because there is some random error associated with a subject on a particular occasion. Sources of random error include day-to-day fluctuations or changes in a person's condition. An average of a subject's test scores for a given measure would be a close approximation of the true score. It is expected that both true scores and random error are distributed normally (Nunnally, 1978). Reliability then, is a reflection of how accurate, on the average, the estimate of true score is to be measured (Hull & Nie, 1979).

Types of Reliability

There are several types of instrument reliability that can be measured. These include: test-retest, alternate-form (immediate and delayed), Kuder-Richardson, Coefficient Alpha, Split-Half and Scorer reliabilities (Anastasi, 1976). Reliability is reported by coefficients of stability, equivalence and homogeneity (internal consistency) (Selltiz, Wrightsman & Cook, 1976).

This study addressed internal consistency reliability and long-term stability of the SCL-90-R by comparing a disaster bereaved group and control group over a two-year time period. Internal consistency reliability assesses

sampling of items and is considered one of the best ways for assessing a most important source of measurement error (Polit & Hungler, 1983). The size of the internal consistency reliability coefficient is affected by the size of the group and length of test, plus range of individual differences or heterogeneity of the population sample it is testing (Anastasi, 1976). An instrument is said to be homogeneous or internally consistent to the extent that all of its subparts are measuring the same characteristics. Comparisons were also made between and within the bereaved and control groups for T_1 and T_2 to assess mean stability over time. Long term stability is concerned with the degree of agreement between two independently derived sets of scores, over time (Anastasi, 1978). Relationships between the two sets of scores examine how consistent particular psychological symptoms are being measured overtime.

Reliability and Validity

A test must be more than reliable if it is to accurately represent some abstract concept. It also must be valid (Carmines & Zeller, 1979). Since both reliability and validity are considered aspects of measurement adequacy (Williams, 1979), they are often reported together in the literature. Scientific acceptance of an instrument is greatly enhanced if the instrument is found to be highly reliable and valid for its intended use (Carmines & Zeller, 1979). Measures of validity report how well an instrument

measures what it is designed to measure (Anastasi, 1976). Types of validity include content, construct and criterion validity (Polit & Hungler, 1983). Validity depends on the extent to which nonrandom error is minimized (which has systematic biasing) in the measurement procedure, whereas reliability depends on the amount of random (unsystematic) error (Carmines & Zeller, 1979). In comparing an aspect of validity with a type of reliability it is found that convergence in construct validity assumes that different methods of measuring the same variable yields comparable results and converge on the construct (Polit & Hungler, 1983), whereas with internal consistency reliability the test items should correlate with one another. In other words, a test should "hang together" (Nunnally, 1978).

Reliability underlies measurement error, and the amount of measurement error places limits on the amount of possible validity for an instrument. However, there is no guarantee of instrument validity even if there is little measurement error to be found. Reliability is a necessary factor for instrument measurement, but is not a sufficient or total requirement for validity (Nunnally, 1978).

In summary, stability measurement reliability concerns the extent (for one kind of reliability) to which measurements are repeatable over time, with measurement error a factor affecting the degree of measurement repeatability

(Nunnally, 1978). Measurement theory assumes that the measurement instrument has a true score or a score obtained if there were no measurement errors (Nunnally, 1978). Reliability is a reflection of how accurate, on the average, the estimate of true score is measured (Hull & Nie, 1979). There are several types of reliability that can be measured with instruments. This study focused on the internal consistency reliability and long-term stability of the SCL-90-R when used with disaster bereaved and control group population samples over a two year time period. The relationship between reliability and validity were also addressed.

The Symptom Checklist-90-Revised (SCL-90-R)

Instrument Description

The SCL-90-R was developed to measure psychological distress (Derogatis, 1981). Respondents' symptom levels are reported in nine clinical areas and yield three overall indices of distress (Derogatis, Abeloff & Mehsaratos, 1979).

The symptom checklist is composed of 90 items and requires 15-20 minutes to complete. Each "distress" symptom is rated on a five-point Likert-type scale from "not at all" (O) to "extremely" (4) (Derogatis, et al., 1979). Eighty-three of the 90 items (Derogatis & Cleary, 1977) are divided into the nine primary symptom dimensions which are: Somatization (SOM), Interpersonal Sensitivity (INT), Obsessive-Compulsive (OBS), Depression (DEP, Anxiety (ANX), Hostility (HOS), Paranoid Ideation (PAR), Phobic-Anxiety (PHOB), and

Psychoticism (PSY) (Derogatis, 1981). The remaining seven items are termed "configural items" not scored collectively but included as part of the total 90 SCL items with the global indices (even though they may fit with several symptom dimensions). The SCL-90-R three global measures of psychiatric distress are: the Positive Symptom Total (PST), the Positive Symptom Distress Index (PSDI), and the Global Symptom Index (GSI) (Jacobs, Doft & Koger, 1981). The PST is scored by adding all symptom items not scored zero to obtain a positive symptom total. The PSDI score is obtained by dividing the PST grand total score to obtain an average score. To obtain the GSI score the scores for all 90 items are summed and then divided by 90 (Derogatis, 1977). Appendix B contains additional information regarding the computation of SCL-90 factor scores. Derogatis (1977) describes the GSI rather than the PST or PSDI as being the most meaningful single indicator of the current degree or depth of the disorder, and recommends its use when a single summary is desired. Table 1 describes the SCL-90-R symptom dimensions and global indices.

Instrument Development

The SCL-90-R is an evolving instrument with a long history of development detailed elsewhere (Derogatis, 1981); Derogatis, Lipman, Rickels, Uhlenhuth & Covi, 1974; Lipman, Covi & Shapiro, 1979). Derogatis (1981) traces some of the

instrument items back to Woolworth's Personal Data Sheet, a self report inventory that was published in 1918. Parloff, Kelman and Frank (1954) described their development of a symptom checklist to measure degree of discomfort or distress that incorporated symptoms from the Cornell Medical Index (Weider, 1948) plus items from Lorr's (1952) scale that measured the respondents' self-assessment of their interpersonal functioning.

Since Parloff and Frank were both investigators at John Hopkins University, the 41-item "Discomfort Scale" that Frank, et al. (1957) used in their study was called the Hopkins Symptom Checklist or HSCL (Lipman et al., 1979). Use of the HSCL with psychotropic drug trials was published by Lipman, Cole, Park, and Rickels (1965), and by Uhlenhuth, Rickels, Fisher, Park, Lipman, and Mock (1966). The number questions or items used from the HSCL has varied with many published studies.

Psychometric properties of the current SCL-90-R were enhanced by the HSCL. The 58-item version of HSCL has been cited as a landmark in the scale's evolution (Derogatis et al., 1974)). Lipman et al. (1979) reported on a 90-item HSCL instrument. By observation, all 90 of the HSCL items (Lipman et al., 1979) are identical to the 90 SCL items (Derogatis, Lipman & Covi, 1973), except for minor grammatical changes on four items.

Table 1

Definitions of the Nine SCL-90-R

Primary Symptom Dimensions And

Three Global Indices

Nine SCL-90-R Primary Symptom Dimensions[a]

SOM   (Somatization) is intended to identify the amount of bodily distress con-
      sciously perceived by individuals.

INT   (Interpersonal Sensitivity) subscale is designed to reflect self-concept
      problems.

OBS   (Obsessive-Compulsive) reflects problems with unwanted or unrelenting
      thoughts and difficulties with cognitive performance.

DEP   (Depression) subscale includes symptoms of clinical depression, such as
      decreases in interest and energy levels and suicidal thoughts.

ANX   (Anxiety) subscale reflects symptoms of clinical anxiety, such as feelings
      of dread, tension, panic.

HOS   (Hostility) component is representative of the affective state of anger and
      includes such qualities as irritability and rage.

PAR   (Paranoid Ideation) focuses on a thinking style that involved a great deal
      of suspiciousness and projection.

PHOB (Phobic Anxiety) dimension represents fears regarding moving away from safe
      and familiar surroundings.

PSY   (Psychoticism) reflects a variety of intensities of psychotic thought
      processes, from a mild social alienation to full-blown psychosis.

Global Measurement Dimensions of the SCL-90-R[b]

PST   (Positive Symptom Total) Reflects the total number of symptoms the
      respondent reports experiencing with all items that were not scored zero.

PSDI (Positive Symptom Distress Index) The average value for all items not
      scored zero, and is designed to measure intensity of symptoms.

GSI   (Global Severity Index) Represents the mean score value of all the 90 raw
      scores.

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[a]Derogatis, Morrow, Fetting, Penman, Piasetsky, Schmale, Henrichs, Carnicke
(1983). Derogatis, et al. (1977).

[b]Jacobs, Doft and Koger (1981). Derogatis (1977).

The SCL-90-R has retained the five symptom dimensions of the HSCL-58, dropped some items, added four new symptom dimensions and 45 new items (including seven "configural items"). Three global measures of psychiatric distress were added to the SCL-90-R (Derogatis, 1977). Further the administrative format was changed and the level of distress continuum was expanded to a five-point scale. These changes have, according to Derogatis (1977), "resulted in an instrument that while related to the HSCL historically is clearly distinct from it" (p. 8). The present SCL-90-R version was finalized in 1975.

Reliability and Validity Testing

An important part of instrument development is the establishment of reliability and validity. In 1977 Derogatis and Cleary published investigations regarding the "Confirmation of the dimensional structure of the SCL-90: A study in construct validation," using 1,002 psychiatric outpatients as subjects. Eighty-three of the items were factor analyzed using varimax rotation, with agreement reported for eight of the nine symptom dimension constructs between hypothetical and empirical representations, with values ranging from .30 to .77. The Psychoticism dimension was excluded because two aspects of this dimension did not converge. High construct validity was noted with most dimensions. The authors reason that if a measure logically

reveals a highly generalizable, stable structure, it is a valid representation of its underlying construct (internal consistency).

Evanson, Holland, Metha and Yasin (1980) did a factor analysis of the symptom checklist 90 using a sample of 327 psychiatric outpatients from a state hospital. Subjects were drawn from a pool of primarily consecutive, voluntarily admitted patients that were able comprehend and complete the SCL-90. The results of a 12-factor solution did not include an independent anxiety dimension. Only two of the identified "psychotic" items clustered together. The authors suggest that the SCL-90 is more a measure of general discomfort than distinct dimensions of psychopathology; however, they do recommend retaining the factor dimensions as well as the total score. Instrument reliability was not reported in this study.

Also using a psychiatric outpatient population sample (of primarily consecutive admissions, n=358), Hoffman and Overall (1973) factor analyzed the SCL-90, examining rotated solutions for 3-8 factors. The five most clearly defined factors selected from factor scoring keys were labeled: Depression, Somatization, Phobic Anxiety, Functional Impairment and Hostile Suspiciousness. Eighty-one of the 90 SCL items had a loading greater than .35, and could be placed in one of the factors. Cronbach's alpha was used to estimate reliabilities of single factor scores and single total

scores of pathology. Internal consistency reliabilities for the five factors ranged from .75 to .93. The alpha coefficient for the total test was .98, and the Spearman Brown split half reliability between odd and even items was .98. The authors recommend, as do Evanson, et al. (1980), use of the SCL-90 (HSCL-90) as a global index to measure psychological distress, rather than using the instrument's individual factor score profiles with psychiatric outpatients.

In comparing the three preceding studies, all used psychiatric outpatient samples and factor analysis to determine construct validity; however, methods and criteria for analysis differed somewhat. Evanson, et al. (1980) and Hoffman and Overall (1978) used primarily consecutive hospital admission patients. Based on their results, they recommended using the SCL-90 as a global instrument of distress rather than using the nine symptom dimensions. Hoffman and Overall (1978) reported internal consistency reliability for a five factor solution ranging from .83 to .94 with the total SCL-90 alpha coefficient at .98. Derogatis and Cleary (1977) did not specify whether their outpatient sample consisted of consecutive or selected symptomatic admissions. No study reviewed identified all nine symptom dimensions as clearly separate factors, which might affect the construct validity of the symptom dimensions.

Psychometric Property Comparison of the SCL-90 with Other
Instruments.

Edwards, Yarvis, Mueller, Zimgale and Wagman (1978)
studied the effect of repeated testing on changes in
adjustment scores, as well as obtaining test-retest stabil-
ity and internal consistency coefficients with data from a
battery of adjustment tests which were given to 92 non-
patient subjects (divided into control and experimental
groups). Instruments used included the Davis version of the
General Well-Being (GWB) scale, the Denver Community Mental
Health questionnaire, the SCL-90, the Langer 22-item
screening score, and the Social Adjustment Self Report
scale. Testing batteries were given at three timed inter-
vals (two weeks apart), with the control group receiving a
"placebo questionnaire" the first session, plus completing a
third session to examine for any testing effects. The SCL-
90 was found to have near perfect internal consistency
reliability, with alpha ranges from .95 to .97, while other
adjustment tests' internal consistency ranged from .69
to .84. In assessing test-retest stability, when
coefficients were averaged for each group and measured
across time periods, the SCL-90 averaged coefficients
near .80. The experimental group's coefficients at both
$Time_1$ and $Time_2$ were very low, possibly due to a condition
of initial testing. When these data were disregarded, new
standard error computations showed the SCL-90 to be the most

reliable instrument available for its intended purpose. The mean correlation was .94, compared with mean correlations ranging from .77 to .82 for the other adjustment scales. The research demonstrated that the SCL-90 was the most sensitive instrument compared to the four other instruments for assessing individual change. However, one might question if $Time_1$-$Time_2$ correlations can be disregarded without a serious threat to test-retest reliability.

In an effort to validate constructs of the SCL-90 scales, they were compared with MMPI clinical content scales (Derogatis, Rickels & Rock, 1976), using 209 symptomatic volunteers (i.e. showing primary neurotic affective symptoms upon screening). Means and standard deviations were obtained and compared for SCL-90 and MMPI symptom dimensions. Correlations ranged from .40 to .68. Each of the SCL-90 symptom dimensions revealed high correlations with corresponding MMPI symptom constructs, except for the OBS SCL-90 subscale for which there was no directly analogous MMPI subscale. Eighty of the 90 SCL items were placed in the nine symptom dimensions. Internal consistency reliability (coefficient alpha) ranged from .77 to .90. The authors stress that the SCL-90 is not a totally independent instrument, but rather a single instrument that is part of a coordinated series of rating instruments.

In summary, Edwards, et al. (1978) found the SCL-90, when compared with four other instruments, to be the most reliable instrument, with a sample of nonpatient subjects. The SCL-90 subscales were also found to correlate highly (except for OBS) with MMPI subscales and to have high internal consistency reliability scores.

