This chapter describes data on the PSS from a large national probability sample collected by the Harris Poll. It includes normative data by gender, occupation, income, race and ethnic background, etc.; data on the relative reliabilities and validities of 4- 10- and 14-item versions of the scale; factor analyses of the three versions of the scale; and data relating the PSS to a range of health related measures including symptoms, self-reported disease, and health practices such as smoking and alcohol use.

S. Cohen

3

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Perceived Stress in a Probability Sample of the United States

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It is a common assumption among health researchers that stressful life events are *not*, in and of themselves, sufficient causes of pathology and illness behavior. Instead, the potential for event-elicited health risk depends on a transaction between the person and the environment (Lazarus, 1966; Lazarus & Folkman, 1984). This perspective assumes that persons actively interact with their environments, appraising potentially threatening or challenging events in the light of available coping resources. Stressful events are assumed to increase risk of disease when they are appraised as threatening or otherwise demanding, and when coping resources are judged as insufficient to address that threat or demand. An important part of this view is that event-elicited disorders are not based solely on the intensity or any other inherent quality of an

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event, but are dependent on personal and contextual factors as well. Although this perspective is widely accepted, it has not been accompanied by the development of psychometrically valid measures of perceived (appraised) stress to test its validity.

The purpose of this chapter is to present psychometric and descriptive data on a scale designed to measure stress perceptions, and to establish that such a scale can predict the range of health-related outcomes presumed to be associated with appraised stress. In the first section, we discuss the advantages of a scale measuring generalized perceptions of stress, describe the Perceived Stress Scale (PSS), and address the controversy surrounding the use of a scale assessing stress perceptions. In the later sections, we report new and exciting PSS data from a large (2,387 respondents) probability sample of the United States collected by Louis Harris and Associates, Inc. in 1983. Data are presented on the psychometric qualities of the scale, and on the relation of the PSS to other stress, health, and satisfaction measures. Mean stress scores (norms) are also provided for breakdowns of the sample on a variety of demographic characteristics.

In an earlier article, we argued that a scale assessing global perceptions of stress can serve a variety of valuable functions (Cohen, Kamarck, & Mermelstein, 1983). First, it can provide information about the processes through which stressful events influence pathology. For example, it can be used in conjunction with an objective scale in an effort to determine whether appraised stress mediates the relation between objective stress and illness. It can similarly be used to assess whether a factor known to moderate stress-illness relations, for example, social support, operates through its influence on stress appraisal or through some other pathway. Second, a perceived stress scale can be used to investigate the pathogenic role of overall stress appraisal in situations in which the objective sources of stress are diffuse or difficult to measure. Similarly, it can be used when the primary issue under study is the role of appraised stress, as opposed to objective stress level. Finally, perceived stress can be viewed as an outcome variable—measuring the experienced level of stress as a function of objective stressful events, coping processes, personality factors, and so on.

Early Approaches to Assessing Perceived Stress

Previous work has employed a number of approaches to assess both global and event-specific levels of perceived stress. For example, several

investigators have modified stressful life-event scales in an attempt to measure global perceived stress. The modification involved asking respondents to rate the stressfulness or impact of each experienced event. In general, life-stress scores based on self-ratings of event stressfulness are better predictors of health-related outcomes than are scores derived from either a simple counting of events (i.e., unit weighting) or event scores based on weights assigned by external judges (e.g., Sarason, Johnson, & Siegel, 1978; Vinokur & Selzer, 1975). However, increases in predictability provided by these ratings are small. A major reason that any increase in predictability of a weighted event score over a simple count of events is likely to be small is that alternative weighting schemes yield composite scores that are substantially correlated with the event count (Lei & Skinner, 1980). Consequently, this measurement technique does not allow for a single event to have the impact of four or five less significant ones. Other weaknesses of global perceived stress scales that are based on a specific list of events include insensitivity to chronic stress from ongoing life circumstances, to stress from events occurring in the lives of close friends and family, from expectations concerning future events, and from events not listed on the scale.