Administration of the SCL-90-R

Procedure and Scoring

The SCL-90-R has a flexible time window, that is, respondents can be asked to report symptoms that occurred during the last seven days or respond to other time lines in keeping with certain clinical or research purposes of administration (Derogatis, 1981). The SCL-90-R can be easily administered and scored using a technician (Derogatis, et al., 1973) and computer program time. Published norms available for the SCL-90-R are for nonpatient normals, psychiatric outpatients and separate gender norms (Derogatis, 1981).

Issues Regarding the Administration of Self Report Instruments

The use of self report methods to identify psychological distress is a growing phenomena. Self report has become an efficient method of data collection because of ease of completion for subjects, generally a short administration time and easy scoring (Howarth & Schokman-Gates, 1981) that is less costly when done by technicians and

17

computer support (Derogatis, et al., 1974). When gathering data by self report questionnaires, it is essential to provide clear directions for the respondent that indicate how they are to answer the questions. Clear directions are the most important factor in enhancing test reliability of self report measures (Nunnally, 1978, Polit & Hungler, 1983). Mailed self report questionnaires are possibly the least intrusive form of obtaining information. Self report questionnaires offer the possibility of anonymity, which may provide more honest responses, particularly on sensitive issues (Zenmore, 1983).

Some disadvantages to self report include concern about the accuracy and thus reliability of self assessment data; since it is out of control of the investigator, it is open to distortion, bias, or deliberate falsification (Frederiksen, et al., 1979). Social desirability has been found to be a selective influence in self report (Derogatis et al., 1974). Also the lack of clinical expertise may handicap the patient in making accurate assessments of the level of severity of symptoms (Prusoff et al., 1972). In addition, there is the possibility that subjects may not understand or correctly follow written instructions, and might even send the instrument back unanswered. Finally, someone other than an identified study subject may have responded to instruments sent in the mail.

Similarly, with clinical assessment instruments, a central issue regarding self report is whether subjects can or will honestly report their symptoms. Prusoff, Klerman and Paykel concluded from their survey of 200 depressed patients that acutely depressed patients do not accurately estimate the severity of their symptoms, although in milder (nonpsychotic) depression, self report has utility and value (1972). Glass, et al. (1978) commented that medical patients reporting specific individual symptoms would be diagnosed having a psychiatric disorder, but stated that "most diagnosed patients do not report those symptoms" (p. 1194). However, Derogatis et al. (1974) concluded that ". . . it is the patient's opinion with all its biases that is most relevant for the initiation and maintenance of treatment" (p. 80). Thus, there is no clear agreement regarding the use of self report for symptom assessment.

How reliable a subject's self rating is compared to a clinician's rating of the subject raises questions associated with rating scales. Such questions can include: information access, utility, sensitivity, and specificity (Carol, et al. 1973). Another issue is the difficulty in distinguishing between causes internal and external to the subject (Miller, Smith & Uleman, 1981). For example, were psychological distress symptoms a regular part of a persons coping mechanism, or were the symptoms the result of losing a significant person from a volcano eruption?

Burkhart, Green and Harrison (1979) believe that with the lack of psychometric research, a specific problem has arisen, namely, ". . . that many studies have used different types of measures as though they were equivalent procedures" (p. 376). Thus different versions of a self report instrument may provide different influences and emphasis, as well as result in different internal consistency reliability.

Validity is an important issue with self report questionnaires. Content validity decisions regarding questionnaires are usually expressed in ranks (e.g., high validity, moderate validity, low validity) or dichotomies (yes-no, valid-invalid). Aiken (1980) suggests social science researchers many times do not pay close attention to the statistical nature of these decisions. He states, "the question of how reliable such decisions are may be entirely neglected" (p. 955).

As self report measures increase in popularity, it is important for researchers to assess the valid limits of their use. For example, are results from a self report instrument alone adequate and valid measures of psychopathology and psychiatric distress? A concern raised by Brown, Sweeney and Schwartz (1979) is that emphasis in some clinical research is placed on using either observed behavior or self report without considering that these dif-

ferent methods may be discrepant and may not overlap. Hesbacher, Rickels, Morris, Newman and Rosenfeld (1980) caution that additional observational and historical data may be necessary for appropriate case detection within high prevalence groups.

In summary, self report is becoming an increasingly popular method for use in identification of psychological distress. The use, potential benefits, as well as disadvantages of self report instrumentation has been discussed.

SCL-90-R Self Report versus Clinicians' Ratings

In 1980, Kass, Skodal, Buckley and Charles published a study which used the SCL-90 in a model designed to review the quality of psychotherapy a subject received. The study recommended using the SCL-90 to identify cases at higher risk for problems. However, in 1983, Kass, Charles, Klein and Cohen published a study regarding discordance between therapists psychopathology ratings and the SCL-90, which used 180 consecutive new psychiatric outpatient clinic patients plus 64 additional outpatient cases as subjects. The SCL-90 and SCL analogue (a matched clinician rated instrument) were found to have a low correlation (r=.17) with this patient group. The most common reasons for discordance were that the symptoms of the physically ill person resulted in false positive scores on Somatization, as well as overreporting of symptoms, and paranoia. Interrater reliabilities were not done for clinician trainees, which

may have affected the results of the study. The authors concluded that the SCL-90 scales produced too many false results to be a reliable clinical screening instrument. Steer and Henry (1979), using the SCL-90 and SCL-90 analogue also reported significant differences in clinician versus patient perceptions.

However, in a study of cancer patients, Derogatis, Abeloff and McBeth (1976) found in their initial analysis that there were no significant differences between physician and self report ratings. Thus, the need for further study seems indicated to determine if there are discrepancies between the SCL-90-R and SCL analogue and the nature of those discrepancies. These findings appear to suggest that the instrument may not be a sensitive clinical instrument.

Studies Reviewed Using the SCL-90 or HSCL With Subjects Experiencing Losses and/or Exposure to Traumatic Events

Horowitz, Wilner, Kaltreider, and Alvarez (1980) studied the signs and symptoms of post-traumatic stress disorders, using the SCL-90 as part of a battery of rating scales. Sixty-six persons (50 women, 16 men) were selected for the study with stressful life events that included loss of a significant relationship, a physical loss, or loss of self esteem. After an evaluation interview at a University Stress Response Unit, a set of ratings were completed by patients and clinicians. The SCL showed that intrusion

(intrusive thoughts) was a frequent symptom, with 90% reporting thoughts or ideas that were hard to dispel. When the SCL-90 subscale scores were compared with presumptive stress scores from the life event report, four of the SCL-90 subscale correlations were low: ANX (r=.29, $p \leq .01$); DEP (r=.20, $p \leq .06$); HOS (r=.21, $p \leq .05$); and SOM (r=.21, $p \leq .05$). The five remaining SCL-90 subscales were positively correlated but not at statistically significant levels. The authors suggest that as the processing of serious life events information results in the appropriate revision of inner models, intrusive thoughts and trying to avoid those thoughts will decrease, and related symptoms to these states will abate.

In 1981, Horowitz, Krupnmick, Kaltreider, Wilner, Leong and Marmar published a study entitled "Initial psychological response to parental death" which used a nonequivalent contrast group design. Persons (29 women and 2 men) seeking outpatient treatment at a university mental health clinic following the death of a parent were compared (via a testing battery of both clinician and subject ratings) with 36 adult subjects (18 women and 18 men) who had also lost a parent, but did not receive treatment. It was hypothesized that those persons who requested therapy after the death of a parent would have more prolonged and intense symptoms than persons who did not seek help, although a small number of persons in the untreated group

would be as symptomatic as those who requested treatment. A primary and secondary data analysis was done using the SCL-90 Anxiety and Depression subscales; the SCL-90 total pathology score was also among items selected for primary analysis. More women (29) sought help than men (2). The average time for a person to seek help and be interviewed was about six months from the death of a parent, compared with less than two months post-parental death for these subjects who had not sought treatment. In this study, it is not known how many of the subjects in the group who had not received treatment at two months would have sought treatment at six months as did the subjects in the intervention comparison group. The hypothesis was supported regarding more distress in the patient group. Over 75% of the treatment group reported at least a moderate amount of anxiety symptoms and over 90% reported symptoms of depression on the SCL-90. Other significant correlations indicated that better educated persons were less likely to report levels of distress. The nonequivalent contrast group design, the time element, the small sample size of men, lack of screening of volunteers for psychiatric history, selecting a patient group without reported psychotic states or a complex psychiatric history, and letting both patients and clinicians know who was in which group are factors that could have affected the reliability and validity of this study.

Bromet, Schullberg and Dunn (1982) report using the SCL-90 with subjects following the Three Mile Island (TMI) nuclear accident. After the 1979 TMI nuclear accident, policy judgments had to be made to identify populations at highest risk and most in need of evacuation supplies, counseling, etc. A question of concern was whether psychiatric patients should be classified as high risk, needing specific interventions. A sample of 151 TMI psychiatric outpatients were compared to 64 persons living in the area of a similar nuclear plant. Structured interviews were conducted, with the SCL-90 given at three time periods (1-3 months after the accident, at 9-10 months, and at one year). SCL-90 Global Summary Scores (GSI) and interviews were used to determine the current level of subclinical symptoms. Patients in both groups reported similar SCL-90 symptom levels at nine and twelve months. Demographic data indicated that better educated and older patients were less symptomatic on the SCL-90 in both groups. Other data revealed that those viewing the TMI reactor site as dangerous and the quality of support networks were significantly associated with mental health.

In summary, Horowitz, et al. (1980) reported that in a sample of post traumatic stress disorder subjects, 90% reported intrusive thoughts that were hard to dispel, and all of the nine SCL-90 subscales correlated at statistically significant levels with the avoidance subscale on the Impact of Event Scale. In studying psychological response to

parental death, Horowitz, et al. (1981) found over 75% indicated medium or high levels of anxiety and over 90% with depression, on the SCL-90. Bromet et al. (1982) studied psychiatric outpatients living in the TMI area after the 1979 nuclear accident. No significant differences were reported on SCL-90 symptom levels when compared with a similar population sample also living near a nuclear reactor.

<div align="center">Disaster Variables</div>

Conceptualization of "Disaster"

The term "disaster" has been defined as "a situation of massive collective stress" (Kinston & Rosser, 1974 p. 438). Melick concurs in describing disasters as massive stress situations, whether they are natural or manmade (1978, p. 335). Not only can disasters be classified according to those causative agents, but they can also be categorized by time periods. Other authors labeled the time periods as warning, threat, impact, inventory, rescue, remedy, and recovery periods (Powell & Rayner, 1952). Tyhurst views these periods as one of impact, a period of recoil and a post-traumatic period (1951). Kinston and Rosser (1974) describe these phases as: Threat, impact, recoil and early aftermath. Thus, there is not universal agreement on what these stages are or when they occur. However, most disaster studies focus on stages from "warning" to "remedy" and

usually end 2-4 weeks following the disaster (Logue, Melick & Hansen, 1981). Green (1982) states that "descriptions of later phases are much more global or vague" (p. 547) indicating a need for more studies focusing on the recovery period. According to Melick, "few studies have investigated illness of post-disaster populations during the recovery period" (1978, p. 335).

Disaster Methodology

Green (1982) emphasized the importance of methodology in disaster research. "Although usually ignored in the literature, there is a set of dimensions which greatly affect estimates of impairment rates, yet are essentially independent of the physical aspects of a particular disaster: these are methodological dimensions" (p. 544).

Of 29 disaster studies reviewed by the investigator only a few cited using a theoretical model to guide their research, although theoretical differences were evident in the different studies. Appendix C provides further information regarding the 29 studies reviewed including type of disaster, sampling methods, types of data, and selected findings. As Perry and Lindell (1978) have pointed out, "a major problem with research on the psychological impact of disaster is that it has largely developed in the absence of formal theory; thus, there is no framework to guide scientific inquiry" (p. 544).

Decisions also have to be made regarding which variables to study, and how long to study them. For example, variables such as short-term or long-term effects, the nature of the disaster, who is to blame, warning strategies, impact, degree of social support, previous life experience, crisis intervention, etc. (Logue, et al., 1981) need to be considered.

Methods of reporting disasters include single case reports and anecdotal studies, questionnaires that depend on recall, experimental analogous studies with simulated disasters and journalistic accounts (Kingston & Rosser, 1974). Glesser, Green and Winget (1981) cite three major approaches that would enhance studies of disaster: Clinical-descriptive, epidemiological and quasi-experimental. The goals of these approaches differ as well as the data they produce. Clinical-descriptive studies focus on victims of extreme stress, and the nature of their symptom constellation, with a goal to increase understanding of the survivor syndrome and its dynamic meaning. These studies can contribute to the development and modification of psychopathology theories. Epidemiologic surveys can aid before and after a disaster in determining typical rates of psychic impairment and illness. This information would be useful for planning mental health services. Quasi-experimental research primarily study relationships between outcomes and degree of stress (Glesser, et al., 1981). Thus, methodological issues

include theoretical perspectives, variables chosen for study, sampling and methods of studying and reporting disasters. Methodological critique of the 29 disaster studies reviewed are presented in appendix C.

Disaster Measurement

Twenty-nine disaster research studies were reviewed for the present study, with a focus on aspects related to disaster measurement, longitudinal health outcome related studies, and instrument replication.

Many studies of disaster "victims" did not focus on those considered to be at highest risk or differentiate if reported disaster "victims" were survivors of a disaster, also bereaved by the loss of a friend or family member, suffered property loss, or personal injury. In response to longitudinal health outcome disaster studies, five studies followed a disaster sample from 1-2 years, with a focus primarily on mental health problems and morbidity. Glesser, et al. (1981) followed a sample of litigants from the 1972 Buffalo Creek Dam collapse and flood for three years with a focus on health outcomes. Leopold and Dillon (1963) followed a sample of survivors from a marine disaster for up to four years, recording subjective physical, emotional complaints along with psychiatric interviews (no formal instruments were mentioned).

Of the 29 studies reviewed, it is difficult to compare

studies with each other, as they varied in regard to type of instrument batteries used to measure disaster bereavement, sampling methods and choice of the aspects of disaster bereavement (e.g. emotional distress during similar time periods). The type of data obtained differs greatly from study to study. Since many instruments were developed for studying a specific disaster, instrument reliability or validity information is limited.

A variety of research designs and instruments have been used to study post-disaster health effects following major disasters (Logue, et al., 1981). Instruments used with disaster bereaved have included "interaction chronograms" (Cobb & Lindeman, 1943), a general assortment of psychiatric tests [including a Roscharch ink blot test (Beach & Lucas, 1960)] to structured surveys focusing on specific bereavement variables, using pairwise matched controls (Logue & Hansen, 1980).

Instrument replication in the 29 studies reviewed was rare. Parker (1977) in studying a sample of evacuees following cyclone Tracy in Australia, 1974, reported using a General Health Questionnaire, as did Singh and Raphael with disaster bereaved following a 1977 train disaster in Australia. Five studies (Green, 1980; Bromet, Schulberg & Dunn, 1982; Glesser, Green & Winget, 1981; Logue & Hansen, 1980; and Murphy, 1981) have reported using the SCL-90 with disaster survivors. Both Green (1980) and Bromet, et al.

(1981) report using the GSI of the SCL-90.

Other limitations to studies include small sample sizes, little systematic follow-up (particularly with non-respondents), often a lack of a control group and poor response rates (Logue, et al., 1981). Part of the problem with small sample sizes and poor response rates is that survivors (including disaster bereaved) have been termed reluctant populations (Lindy, et al., 1981). As Kinston and Rosser (1974) stated, ". . . [there is] the reluctance of the victim to recognize his need for help . . ." (p. 449). Green (1982) also reports that few studies discuss representativeness of control groups.

The Disaster Bereaved as a Study Population

Disaster bereaved are often reluctant to seek help following a severe traumatic event (Lindy, et al., 1981). Long-term health consequences may arise as the result of a disaster (Logue et al., 1981). Disasters can elicit physical, behavioral and psychological distress in varying degrees (Demi & Miles, 1983). Such symptoms as a psychic numbing, a loss of energy for work or emotional relationships, recurrent traumatic dreams or somatic preoccupations may be part of a chronic survivor syndrome (Lindy, et al., 1981).

Disasters are usually not isolated incidents. "Rather, a chain of events are set off in the lives of its victims to

which the victims react, triggering further events and further reactions" (Glesser, et al., 1981, p. 152-3). An unrecognized disaster distress reaction may be the reason some would seek medical help. Further, "immediate reactions and delayed reactions can be pathologic without appropriate support and intervention" (Demi & Miles, 1983, p. 13).

Many personal and situational variables can influence a person's reaction to a disaster. Personal variables include a person's previous experience with disaster, concurrent losses, coping skill, psychological and physical proximity, role conflict and role overload. The situational variables include support systems, physical proximity, the amount and type of warning, the nature and severity of the disaster (Demi & Miles, 1983). The potential for the disaster to occur (i.e., does it occur often, like springtime flooding, or was it a relatively rare occurrence like the eruption of a volcano in the U.S.) and the degree of controllability over future impact (i.e., preventing major losses with fires by use of massive public education and evacuation planning, mandatory functioning smoke alarms and clearly marked accessible exits) were two additional situational variables included in Berren, Beigel and Ghertner's (1980) model of classifying disasters.

Bereavement Variables Possibly Affecting Disaster Measurement

Bereaved individuals experience multiple losses and

changes when an important person dies. These are: loss of income, role change, loss of friendships, and self confidence (Crase, 1982).

Effects of Mode of Death. The mode of death may affect a bereavement outcome. Unexpected death, such as a disaster, allows no time to emotionally prepare for the loss. Parkes (1972) reported less stress and generally better outcomes with bereaved from expected deaths (such as cancer), than bereaved resulting from sudden or unexpected deaths. Sanders (1982) stated that the sudden death group (n=23) she studied "indicated an internalized emotional response described as an anger-in or intropunitive response causing them to sustain prolonged physical stress" (p. 227).

In one of the few research articles published using bereaved subjects and the SCL or HSCL, spouses whose husbands died from suicide (n=20) and natural or accidental causes (n=20) were studied by Demi (1978). Subjects had been widowed 12-24 months. The HSCL-58 Depression and Anxiety subscales plus two other study instruments were employed to measure if suicide survivors show poorer mental health adjustment than non-suicide survivors. Among the findings was an indication that suicide survivors did not show less satisfactory mental (anxiety or depression) or physical health, but a trend was noted toward less satisfactory social adjustment. However, sample sizes used were

very small and replication is recommended before firm con-
clusions can be drawn. After reviewing several mode of
death studies, Levinson (1972) stated, "In general, research
supports a theory of increased psychopathology following
sudden, unexpected death" (p. 162).

Survivor Variables. From Chase's (1982) summary of the
literature, survivor variables with nonelderly widows
included more severe symptoms of nightmares, fatigue,
insomnia, and depression. In addition, somatic reactions to
the loss may be experienced, such as vomiting, palpitations,
chest pains, skin rashes, fainting spells, headaches or
dizziness. Thus, the loss of a spouse may precipitate
emotional and somatic reactions.

Fulton, Gottesman and Owen (1982) surveyed 558 bereaved
persons with mailed questionnaires and home interviews. The
study found that profound social ties are ruptured by death
and that a wide variety of physical, psychological and
social reactions are activated by loss. Also, the quality
of the relationship ruptured by death had a strong effect on
the nature of grief experienced by the survivor. The sample
of adult children showed that the death of an elderly parent
was much less disruptive, less debilitating emotionally and
less socially significant than the death of a child or
spouse.

Increased mortality rates may be associated with
bereavement. Kraus and Lilienfield (1959) found a

significant increase in death rates of younger (under 35) widowed males when compared to married males of the same age. Maddison and Viola (1968) studied male widowers in the first six months of bereavement and found a 50% increase in the number of deaths by coronary heart disease. However, evidence of higher bereaved mortality rates is not conclusive, as studies such as Clayton's (1974) comparing a randomly selected bereaved sample (n=109) with matched controls found no differences in one year mortality rates. Stroebe, Stroebe, Gergen and Gergen (1981) report many methodological problems with several mortality studies which would affect the reliability and validity of the findings.

Mediating Variables

Dean and Lin (1977) urge further research on the ability of social support in buffering stressful life events. Andrews, Tennant, Hewson and Vaillant (1978) concluded that differences in a person's stress reactions were probably the result of the significance of the event to the individual, personality attributes and patterns of coping responses. Vachon (1976) believed those at greatest risk following a spousal death had poor social support, ambivalent marital relationships, minimal funeral ceremonies, previous psychiatric histories and were under 45 when a spouse died suddenly or over 65 when a spouse had an illness of six months or more. Bugen's (1977) model of human grief sug-

gests the closeness of the relationship (centrality) between the bereaved and the deceased, plus to what degree one believes that the death could have been prevented, in predicting the intensity of the bereaved's grief reaction. Green (1982) encourages use of the centrality (central or peripheral) concept in disaster research in relation to the disaster's location to a community. Thus, age, amount of social support, quality of the relationship (centrality), physical, emotional and social factors are cited as some of the bereavement variables affecting survivors.

Value of Early Intervention

Jacobs and Ostfeld (1977) cite conjugal bereavement as a severe stressor and significant public health problem. Many factors can add to the complexity and anguish involved with bereavement, as well as subsequent morbidity risk. Crisis intervention may lessen pathological effects (Raphael, 1978). Studies by Barrett (1978), Vachon, Lyall, Rogers, Freedman-Letofsky, and Freeman (1980), Constantino (1981), also support intervention. Silverman's (1969) widow-to-widow program demonstrates that positive psychological changes can be aided with intervention for the widowed. However, crisis intervention did not reduce distress in a study conducted by Williams, Lee and Polak (1976).

Summary of the Review

Reliability refers to both the item-total correlations and the consistency of scores obtained by the same population sample when re-examined with the same test at different times (Anastasi, 1976). Measurement error would affect reliability to the extent that the measure is repeatable (Nunnally, 1978). An instrument demonstrates internal consistency reliability to the extent that all of its subparts are measuring the same characteristics, whereas long-term stability is concerned with the degree of agreement between two independently derived sets of scores, over time (Anastasi, 1976).

The SCL-90-R is a newer form of self report developed for measuring psychiatric distress. The instrument contains 90 items, nine major symptom dimension subscales, plus three global indices of distress. The SCL-90-R is an evolving instrument in which reliability and validity testing is being done with many different types of study subjects. Edwards, et al. (1978) compared the SCL-90-R with four other instruments and found it to be the most reliable. The SCL-90-R was also found to correlate highly with the MMPI subscales (Derogatis, et al., 1976). Three studies factor analyzed the SCL items, but all were unable to define nine clearly separate factors or symptom dimensions. Thus, two studies recommended using the SCL-90-R Global Summary scores only. Some discrepancies have also been noted between the

SCL-90-R and SCL (therapist) analogue, which may need further testing. Few studies have published use of the SCL-90-R with disaster bereaved. Reliability data for disaster populations has seldom been reported.

Self report instruments such as the SCL-90-R, are easy economical efficient ways to assess large numbers of individuals quickly, yet be minimally intrusive (Zenmore, 1983). Self report reliably provides clarity of direction. Disadvantages include the reliability of retrospective data, possible distortion, bias or falsification (Frederiksen, et al., 1979).

Disasters can be defined as massive stress situations (Melick, 1978) and categorized according to causative agent or time period. Methodological issues in disaster studies include theoretical perspectives, variables chosen for study and method of reporting the disaster. In reviewing 29 disaster studies, measurement problems included: inadequate conceptualization, few longitudinal and replicated studies, and few studies that used standardized instruments. Disaster bereaved are often reluctant to seek help. A person's reaction to a disaster is influenced by many personal and situational variables. Long-term physical and psychological health consequences may arise after a disaster, without appropriate support and interventions.

In reviewing 30 studies that reported using the Symptom Checklist (of varying lengths, ranging from 25 items to the full 90 items), instrument stability was seldom reported. It is important to know how instrument stability is affected over time when the same population sample is used. Often instrument internal consistency reliability was reported in studies for one time only, leaving the question as to what changes might occur with internal consistency over time, using the same population sample. Regarding the disaster bereaved, there is a need to study this population using an instrument that is reliable and generally acceptable to other researchers. There is also a need to compare disaster bereaved with a control or comparison group. Bereaved individuals experience multiple losses and changes when a significant person dies. "Research supports a theory of increased psychopathology following sudden, unexpected death" (Levinson, 1972, p. 162). There are many survivor and mediating variables to consider in bereavement. Early intervention with survivors has been recommended. Since few studies presently published use the SCL-90-R with disaster bereaved, it is very important to lay the groundwork by assessing SCL-90-R instrument internal consistency reliability and long term stability using a disaster bereaved and a comparison group.

Research Questions

1. What is the internal consistency reliability for the SCL-90-R when used to compare disaster bereaved and control groups one and three years postdisaster?

2. What are the long term stability coefficients for the SCL-90-R scales with disaster bereaved and control groups over a two year time period?

Chapter II:

METHODS

Research Design

This methodological study on instrument reliability is a secondary analysis of data collected from a longitudinal study of disaster bereaved by Murphy. Reliability estimates of the SCL-90-R were calculated from Murphy's data, and included coefficients of internal consistency and stability. Data were collected on the SCL-90 to assess mental health outcomes following disaster loss. Mail and structured interview procedures were used.

Subjects

For this study SCL-90-R data were analyzed on 49 close family members and friends of adult deceased disaster victims from the 1980 volcanic eruption of Mt. St. Helens, in southwestern Washington. These subjects were compared at two post-disaster time periods with 34 persons who suffered no disaster-related loss. The control group subjects were similar to the bereaved subjects on the following demographic variables: gender, age, occupation, and geographic location. Table 2 compares demographic variables for the bereaved and control groups. The majority of subjects were females whose mean ages were 30 and 37 respectively. Occupations for bereaved group subjects were primarily listed as self employed, skilled labor and professions (87%), while the control group subjects were primarily in the skilled

Table 2

Demographic Data For The Bereaved And Control Groups

Variable	Bereaved Group (n = 49)		Control Group (n = 34)	
	Number of Subjects	Percent	Number of Subjects	Percent
Gender:				
Female	36	74	22	65
Male	13	26	12	35
Mean Age in Years	30		37	
Age Range	18 - 72		20 - 64	
Occupation:				
Retired	2	4	0	0
Not Employed	2	4	0	0
Self Employed	12	24	1	3
Skilled Labor	20	41	11	32
Professional	11	22	21	62
Student	2	4	1	3
Education:[a]				
Completed Grade School	1	2	0	0
Attended High School	2	4	0	0
Completed High School	17	35	6	18
Attended College	15	31	11	32
Completed College	7	14	7	21
Advanced Degree	7	14	9	26
Relationship to Deceased:				
Widow	4	8	−	
Mother	4	8	−	
Son	2	4	−	
Daughter	10	20	−	
Sibling	7	14	−	
Intimate Friend	22	45	−	

[a] Educational data were obtained at T_1 (1981) for the bereaved subjects and at T_2 (1983) for the control subjects.

labor and professional areas (94%). Subjects reside in ten cities in the United States and two Provinces in Canada. Comparison times included $Time_1$ (T_1), one year post disaster (1981) and $Time_2$ (T_2), three years post disaster (1983).

In the comprehensive disaster study by Murphy (1981), $Time_1$, one year post disaster subjects were 69 close family members and friends of 51 adult deceased disaster victims from the 1980 Mt. St. Helens volcanic eruption. Of these 69 bereaved subjects, 39 were close family members and friends of persons missing and presumed dead and 30 were close family members and friends of persons confirmed dead. The bereaved group included spouses, parents, siblings, adult children, intimate friends and colleagues of the victims. No bereaved person under age 18 was included in the study. Fifty persons who suffered no disaster related loss served as control subjects.

Several approaches were used to obtain bereaved subjects for the longitudinal study. A complex initial and replacement sampling plan was developed and is described elsewhere (Murphy, 1981, Murphy & Stewart, in press).

The bereaved group (n=69 at $Time_1$, and n=49 at $Time_2$) used for secondary analysis was formed based on the following rationale: to compare the presumed and and confirmed dead bereaved groups at both T_1 and T_2 on several outcome measures, Murphy used discriminant function analysis and analysis of variance. She found no significant differences

between the groups at either time (although interview data indicated that both confirmed and bereaved subjects believed presumptive death was worse than confirmed). Thus for this study, the two bereaved groups were judged similar enough to be combined into one disaster bereaved group.

All bereaved and control subjects who participated in 1981 were contacted in 1983 regarding participation for $Time_2$. Table 3 identifies the participation response rates of the study groups. Of 154 persons initially contacted, 119 participated at T_1. Of 125 persons contacted at T_2, 85 participated. There was an average participation rate of 68% for subjects at T_2 (see Table 3). Of the 50 persons selected to serve as comparison subjects, some were excluded by Murphy at T_2 in order to maintain representative demographic characteristics with the bereaved group at T_2. Two of the 36 control subjects did not complete enough of the SCL-90-R at T_2 to warrant inclusion in this study. Therefore, although 36 control subjects participated at T_2 there were only 34 useable SCL-90-R tests returned. For this study, future reference to control group subjects will refer to those 34 subjects with completed SCL-90-R tests.

Finally, some presumed dead victims' bodies were found between the 1981 and 1983 data collection periods. Bereaved study subjects of these victims were transferred from the presumed to confirmed dead bereaved group.

TABLE 3

Participation Response Rates of Study Groups

Group	Potential Number of Participants		Number of Persons Contacted		Number of Persons Who Actually Participated		Percent of those Contacted		Percent of Potential	
	Time1[a]	Time2[b]	Time1	Time2	Time1	Time2	Time1	Time2	Time1	Time2
Confirmed Dead Bereaved	40	36	36	36	30	22	83	61	75	61
Presumed Dead Bereaved	62	45	45	45	39	27	87	60	63	60
Control Subjects	-	44	73	44	50	36	68	82	-	82
Total	-	125	154	125	119	85	77	68	-	68

Note. A dash represents the absence of data.
a. Time1 data from Cowan, 1982.
b. Time2 data from Murphy, Stewart, in press, 1984.

Protection of Human Subjects

Murphy's (1981) study of the Mt. St. Helens disaster bereaved was approved in 1980 by the Portland State University Human Subjects Review Committee and approved in 1983 by the OHSU Human Subjects Review Committee for longitudinal followup. Human subjects were informed of their rights by use of written informed consent which they signed before participating in the study. Study subjects were protected in this study according to the National Institute of Health (NIH) Exemption Category Guideline number five (OHSU Thesis Bluebook, 1982, p. 5) which exempts secondary analysis research of existing data, in which the subjects cannot be identified.

Study Instruments

The focus of this study, a secondary analysis, was on internal consistency and long term stability reliability of the SCL-90-R, with a disaster bereaved population. The SCL-90-R instrument is a multidimensional self report symptom inventory designed to measure psychological distress and was described in the review of the literature. Subjects in Murphy's study (1981, 1983) were instructed to answer the SCL-90-R questions by rating how much discomfort a problem has caused them in the last 30 days at T_1 and T_2.

Statistical Analysis

Frequencies, means and standard deviations were first

computed on both items and subscales of the SCL-90-R for both study groups. Cronbach's alpha was then computed to answer research question one regarding the internal consistency reliability of the SCL-90-R when used to compare disaster bereaved and control groups at one and three years post disaster. Coefficient alpha is used with tests that contain Likert type response scales for the items. This internal reliability coefficient is influenced by content heterogeneity and content sampling (Anastasi, 1976). For internal consistency, the normal theoretical range of values is between 0 and +1.00, with higher positive values reflecting higher degrees of internal consistency. Coefficient alpha is preferable to a split-half procedure as it gives an estimate of all possible ways the split-half correlation measure can be divided into two halves. The number of items and average interitem correlation for each subscale were also taken into account as affecting coefficient alpha values. More specifically, as the number of scale items increases and the average correlation among items increases, the value of alpha increases (Carmines & Zeller, 1979, p. 45). Fluctuations over time as a source of unreliability are not taken into consideration with coefficient alpha (Polit & Hungler, 1983).

A measurement issue to consider in reporting internal consistency reliability is the determination of acceptable coefficient alpha levels for the instrument and its intended

use. Anastasi (1976) suggests desirable reliability coefficients are usually in the .80's or .90's, while Carmines and Zeller (1979) suggest reliabilities of at least .80 for widely used scales. Nunally (1978) more specifically recommends a reliability of .95 as desirable in clinical practice where important decisions are made with specific test results. However, Nunally suggests that use of instruments with only modest reliabilities of .70 or higher is acceptable in the early stages of research (1978). Since internal consistency reliabilities were obtained in this study using the recently developed SCL-90-R, an internal consistency reliability of .70 or above was considered acceptable in this research.

To answer research question two regarding study group differences on long term stability, coefficients for the SCL-90-R scale were computed. Long-term stability is concerned with the degree of agreement between two independently derived sets of scores, over time. The relationship between two sets of scores is expressed by a correlation coefficient (r). In this study, the Pearson Product-Moment Correlation Coefficient (Pearson's r) was used. Pearson's r takes into account the value of a person's score deviation above or below the group mean as well as the person's position in the group. A zero correlation would represent an absence of a relationship or a chance occurrence. A cor-

relation with a +1.00 value would indicate a perfect correlation between variables (Anastasi, 1978).

Since Pearson Correlation coefficients are not equal units of measurement, they cannot be added or averaged. Thus to obtain the mean stability coefficients for the SCL-90-R nine subscales and three global indices, the Pearson r correlation was changed to a z score (using Appendix G, Downie & Heath, 1974). The z scores were averaged and then converted back to r again using Appendix G (p. 315).

In addition to estimating stability with Pearson r, the SCL-90-R scale stability was also computed using Kendall's Tau Rank Correlation. The Kendall Tau Correlations were compared with the Pearson r Correlations as a check for outlying scores, since Pearson r Correlation may not detect "outliers."

According to Downie and Heath (1974), after computing Pearson's r, the next step is to determine whether the r is significant. In testing for the significance of r, the ratio of a deviation to a standard deviation is computed. The statistical significance of the Pearson r is tested using a t test.

CHAPTER III:

RESULTS

The results section reports the statistical computa-
tions carried out to answer the two research questions on
the internal consistency reliability and long term stability
of the SCL-90-R using a natural disaster bereaved sample.
In addition to answering the two research questions, other
findings will be presented.

Findings Related to the First Research Question

The first research question was: What is the internal
consistency reliability for the SCL-90-R when used to com-
pare disaster bereaved and control groups one and three
years postdisaster? To determine the internal consistency,
coefficient alpha was computed for the nine subscales and
the Global Severity Index (GSI), using bereaved and control
group data. Table 4 provides results of the internal con-
sistency estimates.

All coefficient alpha estimates were above .70 for the
bereaved group, except for the Psychoticism (PSY) subscale
at T_2 which was .67. Coefficient alphas for the bereaved
group ranged from .91 (T_1) to .67 (T_2). In comparing coef-
ficient alpha for the bereaved group at T_1 and T_2, six
subscale coefficient values decreased whereas one increased
at T_2. Two subscales remained the same. For the bereaved
group the subscales that had the highest coefficient alpha
correlations (ranging from .86 to .91) at T_1 were: INT,

TABLE 4

INTERNAL CONSISTENCY RELIABILITY ESTIMATES OF THE SCL-90-R SCALES

FOR THE BEREAVED AND CONTROL GROUPS IN 1981 AND 1983

SCL-90-R Subscales	Number of Items	1981 BEREAVED GROUP[b]		1981 CONTROL GROUP		1983 BEREAVED GROUP		1983 CONTROL GROUP	
		Average Correlation	Alpha	Average Correlation	Alpha	Average Correlation	Alpha	Average Correlation	Alpha
SOM (Somatization)	12	.29	.82	.48	.91	.28	.82	.36	.86
INT (Interpersonal Sensitivity)	9	.42	.86	.40	.87	.48	.89	.37	.82
OBS (Obsessive Compulsive)	10	.51	.91	.34	.83	.44	.88	1.22	.73
DEP (Depression)	13	.37	.89	.43	.91	.39	.89	.46	.91
ANX (Anxiety)	10	.44	.89	.47	.89	.40	.86	.25	.78
HOS (Hostility)	6	.49	.85	.43	.82	.33	.74	.34	.72
PAR (Paranoid Ideation)	6	.40	.80	.40	.77	.39	.76	.31	.65
PHOB[a] (Phobic Anxiety)	7	.37	.78	.28	.62	.39	.76	.10	.44
PSY[a] (Psychoticism)	10	.24	.74	.20	.68	.18	.67	.20	.74
SCL-90-R GLOBAL MEASURES									
PST[c] (Positive Symptom Total)									
PSDI[c] (Positive Symptom Distress Index)									
GSI (Global Severity Index)	90	.29	.97	.27	.97	.27	.97	.25	.97

[a] The number of items in the PHOB and PSY subscales at T_2 may slightly differ from the number of items reported by Derogatis in the SCL-90-R manual (1977), as some of the items had no variability with control group scores.
[b] Sample size based on those subjects who responded to all items with in the specified subscale. (n=48-49 for the bereaved group, also n=33-34 for the control group).
[c] No reliability was calculated for theses global measures.

OBS, DEP and ANX. These same subscales continued to have the highest coefficient alpha correlations (ranging from .86 to .89) for the bereaved group at T_2 (see table 4).

For the control group 4 of the 18 subscale coefficient alphas obtained were below .70. The 4 lower coefficient alphas were found with the PAR, PHOB (T_1 & T_2) and PSY subscales. The range of coefficient alphas for the control group was from .91 (T_1, T_2) to .44 (T_2). The number of items used to compute reliability in some subscales differed slightly from those reported by Derogatis (1977), because some of the PHOB and PSY subscale items had no score variability at T_2 and therefore were dropped from the SPSS analysis. The control group was similar to the bereaved group in that the four highest control group subscale coefficient alphas (ranging from .87 to .91) at T_1 were also the four highest control group coefficient alphas (ranging from .78 to .91) at T_2. The four control group subscales with the highest internal consistency reliability were: SOM, INT, DEP and ANX (See table 4).

In comparing the bereaved group with the control group at T_1, the coefficient alphas for the bereaved group were higher than the control group on five subscales. Conversely the SOM, INT and DEP subscale alphas for the control group were higher than for the bereaved group, while the reliabilities for ANX subscale scores were the same for both groups at T_1. In making the same comparisons at T_2, the

bereaved group coefficient alphas were higher than the alphas for the control groups on six subscales, while the coefficient alphas for the control group were higher on the three subscales (see table 4). The four highest subscale coefficient alphas for both groups were very similar for the two time periods in that they remained the highest subscale coefficient alphas at T_2.

The internal consistency coefficient alpha was noted to be the same and extremely high (.97) for the Global Severity Index (GSI), for both groups, at both time periods. Moreover, the GSI average correlation coefficients with both groups over time were similar (.25 to .29) (see table 4).

Findings Related to the Second Research Question

The second research question was: What are the long term stability coefficients for the SCL-90-R scales with disaster bereaved and control groups over a two year time period? To answer this question, Pearson Product Moment Correlation Coefficients were computed for both groups and tested for significance. Table 5 summarizes these results.

All SCL-90-R stability coefficients were statistically significant at the $p \leq .001$ level for the bereaved group. Stability coefficients for the bereaved group ranged from .47 for the PAR subscale to .69 for the ANX subscale (see Table 5). The three SCL-90-R Global Indices for the

TABLE 5

STABILITY COEFFICIENTS FOR THE SCL-90-R SCALES WITH THE

BEREAVED AND CONTROL GROUPS FROM 1981 TO 1983

SCL-90-R SUBSCALES	BEREAVED GROUP		CONTROL GROUP	
	Pearson r	Kendall's Tau	Pearson r	Kendall's Tau
SOM (Somatization)	.55***	(.31***)	.24	(.24*)
INT (Interpersonal Sensitivity)	.66***	(.40***)	.50***	(.44***)
OBS (Obsessive Compulsive)	.58***	(.44***)	.43**	(.43***)
DEP (Depression)	.52***a	(.35***)	.37*	(.40***)
ANX (Anxiety)	.69***	(.40***)	.35*	(.33**)
HOS (Hostility)	.63***	(.48***)	.34	(.32**)
PAR (Paranoid Ideation)	.47***	(.49***)	.06	(.20)
PHOB (Phobic Anxiety)	.61***	(.52***)	-.14	(-.006)
PSY (Psychoticism)	.60***	(.40***)	.24	(.33**)
SCL-90-R GLOBAL INDICES				
PST (Positive Symptom Total)	.63***	(.49***)	.49**	(.38***)
PSDI (Positive Symptom Distress Index	.57***	(.41***)	.30*	(.34**)
GSI (Global Severity Index)	.66***	(.45***)	.40**	(.40***)

Note. The first numerical value for each group is The Pearson Product Moment Correlation Coefficient, which can be compared with the Kendalls Tau Correlation Coefficients, that follow the Pearson Correlations (in parenthesis).
aThe coefficients for The Bereaved Depression subscale were calculated using data from 48 subjects, as one subject did not complete the subscale.
*$p \leq .05$ **$p \leq .01$ ***$p \leq .001$

bereaved group were also statistically significant at the
$p \leq .001$ level.

In contrast to the bereaved group, only the stability
coefficient for the INT subscale was significant at the
$p \leq .001$ level for the control group. Moreover, the
global GSI and PST indices as well as the OBS subscale were
significant at the $p \leq .01$ level for the control group. The
subscales of DEP, ANX and HOS as well as the global PSDI
index for the control group was statistically significant at
the $p \leq .05$ level. Thus while all bereaved group Pearson r
correlations were statistically significant at the $p \leq .001$
level, only one control group subscale was significant at
$p \leq .001$. level One control group subscale and two global
indexes were significant at the $p \leq .01$ level while three
subscales and one global index were significant at the $p \leq .05$
level (see Table 5).

The stability coefficient scores for the control group
ranged from -.14 for the PHOB subscale to .50 for the INT
subscale. In contrast the PHOB subscale with the bereaved
group was .61. For the bereaved group the ANX, PAR and PSY
subscale stability coefficients were of greater magnitude
(.69, .47 and .60 respectively) when comparing the same
subscale coefficients in the control group (.35, .06 and .24
respectively) (see Table 5).

The mean stability correlation computed for the nine
SCL-90-R subscales was .60 for the bereaved group, compared

to .28 for the control group. For the three global indices, the mean stability correlation was .62 for the bereaved group and .22 for the control group.

Kendall's Tau Correlation Coefficients were computed for comparison with the Pearson correlations as a check for outlying scores (see Table 5). Kendall Tau values were all significant at the $p \leq .001$ level for the bereaved group, indicating similarity to the Pearson correlations. Similarly for the control group, the Kendall's Tau Correlations were similar to Pearson correlations with the exception of the phobic anxiety and psychotocism subscales.

Between and Within Group Differences on the SCL-90R

Between Group Differences. To observe what changes or differences may have occurred with the SCL-90-R scores over time, means and standard deviations were computed and tested for significance comparing the bereaved and control groups at T_1 and T_2. Results of these computations are found in Table 6. Statistically significant differences on t values between the bereaved and control group at T_1 were: the PSDI index ($p \leq .001$): the GSI index and OBS, DEP, ANX and PSY subscales ($p \leq .01$); and the PST index, and HOS, PAR, PHOB subscales ($p \leq .05$). At T_2, the ANX and PHOB were significant at the $p \leq .01$ level while the PHOB subscale, PST and GSI indices were all significant to the $p \leq .05$ level. At both T_1 and T_2 the lowest means for both the bereaved and control

TABLE 6

COMPARISON OF MEANS WITH BEREAVED AND CONTROL GROUPS

USING THE SCL-90-R IN 1981 AND 1983

SCL-90-R SUBSCALES	1981			1983		
	BEREAVED GROUP n = 49	CONTROL GROUP n = 34	t value	BEREAVED GROUP n = 49	CONTROL GROUP n = 34	t value
SOM (Somatization)	.81 (.59)	.57 (.63)	1.76	.50 (.45)	.36 (.42)	1.48
INT (Interpersonal Sensitivity)	.80 (.73)	.66 (.60)	.94	.66 (.66)	.47 (.47)	1.45
OBS (Obsessive Compulsive)	1.12 (.86)	.66 (.54)	2.78**	.69 (.59)	.54 (.43)	1.24
DEP (Depression)	1.34 (.76)	.88 (.72)	2.83**	.82 (.6)	.67 (.67)	1.04
ANX (Anxiety)	.96 (.80)	.51 (.56)	2.79**	.62 (.57)	.43 (.40)	2.67**
HOS (Hostility)	.70 (.73)	.42 (.46)	2.03*	.58 (.53)	.38 (.47)	1.81
PAR (Paranoid Ideation)	.86 (.82)	.48 (.52)	2.40*	.52 (.52)	.29 (.36)	2.29*
PHOB (Phobic Anxiety)	.32 (.49)	.15 (.26)	2.02*	.22 (.37)	.07 (.16)	2.56**
PSY (Psychoticism)	.54 (.48)	.28 (.35)	2.62**	.32 (.36)	.22 (.35)	1.21
SCL-90-R GLOBAL INDICES						
PST (Positive Symptom Total)	44.47 (21.42)	33.41 (21.86)	2.29*	34.88 (20.97)	24.88 (18.13)	2.25*
PSDI (Positive Symptom Distress Index)	1.74	1.29 (.43)	3.89***	1.36 (.48)	1.23 (.40)	1.34
GSI (Global Severity Index)	.90 (.58)	.55 (.46)	2.96**	.59 (.44)	.40 (.37)	2.12*

Note. With each mean and standard deviation pair the mean is presented as the first number in the pair and the standard deviation follows enclosed in parentheses.

*p≤.05   **p≤.01   ***p≤.001

groups were on the PHOB subscale. The highest subscale mean scores for both groups at T_1 and T_2 were on the DEP scale. In examining Table 6, all scale means are higher for the bereaved group than the control group at both time periods.

Within Group Differences. Means and standard deviations were computed and tested for significance comparing differences of the bereaved and the control group at T_1 and T_2. These findings are summarized in Table 7. Profiles of the means with the nine primary SCL-90-R subscales are illustrated in Figure 1 for both the bereaved and control groups.

There were several statistically significant t values (using a t test for paired subjects) with comparing mean differences. For the bereaved group, T_1 and T_2 mean scores on all global indices and the OBS, DEP, ANX and PSY subscales were statistically significant at the $p \leq .001$ level. Also, the PAR subscale mean scores were significantly different for T_1 and T_2 at the $p \leq .01$ level. In contrast, the control group T_1 and T_2 mean scores were significantly different for the PST and GSI indices, and the INT and ANX subscales at the $p \leq .05$ level.

TABLE 7

COMPARISON OF MEANS OF BEREAVED FROM 1981 TO 1983

AND FOR THE CONTROL GROUP FROM 1981 TO 1983

MEANS AND STANDARD DEVIATIONS

SCL-90-R SUBSCALES	BEREAVED GROUP 1981	1983	t value	CONTROL GROUP 1981	1983	t value
SOM (Somatization)	.81 (.59)	.50 (.45)	4.18	.57 (.63)	.36 (.42)	1.84
INT (Interpersonal Sensitivity)	.80 (.73)	.66 (.66)	1.73	.66 (.60)	.47 (.42)	2.07*
OBS (Obsessive Compulsive)	1.12 (.86)	.69 (.59)	4.35***	.66 (.55)	.54 (.43)	1.37
DEP (Depression)	1.34 (.76)	.82 (.66)	5.26***	.88 (.72)	.67 (.67)	1.56
ANX (Anxiety)	.96 (.80)	.62 (.57)	3.97***	.51 (.56)	.32 (.40)	2.00*
HOS (Hostility)	.70 (.73)	.58 (.53)	1.49	.42 (.46)	.38 (.47)	.43
PAR (Paranoid Ideation)	.86 (.82)	.52 (.52)	3.17**	.48 (.52)	.29 (.36)	1.76*
PHOB (Phobic Anxiety)	.32 (.49)	.22 (.37)	1.61*	.15 (.26)	.07 (.16)	1.35
PSY (Psychoticism)	.54 (.48)	.32 (.36)	3.94***	.28 (.35)	.22 (.35)	.87
SCL-90-R GLOBAL INDICES						
PST (Positive Symptom Total)	44.47 (21.42)	34.88 (20.97)	3.66***	33.41 (21.86)	24.88 (18.13)	2.43*
PSDI (Positive Symptom Distress Index)	1.74 (52)	1.36 (.48)	5.25***	1.29 (.43)	1.23 (.40)	.71
GSI (Global Severity Index)	.90 (.58)	.59 (.44)	4.98***	.55 (.46)	.40 (.37)	2.01*

Note. With each mean and standard deviation pair the mean is presented as the first number in the pair and the standard deviation follows enclosed in parentheses.

*$p \leq .05$ **$p \leq .01$ ***$p \leq .001$
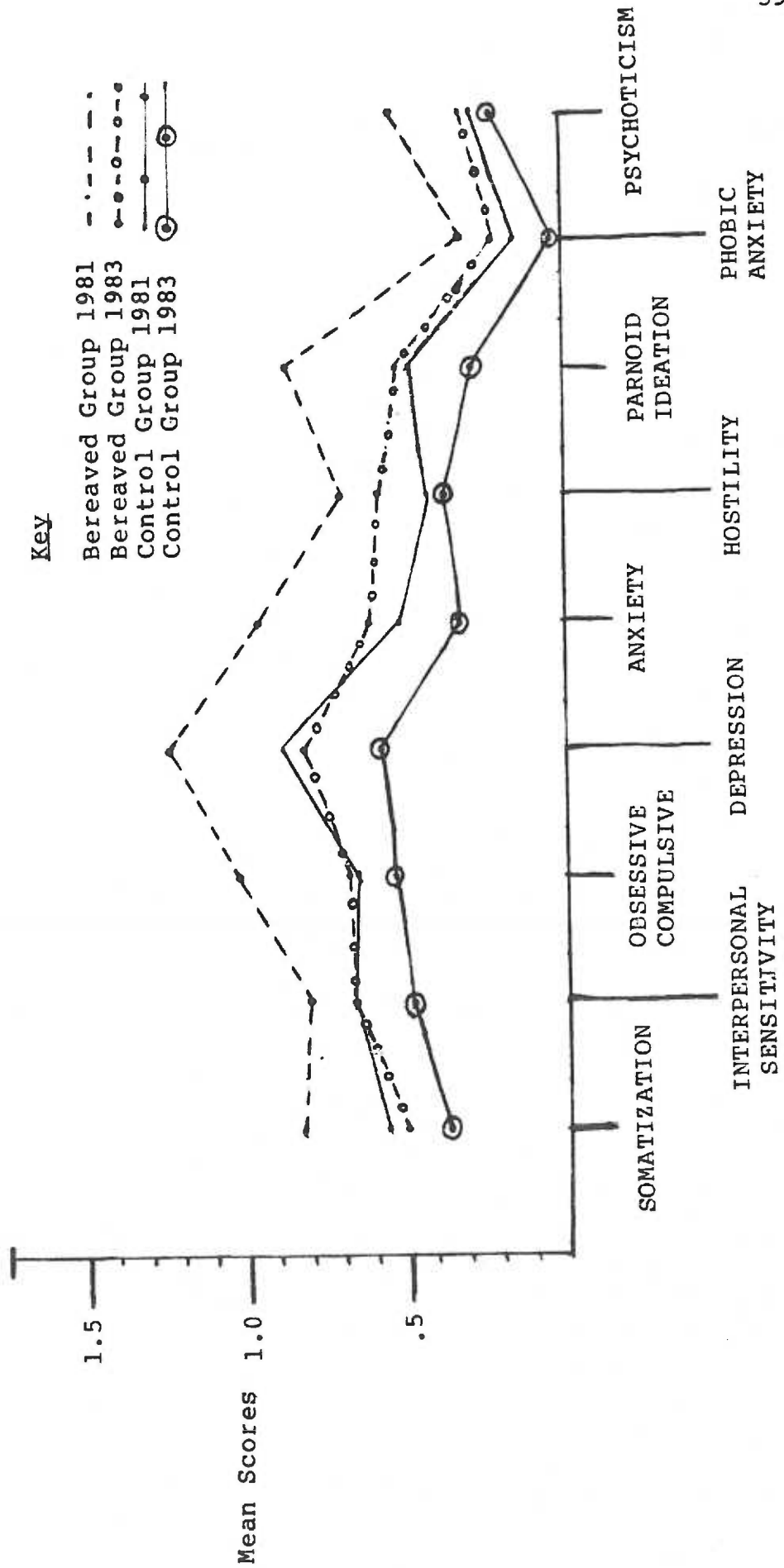
SCL-90-R Subscales

FIGURE 1.

BEREAVED AND CONTROL GROUP SCL-90-R SUBSCALE PROFILES

CHAPTER IV:

DISCUSSION

The purpose of this study was to examine internal consistency reliability and long term stability of the SCL-90-90-R scales using natural disaster bereaved subjects (n=49) and comparison subjects (n=34). This section will focus on a discussion of the findings related to the two research questions, methodological issues, and significance to mental health nursing.

Research Question One

What is the internal consistency reliability for the SCL-90-R when used to compare disaster bereaved and control subjects at T_1 and T_2? Coefficient alpha was used to determine internal consistency reliability estimates. Alpha correlations ranged from .44 to .91.

All coefficient alpha reliability estimates were above .70 for the bereaved group (n=49), except for the Psychoticism (PSY) subscale at T_2 (a= .67). The lower alpha may reflect construct validity problems of the PSY subscale. Derogatis and Cleary (1977) reported that agreement was not found on the PSY dimension as two aspects of this dimension did not converge with the varimax procedure in the factor analysis of SCL-90 items. In the Evanson et. al. (1980) study of construct validity, only two of the identified "Psychotic" items clustered together on factor analysis.

Furthermore, the types of populations tested may affect the internal consistency reliability. For example, Derogatis and Cleary (1977), Evanson et al. (1980), and Hoffman and Overall (1978) all used psychiatric outpatient subjects in their factor analyses. Subjects in these studies were dissimilar to the current secondary analysis study. Thus, valid comparisons cannot be made.reli-

Internal consistency coefficient alphas on four of the 18 subscale scores were below .70. These four lower alphas were for the PAR, PHOB (T_1 & T_2) and PSY subscales. Interestingly, these are three of four newer subscales that Derogatis et al. (1973) developed and added to the five HSCL-58 subscales to form the SCL-90. Factors that may have influenced these alphas are: the control group sample was smaller than the bereaved group sample; the number of items on the subscales with lower reliabilities consisted of only six or seven items; the low PHOB subscale average correlation coefficient may indicate a lack of variability responses to some items. Thus, factors that can affect the internal consistency reliability are: the number of items, the type of subjects, sample size, understanding test directions, low average correlations, restriction of range, homogeneity and lack of variability of scores.

Nonetheless, except for PSY, the SCL-90-R subscales are reliable enough to use in further disaster research. In the bereaved group, subscales had coefficient alphas above .70.

Also the Global Severity Index had a high internal consistency coefficient (.97) for both groups across both time periods. This suggests that the GSI is a reliable measure of distress that could be used with bereaved subjects as well as other population samples (Evanson et al., 1980; Hoffman & Overall, 1978). Also in that some of the subscales (e.g., ANX, HOS) can be identified with states that could change day to day, moment to moment, Speilberger, Gorsuch, and Lushene (1970) suggested with their State-Trait Anxiety Inventory that coefficient alpha internal consistency would probably provide more meaningful reliability index than test-retest correlations.

Research Question Two

What are the long term stability coefficients for the SCL-90-R scales with disaster bereaved and control groups over a two year time period? All SCL-90-R stability coefficients were statistically significant at the $p \leq .001$ level for the bereaved group and were higher than the stability coefficients of the control group. The SCL-90-R instrument appears to be a highly stable instrument to be used with this disaster bereaved population (as seen in table 5), yet sensitive to change as shown by comparing disaster bereaved mean scores over two time periods and finding significant t values ($p \leq .05$ to $p \leq .001$) for all but two SCL-90-R subscales (see table 6).

However, generalizations regarding the stability of the instrument with this disaster bereaved sample need to be made with caution. Kendall's Tau correlations were computed and compared with the Pearson correlations as a check for outlying scores. For the bereaved group, magnitude differences were noted between the two correlation coefficients. on four subscales and one global index, however all were significant at $p \leq .001$. Kendall Tau correlations were also lower than Pearson r correlations on three subscales and two global indices for the control group. Higher magnitudes of the Pearson correlations may be due to variability among scores and restriction of range, particularly with the control group on some subscales, rather than outlying scores. True reliability estimates for the subjects studied may lay somewhere between the Pearson correlation coefficients and the Kendall Tau correlations.

Since instrument stability of the SCL-90-R has not been assessed using a disaster bereaved population, comparison studies are difficult to obtain. However, Green (1980) and Bromet et al. (1981) did use the SCL-90 GSI score to predict changes over time for disaster bereaved samples. Green (1980) recommended the GSI and daily living changes as being the most predictable at one year, while measures such as the Hostility subscale as being less predictable. In the Bromet et al. (1982) study, means and standard deviations were computed for the GSI scores for two psychiatric outpatient

groups. One group lived near the Three Mile Island nuclear reactor after the 1979 nuclear accident, and the other lived near another nuclear reactor. No significant differences between the groups were noted. Horowitz et al. (1980) in studying symptoms of post-traumatic stress disorders found relatively low correlations (r=.20-.29) for four SCL-90 subscales when compared to presumptive stress scores from a life events report. In contrast, Edwards et al. (1978) studied the test-retest stability of an instrument battery with a sample of non patient subjects and found the SCL-90 to be the most reliable of five instruments used.

In the current analysis, Pearson correlations were lower for the control subjects when compared with the bereaved group. Two factors may account for this finding. First, the investigator has assumed that "The magnitude of the correlation coefficient is a function of the variability of the measures" (Roscoe, 1975, p. 99). Thus, a correlation coefficient calculated for a group having a wide range of symptoms such as with the bereaved group will be larger than that for a group which is quite homogenous on items, such as the control group (Roscoe, 1975). A second factor was that non equivalent sample sizes were used. The bereaved sample was larger than the control sample.

Between and Within Group Differences on the SCL-90.
Changes are normal occurrences throughout the life cycle and
can account for varying degrees of stress in daily living.
For example, marriage, divorce, moving, job change,
acquiring additional education, all require change and adap-
tation. Change factors occurred for both the disaster
bereaved and the control group subjects. The purpose of
having a control group was to compare differences between
the bereaved and control group subjects in an attempt to
establish differences between psychological distress related
to normal life changes and the level of distress a popula-
tion sample may face that has experienced the loss of a
significant person in a disaster.

From a review of disaster bereaved literature it was
anticipated that the bereaved group would experience and
report greater levels of symptom distress than the control
subjects, and that the bereaved mean scores would be higher.
It was also anticipated that the bereaved and control sub-
jects' scores would be more similar at T_2, as the bereaved
group would have had three years to recover from the
disaster related loss of a significant person at that point
in time.

SCL-90-R means and standard deviations were computed
and tested for significance by comparing the bereaved and
control group at T_1 and T_2. Several statistically signi-
ficant t values were found between the bereaved and control

group (Table 6) at T_1. At both T_1 and T_2 the lowest means for both the bereaved and control groups were with the PHOB subscale, which might suggest that the subscale was not a relevant subscale for the populations studied.

Within group differences were also computed. There were more statistically significant t values for the bereaved group at T_1 and T_2, than for the control group. Figure 1 profiles mean subscale score differences between the bereaved and control groups. Even at T_2 the means for the bereaved group were higher when compared with control group means at T_2. This table might be used to support the assumption that disaster bereavement takes a long time to resolve, although it must be kept in mind that different population samples and sample sizes were used in comparison of means.

Use of the SCL-90-R in Disaster Research

The SCL-90-R has been used a variety of ways in disaster research. Logue and Hansen (1980) used five SCL-90-R subscales for a retrospective study (five years later) of female flood disaster victims. They found that the SCL-90 ANX and SOM subscales were significantly associated with hypertension in the study. Murphy (1981) used the SCL-90-R DEP and SOM subscales to measure health outcomes with the Mt. St. Helens disaster bereaved. Green (1980) used the SCL-90-R GSI index to predict levels of impairment at one

and two years among fire disaster victims. Bromet et al. (1981) also used the GSI to measure symptom distress. Thus it is difficult to compare reliabilities. Also an important issue in future disaster research is possibly standardizing the use of the SCL-90-R with various disaster bereaved populations, so that levels of psychiatric distress can be compared with disaster victims who possibly suffered different types or intensities of loss.

Another important issue is to compare the bereaved and control group means (see table 7) with a non-patient normative sample to ascertain if the subjects studied generally appear more symptomatic than a normative sample. The SCL-90-R manual provides mean data from a non-patient normal sample of 494 males and 480 females, whose mean ages were 46 (Derogatis, 1977, p. 54). The mean raw scores of the non-patient sample for the nine SCL-90-R subscales were: SOM, .36; INT, .29; OBS, .39; DEP, .36; ANX, .30; HOS, .30; PHOB, .13; and PAR, .34 (Derogatis, 1977, p. 55). The normative sample raw mean scores were lower than the bereaved mean scores at both time periods and lower than the control group means at T_1. Means for the control group at T_2 were higher than the normative group means for all but three subscales (SOM, PAR & PHOB). This might suggest the possibility of greater symptom distress, particularly with the bereaved group mean scores, when compared to the normative group mean scores.

In comparing normative mean scores with the control group T_2 scores, the subscale mean scores were very similar except for the INT, OBS and DEP subscales which appeared noticeably lower for the normative sample. These lower subscale scores might possibly be affected by gender related differences in that there were more women (65% to 74%) with the bereaved and control sample as compared to the normative sample (49% women). Women might respond to items (such as depression) differently than men. Also the mean age for the normative sample was older (46) than the bereaved (37) and control group (31), with the possibility of age and maturity affecting decreased symptomatology with the INT, OBS and DEP subscales. Another factor is the difference between sample sizes for the non-patient normative subjects (n=947) versus the bereaved and control group subjects (n=83).

Measurement Issues

One major concern in reporting findings using the SCL-90-R is determining if the instrument measures enduring traits or subject states. In reviewing 25 studies in which the SCL-90 was used, 10 authors focused on measuring more enduring characteristics or traits of the population sample, while 10 other authors (particularly with disaster or stress related research) focused on measuring the subjects "state," with the SCL-90. Some authors show the SCL-90 as measuring both state and trait characteristics.

In referring to the SCL-90-R manual regarding test characteristics, Derogatis states that "the SCL-90-R is a measure of current, point-in-time, psychological symptom status; it is not a measure of personality, except indirectly, in that certain personality 'types' and 'disorders' may manifest a characteristic profile on the primary symptom dimensions" (1977, p. 13). However, at a later point in the manual when discussing stability, Derogatis states ". . . psychopathologic syndromes fall between stable personality characteristics like 'intelligence' on the one hand, and vascillating states such as 'mood' on the other" (p. 34). In summary, from the SCL-90-R manual and from reviewing several studies using the SCL-90-R, it appears rather gray conceptually and operationally whether the SCL-90-R is designed to measure "states" or "traits".

Implications For Nursing Practice

This study found that the SCL-90-R was sensitive to change, primarily for the bereaved group. It was interesting to note that mean symptom scores for the disaster bereaved group were higher than for the control group on all scales three years after the disaster (T_2), although it must be taken into consideration that factors such as different sample sizes and homogeneity could have affected these results. With both the bereaved and control groups across time the SCL-90-R Global Severity Index (GSI) scores were

found to have high internal consistency reliability (.97) and could be recommended for use with similar populations in clinical practice.

This internal consistency and stability reliability study using the SCL-90-R with a disaster bereaved population may generate SCL-90-R reliability studies with similar populations. It is important from a mental health nursing clinical perspective to assess not only if subjects are more distressed than a normative group, but also what type of distress they are experiencing so that timely appropriate intervention and support can be given. Self report instrumentation can be a helpful component used in assessing psychiatric client followup. An important aspect of any mental health clinician's role is to listen to client perceptions of their problems. Self report instrumentation can provide a relatively safe way for a client to communicate this information to the clinician.

CHAPTER V:

SUMMARY, LIMITATIONS, RECOMMENDATIONS AND CONCLUSIONS

This chapter will include a discussion of the summary of the findings, limitations, and recommendations. Conclusions based on the findings are included.

Summary

The purpose of this study was to establish the internal consistency reliability and stability of the SCL-90-R for a disaster bereaved population. The SCL-90-R is a multidimensional self report symptom inventory designed to measure psychological distress (Derogatis, 1981), and consists of nine symptom dimension subscales and three global indices. Disaster bereaved are of special interest for study because of their reluctance to seek help following such a traumatic event (Lindy, et al., 1981). Currently disaster investigators have a limited number of instruments available to quantify health outcomes. Thus it is important to establish the internal consistency reliability and long term stability of the SCL-90-R with a disaster bereaved population to determine if it is a reliable instrument for this type of population.

For the purposes of this study, reliability was defined as an important aspect of measurement adequacy and refers to both the item-total correlations and the consistency of scores obtained by the same population sample when re-

examined with the same test at different times (Anastasi, 1976).

Statistics were computed and analyzed using data from two groups of subjects measured over a two year time period. Coefficient alpha was computed and tested for significance to answer question number one regarding internal consistency reliability. To answer the second question regarding instrument stability, Pearson's Product Moment Correlation Coefficient was computed and tested for significance. Kendall's Tau was also computed and compared with the Pearson correlations as a check for outliers. To look at differences between scores over time, means and standard deviations were computed and tested for significance.

Findings indicated that the SCL-90-R internal consistency reliabilities ranged from acceptable (.70) to very high (.97) for the bereaved group. Some subscales were below acceptable for the control group. Internal consistency reliability for the GSI (Global Severity Index) was very high at .97 for both groups at both time periods. Regarding instrument stability, all SCL-90-R stability coefficients were statistically significant at the $p \leq .001$ level for the bereaved group, and higher than for the control group at both time periods. Findings of clinical significance are the reported differences in means between the bereaved and control group. Factors which could have affected the

results of this study may have included: unequal sample sizes, restriction of range, number of items in a subscale, instrument development issues and homogeneity.

Limitations of the Study

The following limitations should be noted:

1. The size and homogeneity of the study groups.

2. The use of unequal group sizes.

3. The validity of the instrument has not been documented for a disaster bereaved population.

4. Subjects were asked to recall and rate the severity of symptoms they may have experienced over the last 30 days. Inaccurate memory may have affected or distorted the results.

5. Data for Murphy's (1981) comprehensive study were gathered by mailed questionnaires, a method considered one of the least intrusive forms of data collection. This is a very important ethical consideration when studying a sensitive or relatively vulnerable population group such as disaster bereaved. However using this method of data collection reduces the amount of testing control, and may introduce problems associated with self report (e.g., misinterpreting testing directions, falsification of symptoms, returning incomplete tests, etc.), all of which could affect the results found.

6. Problems have been noted with the construct validity of the Psychoticism subscale dimension (Derogatis & Cleary, 1977, Evenson et al., 1980) when psychiatric outpatient data was analyzed. This subscale may need further revisions or changes.

7. There are no clear definitions from the author (Derogatis, 1977) whether the SCL-90-R measures states or traits.

Recommendations for Future Research

1. The use of the SCL-90-R instrument with disaster bereaved populations is encouraged.

2. The global index of distress proved highly reliable for a disaster bereaved population. Its use is encouraged.

3. The construct validity of the SCL-90-R subscales should be tested using the present study groups.

4. That the different SCL-90-R subscales (e.g., anxiety, hostility, etc.) be tested and compared with other instruments that have been developed to measure these specific factors in order to establish reliability of equivalence.

5. Further clarification by developees of the SCL-90-R as to whether the instrument measures traits or states.

6. Further development and refinement of the Psychoticism subscale dimension is needed prior to additional use.

Conclusions

This study concluded that the disaster bereaved groups internal consistency coefficient alpha scores were sufficiently high (except for the PSY subscale) to recommend further research using the SCL-90-R with disaster bereaved subjects. It is further concluded that the stability coefficients for the disaster bereaved were all statistically significant at the $p \leq .001$ level, although the scores could have been affected by outliers. The control group's less significant internal consistency reliability and stability scores were most likely affected by factors such as a smaller sample size, restriction of range and homogeneity.

More research is needed on SCL-90-R subscales and item content particularly of the last three subscales (PSY, PHOB, & PAR) or tighter definitions made of which subjects for which they are most appropriate. Also more systematic studies need to be done with disaster bereaved subjects. It was also concluded that clearer conceptual and operational guidelines need to be developed for the SCL-90-R.

In conclusion, statistics will often indicate no more than approximate trends or developments, because of the complexities and margin for error involved (Picket, 1975). Picket further states "They [statistics] should therefore be used with caution, and in decision making should be looked upon as the starting point rather than as the determining

factor, as decision making must also take human, environmental and various other factors into consideration" (Picket, 1975, p. 4).

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APPENDIX A

Symptom Checklist-90-Revised (SCL-90-R)

SCL-90-R   For Exhibit Only

Name: _____

Location: _____

Age: _____ Sex: M _____ F _____ Date: _____

Technician: _____ Ident. No. _____

Visit No.: _____   Mode: S-R _____ Nar _____

Remarks: _____

INSTRUCTIONS

Below is a list of problems and complaints that people sometimes have. Read each one carefully, and select one of the numbered descriptors that best describes HOW MUCH DISCOMFORT THAT PROBLEM HAS CAUSED YOU DURING THE PAST _____ INCLUDING TODAY. Place that number in the open block to the right of the problem. Do not skip any items, and print your number clearly. If you change your mind, erase your first number completely. Read the example below before beginning, and if you have any questions please ask the technician.

EXAMPLE

HOW MUCH WERE YOU DISTRESSED BY:

Descriptors
0 Not at all
1 A little bit
2 Moderately
3 Quite a bit
4 Extremely

Ex. Body Aches . . . . Ex. [3]   Answer

HOW MUCH WERE YOU DISTRESSED BY:

Descriptors
0 Not at all
1 A little bit
2 Moderately
3 Quite a bit
4 Extremely

1. Headaches . . . .
2. Nervousness or shakiness inside . . . .
3. Repeated unpleasant thoughts that won't leave your mind . .
4. Faintness or dizziness . . . .
5. Loss of sexual interest or pleasure . . . .
6. Feeling critical of others . . . .
7. The idea that someone else can control your thoughts . . . .
8. Feeling others are to blame for most of your troubles . . . . .
9. Trouble remembering things . . . .
10. Worried about sloppiness or carelessness . . . .
11. Feeling easily annoyed or irritated . . . .
12. Pains in heart or chest . . . .
13. Feeling afraid in open spaces or on the streets . . . . .
14. Feeling low in energy or slowed down . . . .
15. Thoughts of ending your life . . . .
16. Hearing voices that other people do not hear . . . .
17. Trembling . . . .
18. Feeling that most people cannot be trusted . . . .
19. Poor appetite . . . .
20. Crying easily . . . .
21. Feeling shy or uneasy with the opposite sex . . . .
22. Feelings of being trapped or caught . . . .
23. Suddenly scared for no reason . . . .
24. Temper outbursts that you could not control . . . .
25. Feeling afraid to go out of your house alone . . . .
26. Blaming yourself for things . . . .
27. Pains in lower back . . . .

28. Feeling blocked in getting things done . . . .
29. Feeling lonely . . . .
30. Feeling blue . . . .
31. Worrying too much about things . . . .
32. Feeling no interest in things . . . .
33. Feeling fearful . . . .
34. Your feelings being easily hurt . . . .
35. Other people being aware of your private thoughts . . . . .
36. Feeling others do not understand you or are unsympathetic . . . .
37. Feeling that people are unfriendly or dislike you . . . .
38. Having to do things very slowly to insure correctness . . .
39. Heart pounding or racing . . . .
40. Nausea or upset stomach . . . .
41. Feeling inferior to others . . . .
42. Soreness of your muscles . . . .
43. Feeling that you are watched or talked about by others . . .
44. Trouble falling asleep . . . .
45. Having to check and doublecheck what you do . . . .
46. Difficulty making decisions . . . .
47. Feeling afraid to travel on buses, subways, or trains . . . .
48. Trouble getting your breath . . . .
49. Hot or cold spells . . . .
50. Having to avoid certain things, places, or activities because they frighten you . . . .
51. Your mind going blank . . . .
52. Numbness or tingling in parts of your body . . . .

PAGE ONE

PLEASE CONTINUE ON THE FOLLOWING PAGE ▷

SCL-90-R

HOW MUCH WERE YOU DISTRESSED BY:	Descriptors
	0 Not at all
	1 A little bit
	2 Moderately
	3 Quite a bit
	4 Extremely

53. A lump in your throat ☐

54. Feeling hopeless about the future ☐

55. Trouble concentrating ☐

56. Feeling weak in parts of your body ☐

57. Feeling tense or keyed up ☐

58. Heavy feelings in your arms or legs ☐

59. Thoughts of death or dying ☐

60. Overeating ☐

61. Feeling uneasy when people are watching or talking about you ☐

62. Having thoughts that are not your own ☐

63. Having urges to beat, injure, or harm someone ☐

64. Awakening in the early morning ☐

65. Having to repeat the same actions such as touching, counting, washing ☐

66. Sleep that is restless or disturbed ☐

67. Having urges to break or smash things ☐

68. Having ideas or beliefs that others do not share ☐

69. Feeling very self-conscious with others ☐

70. Feeling uneasy in crowds, such as shopping or at a movie ☐

HOW MUCH WERE YOU DISTRESSED BY:	Descriptors
	0 Not at all
	1 A little bit
	2 Moderately
	3 Quite a bit
	4 Extremely

71. Feeling everything is an effort ☐

72. Spells of terror or panic ☐

73. Feeling uncomfortable about eating or drinking in public ☐

74. Getting into frequent arguments ☐

75. Feeling nervous when you are left alone ☐

76. Others not giving you proper credit for your achievements ☐

77. Feeling lonely even when you are with people ☐

78. Feeling so restless you couldn't sit still ☐

79. Feelings of worthlessness ☐

80. The feeling that something bad is going to happen to you ☐

81. Shouting or throwing things ☐

82. Feeling afraid you will faint in public ☐

83. Feeling that people will take advantage of you if you let them ☐

84. Having thoughts about sex that bother you a lot ☐

85. The idea that you should be punished for your sins ☐

86. Thoughts and images of a frightening nature ☐

87. The idea that something serious is wrong with your body ☐

88. Never feeling close to another person ☐

89. Feelings of guilt ☐

90. The idea that something is wrong with your mind ☐

APPENDIX B

Computation of SCL-90-R Factor Scores

SOMATIZATION		
ITEM		**SCORE**
HEADACHES	1	
FAINTNESS OR DIZZINESS	4	
PAINS IN HEART OR CHEST	12	
PAINS IN LOWER BACK	27	
NAUSEA OR UPSET STOMACH	40	
SORENESS OF YOUR MUSCLES	42	
TROUBLE GETTING YOUR BREATH	48	
HOT OR COLD SPELLS	49	
NUMBNESS OR TINGLING IN PARTS OF YOUR BODY	52	
A LUMP IN YOUR THROAT	53	
FEELING WEAK IN PARTS OF YOUR BODY	56	
HEAVY FEELINGS IN YOUR ARMS OR LEGS	58	
TOTAL ITEM SCORE / 12		

OBSESSIVE-COMPULSIVE		
ITEM		**SCORE**
3. REPEATED UNPLEASANT THOUGHTS THAT WON'T LEAVE YOUR MIND	3	
9. TROUBLE REMEMBERING THINGS	9	
10. WORRIED ABOUT SLOPPINESS OR CARELESSNESS	10	
28. FEELING BLOCKED IN GETTING THINGS DONE	28	
30. HAVING TO DO THINGS VERY SLOWLY TO INSURE CORRECTNESS	30	
45. HAVING TO CHECK AND DOUBLE CHECK WHAT YOU DO	45	
46. DIFFICULTY MAKING DECISIONS	46	
51. YOUR MIND GOING BLANK	51	
55. TROUBLE CONCENTRATING	55	
65. HAVING TO REPEAT THE SAME ACTIONS SUCH AS TOUCHING, COUNTING, WASHING	65	
TOTAL ITEM SCORE / 10		

INTERPERSONAL SENSITIVITY		
ITEM		**SCORE**
6. FEELING CRITICAL OF OTHERS	6	
21. FEELING SHY OR UNEASY WITH THE OPPOSITE SEX	21	
34. YOUR FEELINGS BEING EASILY HURT	34	
36. FEELING OTHERS DO NOT UNDERSTAND YOU OR ARE UNSYMPATHETIC	36	
37. FEELING THAT PEOPLE ARE UNFRIENDLY OR DISLIKE YOU	37	
41. FEELING INFERIOR TO OTHERS	41	
61. FEELING UNEASY WHEN PEOPLE ARE WATCHING OR TALKING ABOUT YOU	61	
69. FEELING VERY SELF-CONSCIOUS WITH OTHERS	69	
73. FEELING UNCOMFORTABLE ABOUT EATING OR DRINKING IN PUBLIC	73	
TOTAL ITEM SCORE / 9		

DEPRESSION		
5. LOSS OF SEXUAL INTEREST OR PLEASURE	5	
14. FEELING LOW IN ENERGY OR SLOWED DOWN	14	
15. THOUGHTS OF ENDING YOUR LIFE	15	
20. CRYING EASILY	20	
22. FEELING OF BEING CAUGHT OR TRAPPED	22	
26. BLAMING YOURSELF FOR THINGS	26	
29. FEELING LONELY	29	
30. FEELING BLUE	30	
31. WORRYING TOO MUCH ABOUT THINGS	31	
32. FEELING NO INTEREST IN THINGS	32	
54. FEELING HOPELESS ABOUT THE FUTURE	54	
71. FEELING EVERYTHING IS AN EFFORT	71	
79. FEELINGS OF WORTHLESSNESS	79	
TOTAL ITEM SCORE / 13		

ANXIETY		
2. NERVOUSNESS OR SHAKINESS INSIDE	2	
17. TREMBLING	17	
23. SUDDENLY SCARED FOR NO REASON	23	
33. FEELING FEARFUL	33	
39. HEART POUNDING OR RACING	39	
57. FEELING TENSE OR KEYED UP	57	
72. SPELLS OF TERROR OR PANIC	72	
78. FEELING SO RESTLESS YOU COULDN'T SIT STILL	78	
80. THE FEELING THAT SOMETHING BAD IS GOING TO HAPPEN TO YOU	80	
86. THOUGHTS AND IMAGES OF A FRIGHTENING NATURE	86	
TOTAL ITEM SCORE / 10		

HOSTILITY		
11. FEELING EASILY ANNOYED OR IRRITATED	11	
24. TEMPER OUTBURSTS THAT YOU COULD NOT CONTROL	24	
63. HAVING URGES TO BEAT, INJURE, OR HARM SOMEONE	63	
67. HAVING URGES TO BREAK OR SMASH THINGS	67	
74. GETTING INTO FREQUENT ARGUMENTS	74	
81. SHOUTING OR THROWING THINGS	81	
TOTAL ITEM SCORE / 6		

PHOBIC ANXIETY		
13. FEELING AFRAID IN OPEN SPACES OR IN THE STREETS	13	
25. FEELING AFRAID TO GO OUT OF YOUR HOUSE ALONE	25	
47. FEELING AFRAID TO TRAVEL ON BUSES, SUBWAYS, OR TRAINS	47	
50. HAVING TO AVOID CERTAIN THINGS PLACES, OR ACTIVITIES BECAUSE THEY FRIGHTEN YOU	50	
70. FEELING UNEASY IN CROWDS, SUCH AS SHOPPING OR AT A MOVIE	70	
75. FEELING NERVOUS WHEN YOU ARE LEFT ALONE	75	
82. FEELING AFRAID YOU WILL FAINT IN PUBLIC	82	
TOTAL ITEM SCORE / 7		

PARANOID IDEATION		
8. FEELING OTHERS ARE TO BLAME FOR MOST OF YOUR TROUBLES	8	
18. FEELING THAT MOST PEOPLE CAN NOT BE TRUSTED	18	
43. FEELING THAT YOU ARE WATCHED OR TALKED ABOUT BY OTHERS	43	
68. HAVING IDEAS OR BELIEFS THAT OTHERS DO NOT SHARE	68	
76. OTHERS NOT GIVING YOU PROPER CREDIT FOR YOUR ACHIEVEMENTS	76	
83. FEELING THAT PEOPLE WILL TAKE ADVANTAGE OF YOU IF YOU LET THEM	83	
TOTAL ITEM SCORE / 6		

PSYCHOTICISM		
7. THE IDEA THAT SOMEONE ELSE CAN CONTROL YOUR THOUGHTS	7	
16. HEARING VOICES THAT OTHER PEOPLE DO NOT HEAR	16	
35. OTHER PEOPLE BEING AWARE OF YOUR PRIVATE THOUGHTS	35	
62. HAVING THOUGHTS THAT ARE NOT YOUR OWN	62	
77. FEELING LONELY EVEN WHEN YOU ARE WITH PEOPLE	77	
84. HAVING THOUGHTS ABOUT SEX THAT BOTHER YOU A LOT	84	
85. THE IDEA THAT YOU SHOULD BE PUNISHED FOR YOUR SINS	85	
87. THE IDEA THAT SOMETHING SERIOUS IS WRONG WITH YOUR BODY	87	
88. NEVER FEELING CLOSE TO OTHER PERSON	88	
90. THE IDEA THAT SOMETHING IS WRONG WITH YOUR MIND	90	
TOTAL ITEM SCORE / 10		

ADDITIONAL ITEMS	
19. POOR APPETITE	19
60. OVEREATING	60
44. TROUBLE FALLING ASLEEP	44
64. AWAKENING IN THE EARLY MORNING	64
66. SLEEP THAT IS RESTLESS OR DISTURBED	66
59. THOUGHTS OF DEATH OR DYING	59
89. FEELINGS OF GUILT	89

SYMPTOM	TOTAL	N	RAW SCORES
SOMATIZATION			
OBSESS-COMPULSIVE			
INTER SENSITIVITY			
DEPRESSION			
ANXIETY			
HOSTILITY			
PHOBIC ANXIETY			
PARANOID IDEATION			
PSYCHOTICISM			
ADDITIONAL			

GLOBAL SCORES

GRAND TOTAL

1 GSI (GRAND TOTAL/90)   1 _____

2 PST   2 _____

3 PSDI (GT/PST)   3 _____

APPENDIX C

Review of Twenty-Nine Disaster Studies

Type of Disaster Location, Year	Author(s) (Date)	Sampling Methods (Number of Subjects)	Types of Data Instruments Used	Selected Findings
Fire--Cocoanut Grove (Boston, Mass. in 1942 There were 491 deaths-- this information supplied by B. Green, 1982)	Cobb and Lindeman (1943)	Patients (39) from the Cocoanut Grove fire, admitted on the "Disaster Ward", with 7 dying within 62 days	Psychiatric interview-and examination chronogram. General medical care and observations were also provided	A psychiatric examination is recommended (for fire disaster hospitalized survivors) early in hospital care, and continued psychiatric care should be given after leaving the hospital. Fourteen of the survivors presented with neuropsychiatric problems
Flood--Denver, Colorado, causing $325 million in damages, no lives were reported lost	Drabek and Boggs (1968)	Random sample of 278 of the 3,700 families evacuated from their home	Interview, demographic information was obtained. Attempts were made to use a symbolic interactions first framework. "Social class was arrived at by using occupation, education, price of home as indicators	"Disbelief" was the main initial response to warnings. Families tended to evacuate in units and most took refuge with relatives than at official centers
Cyclone--(Tracy)--hit Darwin, Australia in 1974 killing 50 people and destroying 90% of the homes	Parker (1977)	Evacuees (67) filled out a questionnaire and minimal demographic information at a evacuation center in Sidney about a week after the cyclone. Two follow-up studies were initiated at 2 and 12 months with 37 of the evacuees	30 item General Health Questionnaire (GHQ) was handed out at evacuation center with minimal demographic and observational data obtained. More extensive mailed questionnaires were initiated at 2 other time periods and a retrospective assessment of status before the cyclone, the GHQ and an unnamed self report instrument to describe present status and future expectations	Psychological dysfunction initially had increased (58%) but at 14 months had returned to an Australian general population control level of 22%

94

Type of Disaster Location, Year	Author(s) (Date)	Sampling Methods (Number of Subjects)	Types of Data Instruments Used	Selected Findings
Marine disaster collision—Freighter caught fire in Delaware River, 9 killed, near Newcastle, Delaware, 1957.	Leopold & Dillon (1963)	Sample of (36) Survivors, some of which were followed for 4 years, employment status for 34 was obtained 4 years later	Psychiatric interviews which included demographic variables, somatic complaints, alcohol and psychiatric history, subsequent employment. No formal instruments mentioned. Survivors were scored on subjective complaints plus observational data	More regressive scores were obtained from men 36 or over at the time of the accident
Fire—Beverly Hills Supper Club, Southgate, Kentucky, 1977, 165 died	Lindy, Grace & Green (1968)	Survivors (125) participating in the study were at the night club at the time of the fire. Those hospitalized from fire and those family members who viewed bodies did not participate. Convenience sample was obtained with outreach methods. Sampling began 6 months to 1 year following the fire	Structured interview using the psychiatric Evaluation Form. Attempts made to quantify the subjects loss, life threat, and subjective stress by 5-6 point rating scales	Outreach was a valuable mental health service to survivors. Problems survivors experienced included: sleep difficulty, nightmares, phobias and problems at work
Fire—Beverly Hills Supper Club, Southgate, Kentucky, 1977, 165 died	Green (1980) Doctorial Dissertation	One hundred forty-seven people were seen about one year after the fire, with 88 subjects followed up to 2 years. 23% had been injured and 44% had lost at least a friend or co-worker	1. Structured Interviews 2. Psychiatric Evaluation Form 3. The SCL-90 4. Prepared stress rating scales 5. Individual narratives	Global distress measures and daily living changes were found to be the most predictable at 1 year, with hostility and acting out much less predictable. No control group mentioned. GSI (SCL-90) showed 20% at least moderately impaired at 1 year and at 2 years 10% were still rated moderately impaired

Type of Disaster Location, Year	Author(s) (Date)	Sampling Methods (Number of Subjects)	Types of Data Instruments Used	Selected Findings
Dam collapse and flood (1972) in Buffalo Creek Valley, West Virginia. There were 125 killed and 4000 left homeless	Titchener and Kapp (1976)	Survivors (654) that were plaintiffs in a lawsuit were interviewed about 2 years after the flood. Team of interviewers interviewed families in their homes, plus each family member was interviewed individually	"Psychoanalytically oriented" individual psychiatric interview	With 80% of the survivors traumatic neurotic reactions were found, at 2 years. The symptom complex was labeled the Buffalo Creek syndrome
Dam Collapse & flood Buffalo Creek, 1972	Newman (1976)	Survivor-plaintiff children (224). Each child was interviewed individually. Childs previous (to flood) functional and developmental history obtained from mother	Somewhat structured psychiatric interview with child had pre adolescent children draw a picture regarding the flood	Selected case studies and interpretations of their drawings were presented. Author concluded "most" of the children were emotionally impaired by their experiences
Dam Collapse & flood Buffalo Creek, 1972	Church (1974)	Four case studies with type of mental health therapy given to the subject described	Descriptive case studies (retrospective review)	Suggestions given as to how to decrease the emotional trauma occurring with disasters that destroy populated areas.
Earthquake—Guatemala leaving 22,778 dead and 76,504 injured in 1976. The Santa Maria Canque village in Guatemala was studied	Glass, Urrutia, Sibony, Smith, Garcia, Rizzo (1977)	A sample of heads of households (n=58) in the Santa Maria Cauque village (in an area of major injury) were interviewed by 3 nurses	Epidemiologic survey, on site interview of head of household by a nurse, primarily obtaining demographic variables regarding deaths and injuries, plus housing construction	All deaths and serious injuries were associated with residents of adobe structure housing. Recommendations included fast epidemiological diagnosis when disaster strikes, plus the enactment and enforcement of improved building codes, along with education regarding aseismic construction

Type of Disaster Location, Year	Author(s) (Date)	Sampling Methods (Number of Subjects)	Types of Data Instruments Used	Selected Findings
Snow Disaster--a blizzard occurred in 1978 in eastern Massachusetts. There were 27 storm related deaths, 1000 coastal homes were flooded, 23,500 evacuated	Glass, O'Hare, Conrad (1979)	Administrators of 18 eastern Massachusetts hospitals were surveyed. Newspaper accounts, Red Cross files, and discussions with selected town clerks and medical examiners were also used	Survey methods were used to obtain records of deaths, hospital admissions/discharged one week after the blizzard	No significant increase in the number of deaths or in outbreaks of infectious disease were found one week after the blizzard. Blizzard preparedness health and safety recommendations were made
Reactions to combat an expost facto study an average 15 years later	Archibald, Long, Miller, & Tuddenham (1962)	Groups compared included: 1. Combat patients, none of which were judged psychotic (n=57) 2. Non combat patients from a mental hygiene clinic (nearly 50% diagnosed schizophenic) (n=48) 3. Combat veterans without service connection who had never requested psychiatric treatment	Structured questionnaire survey using a 64 item questionnaire in which 24 of the items were judged clinical symptoms of the combat syndrome. The MMPI was also given	Stress reactions and symptoms of combat veterans were described and compared with non combat veterans. Implications for therapy were given
Flood Disaster--Canvey Island, 1953 12,500 people were on the island when it flooded, 58 died	Lorraine (1954)	Public health involvements evacuation and rehabilitation procedures were described	Descriptive study on the roles played by the public health service and others, as well as factors involved in the disaster	People of the island and many others rose to the occasion to help those in need at the time of the disaster
Tornado, Wichita Falls, Texas, 1979. Forty-Seven people died, hundreds were injured over 3000 of 4800 homes were rendered uninhabitable	Glass, Craven, Bregman, Stoll, Horowitz, Kerndt, Winkle (1980)	Representative sample (5 percent) of community residents (n=3510)	Epidemiologic survey, an on site structured primarily demographic interview of a family member given by a volunteer	Discussion and recommendations made as type of housing construction better able to withstand tornados, plus safety precautions to take when a tornado strikes

Type of Disaster Location, Year	Author(s) (Date)	Sampling Methods (Number of Subjects)	Types of Data Instruments Used	Selected Findings
Marine Disaster--collision of 2 ocean liners, including the Andrea Doria, near Nantucket Island, 1956 (no report on number of deaths)	Freedman & Linn (1957)	Unsystematic recording of thoughts, feelings and observed response reactions of those on the rescue ship ill deFrance and the survivors rescued from the Andrea Doria (n=?)	Descriptive study unstructured interview observations	Paranoid reactions are apt to arise in crisis. One parent should stay with their children. A survivor list should be collected and published as soon as possible. "Men of leadership caliber" (p. 432) might be encouraged to participate in disaster training emphasizing peacetime disasters
Nazi Holocaust	Schneider (1978)	Case studies presented of 3 american adolescents who were in a residential treatment program in Israel. They were offspring of Holocaust survivors	Psychiatric clinical Data the 3 adolescents Included: Biographical Data Diagnostic Categories Review of TAT responses Relationship abilities Examples of dreams	Recommended a firm and nurturant therapeutic approach to "provide restitution for affectional deprivation and set needed limits" (p. 582)
Servicemen (215) MISSING in action (MIA) or prisoners of war (PW)	McCubbin, Hunter, Dahl (1975)	Probable convenience sample of about 1/2 the total MIA/PW reported service families. The sample included 215 wives and 405 children, although only the wives appeared to have been interviewed	Structured interview with wife (lasting from 2 to 8 hours) Information regarding demographic, social, psychological, adjustment, and medical factors was obtained. Specific instruments used were not mentioned	About 80% of the families would benefit from counselling when reunited. Over 50% of the wives were or had been taking tranquilizers during husbands absence. Hypothesized that wives who adjusted well to husbands absence will have the greatest difficulty adjusting to his return

Type of Disaster Location, Year	Author(s) (Date)	Sampling Methods (Number of Subjects)	Types of Data Instruments Used	Selected Findings
School Bus Disaster, near Martinez, Calif., 1976, leaving 28 killed and 24 critically injured	Ciuca & Downie & Morris (1977)	Observational data, of families reactions, crisis intervention offered, and caregivers reactions (n=?)	Descriptive study	Emphasized need for a mental health team to be included in a hospital disaster plan, and a place designated where families can meet and be assisted
Nuclear Accident 1979, Three Mile Island, Harrisburg, Pa., families were evacuated (injuries?)	Wert (1979)	A sample of 1423 respondents employed by Pennsylvania Blue Shield returned usable "stress" surveys developed by an Occupational Health R.N. Population sampled lives in different zones from the plant survey given to employees 1 month after accident. Convenience sample used	Employee Survey cover letter explaining survey starts out"...we have all gone through a rather long period of considerable stress" (p. 20), which might be a bias on the authors part	Many people (n=?) denied any symptoms of stress. Factories were encouraged to formulate evacuation plans and to shut down during the biggest part of a hazard
Nuclear Accident. Three Mile Island, (TMI), 1979	Bromet, Schuylbeg & Dunn (1981)	A sample of 151 TMI psychiatric outpatients were compared to a control group of 64 patients living in an area of a similar nuclear plant	Structured Interviews Demographic data obtained. The SCL-90 was, given at 3 time periods (1-3 months after the accident at 9-10 months, and at 1 year). The SCL-90 Global Summary Scores and interviews were used to determine symptoms	Patients in both groups reported similar SCL-90 symptom levels at 9 and 12 months. TMI patients viewing the TMI as dangerous and the quality of support networks significantly associated with mental health

Type of Disaster Location, Year	Author(s) (Date)	Sampling Methods (Number of Subjects)	Types of Data Instruments Used	Selected Findings
Coal Mine Disaster 1958 in Nova Scotia (pseudonym "Mine-town") in which 75 were killed and 19 were trapped 6 1/2-8 1/2 days	Beach and Lucas, editors (1960)	Subjects included: All (19) trapped miners Nontrapped miners (12) Wives of trapped miners (17) Wives of nontrapped miners (11) Professional personal (10) Wives of professional personnel (7)	Trapped miners a Psychiatric Evaluation, plus sub tests of Wechsler adult Intelligence Scale, Serial 7's counting backward from 20, Bender Gestalt drawing test, a Rorschach ink blot test, and a sentence completion test	When the miners were evaluated between the 6th and 23rd day after rescue, all but one showed signs of anxiety. One miner had signs of depression, another paranoid ideas and a 3rd was confused
Massive Earthquake—Skopeje, Macedonia, 1963, killing 3,000 people, injuring 3,300, and destroying 4/5's of the houses	Popovic and Petrovic, (1964)	A psychiatric team visited 27 disaster camps daily, from arriving 22 hours after the earthquake and staying for 5 days (n=?)	Descriptive study Observations. Supportive counselling, with a focus on basic needs (food, sanitation, etc.)	The first days after the earthquake people seemed to be in a mild stupor and tended to band together in groups. Some people seemed to feel the need to be punished and rumors were easily spread
Massive Cyclone-Bangladish, 1970, killing over 224,000 and destroying over 180,000 homes	Sommer & Mosley, (1972)	A sample of 2973 family (1.4% of the population) were studied. A rapid 18 site survey was done Nov. or Dec., 1970 with a second more comprehensive survey done 2 months later. Cluster sampling was used with the 2nd survey	Survey	About 6 months later over 1,000,000 were still dependent on outside food relief to survive. Epidemiological disaster data was obtained

Type of Disaster Location, Year	Author(s) (Date)	Sampling Methods (Number of Subjects)	Types of Data Instruments Used	Selected Findings
Hurricane (Agnes) Flood-with over 80,000 residents evacuated from Wyoming Valley, Penn. In 1972, including the study communities of Wilkes-Barre and Kingston. Three flood related deaths reported	Melick (1978)	The two communities were compared using a stratified multistage probability sample of 91 men. This sample included working class men. Comparisons were made between those whose homes were flooded (43), or not flooded (48). Data was collected on subjects at a pre-flood time, after the flood time, after the flood (1972-1975) and about 3 years after the flood	Structured interview schedule (which had been pilot-tested) Demographic and flood experience information obtained. All subjects completed a Holmes and Rabe Schedule of Recent Experience and a Gurin Symptom checklist (of 20 items)	No significant differences were found on mean duration of illness at the pre flood time, however, the flood group had significantly longer duration of illnesses in the post-disaster periods. Some of these illnesses such as heart disease were attributed to the flood
Hurricane (Agnes) Flood, 1972, Wyoming Valley, Penn.	Logue and Hansen (1980)	A retrospective case-control study, with 396 female flood victims, primarily living in Kingston were compared with 166 female	Structured Survey Instruments include: The Langner 22-item Screening Instrument, Zungs Self Rating Depression Scale and 5 symptom dimensions (SOM, QBS, INT, DEP and ANX) of the SCL-90	The SCL-90 anxiety and somatization symptom dimensions were significantly associated with hypertension in the study. Property loss, financial difficulties, use of alcohol, physical work and perceived stress with the recovery period, significantly associated with hypertension
Dam collapse and flood (1972) in Buffalo Creek Valley, West Virginia	Glesser, Green, Winget (1981)	A 3 year longitudinal study of primarily litigants over age 16. In 1974, n=381, 1975 n=35, 1976 n=51 and in 1977, n=19 (N taken from table 8.2, p. 135)	Semi-structured interview schedule which included (when possible). 48 of 58 items in the HSCL, Karacan sleep disruption questionnaire, a checklist of family disruption indicators (developed for the study) a clinical impairment rating when possible, and the Spitzer et al psychiatric Evaluation Form	The "SCL scores were termed more reliable as they were derived from self reports rather than interviewer ratings. There was a trend to report decreased symptomology through 1976 (with the settlement), although Somatic and Hostility complaints tended to remain constant". Out of

Type of Disaster Location, Year	Author(s) (Date)	Sampling Methods (Number of Subjects)	Types of Data Instruments Used	Selected Findings
Train Derailment near Granville, Australia, 1977, killing 83 and severely injuring many others	Boman (1976)	Observations of selected survivors psychological responses were obtained from community mental health workers, a hospital psychiatric laison service, and interviews with relatives of injured and non-injured, up to 18 months after the disaster. (n=?)	Descriptive observations. General disaster related literature review	At 18 months the authors impression was that high levels of psychiatric and psychosomatic disorder still remained with survivors. Recommendations made to quantify the adjustment required by life changes.
Granville train derailment (1977)	Raphael (1979)	Observational data selected case studies a journal was probably kept recounting daily occurances for the first 50 days from the disaster (n=?)	Descriptive study occurances, case examples highlighted from the first 50 days following the disaster	A crisis intervention model is described integrating primary prevention with a preventive intervention mental health program
Granville train derailment (1977)	Singh & Raphael (1981)	Next of kin (15 widows 9 widowers, 11 mothers and 8 fathers) of 36 people killed in the accident were interviewed and filled out questionnaires 15-18 months after the disaster	Unstructured psychiatric interview, to access outcomes subject filling out questionnaires including: 1. a 50 item "State of Health" after accident questionnaire (official title of health questionnaire not reported. Reliabilities, validity of instrument not reported). 2. The Goldberg General Health Questionnaire 3. A 16 item loss questionnaire which was undergoing a validation check at the time of the study 4. A social network at time of bereavement questionnaire devised for this disaster	Small sample size used. Results suggested bereaved parents suffer the highest morbidity, also that resolving grief may not be a standardized issue. Some people were better able to use counselling from a policeman than a health worker (perceived as an outsider)

AN ABSTRACT OF THE THESIS OF

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FOR THE MASTERS OF NURSING

DATE OF RECEIVING THIS DEGREE: JUNE 8, 1984

TITLE: A RELIABILITY ASSESSMENT OF THE SCL-90-R USING A
LONGITUDINAL NATURAL DISASTER BEREAVED SAMPLE

APPROVED: _____
S██████ ██████, █.N., PH. D.   THESIS ADVISOR

The purpose of this study is to establish the internal consistency reliability and long term stability of the SCL-90-R for a disaster bereaved population.   The SCL-90-R is a multidimensional self report symptom inventory designed to measure psychological distress. This self report instrument is currently being tested and used with a wide variety of populations, although little research has been published using the SCL-90-R with bereavement populations.   The disaster bereaved are of special interest because of their reluctance to seek help following a severe traumatic event.

Mail and structured interview procedures were used to collect data one and three years post-disaster for the comprehensive study from which the current project evolved (Murphy, 1981). Data used in the secondary analysis consisted of 49 subjects who were close family members and friends of deceased disaster victims from the 1980 volcanic eruption of Mt. St. Helens in southwestern Washington. Thirty-four nondisaster loss persons served as control subjects. These same 83 subjects continued with the study in 1983 (Murphy, Stewart in press).

SCL-90-R data were analyzed for the current study. Internal consistency reliabilities for nine SCL-90-R subscales and Global Severity Indice (GSI) were assessed for both Time$_1$ (1981) and Time$_2$ (1983) for both study groups by coefficient (Cronbach's) Alpha. Long-term stability coefficients for the SCL-90-R subscales and three global indices were computed for both study groups by Pearson Product Moment correlation. Kendall Tau Rank correlation coefficient was computed as a confirmatory stability statistic to check for outlying scores.

Results indicate that the internal consistency reliability of the SCL-90-R subscales (except the Psychoticism subscale) were sufficiently high (above.70) for the bereaved group only, to recommend further instrument use in disaster research. Coefficient alphas with the GSI indice for both groups were very high (.97). Pearson r correlations were highly significant ($p \geq .001$) for the bereaved group (although some subscale scores could have been affected by outliers) which tends to demonstrate sensitivity to symptomatology levels as measured by the SCL-90-R scales over time.

Additional findings, interpretation of findings, methodological issues and limitations of the study were discussed. Conclusions were drawn and recommendations were made for further study.