Subjective measures of response to specific stressors have also been widely used, e.g., measures of perceived occupational stress (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). There are, however, some practical and theoretical limitations of measures of specific stressors. Practically, it is difficult and time-consuming to develop and psychometrically validate an individual measure every time a new stressor is studied. Theoretically, there is an issue of whether measures of perceived response to a specific stressor really assess evaluations of that stressor. There is, in fact, evidence that people often misattribute their feelings of stress to a particularly salient source when that stress is actually due to another source (Keating, 1979; Worchel, 1978; Worchel & Teddlie, 1976). Another problem with measures of response to specific stressors is that such measures imply the independence of that event in the precipitation of disease. However, it is likely that the illness process is affected by global stress level, not just by the response to a particular event.

The Perceived Stress Scale

The PSS is a measure of the degree to which situations in one's life are appraised as stressful (Cohen et al., 1983). Items were designed to tap how

unpredictable, uncontrollable, and overloaded respondents find their lives. These three issues repeatedly have been found to be central components of the experience of stress (Averill, 1973; Cohen, 1978; Glass & Singer, 1972; Lazarus, 1966, 1977; Seligman, 1975). The scale also includes a number of direct queries about current levels of experienced stress. The PSS was designed for use in community samples with at least a junior high school education. The items are easy to understand, and the response alternatives are simple to grasp. Moreover, the questions are of a general nature and hence are relatively free of content specific to any subpopulation group.

The original scale contained 14 items. Four-item (PSS4), and 10-item (PSS10) versions of the scale have also been validated. We present data on the psychometrics of each version of the scale in this chapter. We will argue later that the PSS10 allows the assessment of perceived stress without any loss of psychometric quality (actually a slight gain) over the longer PSS14.

All 14 items used in the original scale are presented in Appendix A.[1] The PSS10 includes items 1-3, 6-11, and 14, and the PSS4 includes items 2, 6, 7, and 14. The questions in the PSS ask about feelings and thoughts during the last month. In each case, respondents are asked how often they felt a certain way. PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2) to the seven positively stated items (items 4, 5, 6, 7, 9, 10, and 13) and then summing across all scale items.

The PSS does not tie appraisal to particular situations; it is sensitive to the nonoccurrence of events as well as to ongoing life circumstances, to stress resulting from events occurring in the lives of friends and relatives, and to expectations concerning future events. It is an economical scale that can be administered in only a few minutes and is easy to score. Because levels of appraised stress should be influenced by daily hassles, major events, and changes in coping resources, the predictive validity of the PSS is expected to fall off rapidly after four to eight weeks.

Evidence for PSS validity. In our own work (Cohen et al., 1983; Cohen, 1986), we found that the PSS provided better predictions than did life-event scales of psychological symptoms, physical symptoms, and utilization of health services. We also found that although life events did not prospectively predict smoking cessation and relapse among persons attempting to quit, persons with higher PSS scores were less likely to quit smoking and had a greater increase in posttreatment smoking rates than did those with relatively lower scores. Other investigators have reported that relatively higher PSS scores were prospectively associated with failure to quit smoking (Glasgow, Klesges, Mizes, & Pechacek, 1985), and failure among diabetics to control blood sugar levels (Frenzel, McCaul, Glasgow, & Schafer, in press). In a cross-sectional study, higher PSS scores were associated with greater vulnerability to stressful life-event-elicited depressive symptoms (Kuiper, Olinger, & Lyons, 1986). The PSS has also been used as an outcome variable, with life events, coping processes, and personality factors prospectively predicting changes in perceived stress (e.g., Linville, 1987).

Perceived Stress or Psychological Disorder?

Because it is difficult to distinguish conceptually between perceived stress and psychological distress, the practical and conceptual viability of a perceived stress scale is controversial (e.g., Cohen, 1986; Dohrenwend & Shrout, 1985; Lazarus, DeLongis, Folkman, & Gruen, 1985). For example, feelings of stress and overload are viewed as symptomatic of psychological disorder. As a result, a correlation between a scale assessing perceived stress and one assessing psychological distress may be partly or totally attributable to the fact that some of the items in the two scales measure a similar or identical concept. In short, cross-sectional correlations between perceived stress and psychological distress may be totally artifactual, and correlations between perceived stress and physical disorders may actually reflect an association between psychological distress (as measured by questions about perceived stress) and physical disorder.

Although appraised stress may be symptomatic of psychological distress when viewed in combination with elevated scores on other symptoms, it is our contention that the perception of stress itself, as assessed by the PSS, is not merely a measure of psychological symptomatology. First, the PSS contains some items that are not typical of psychological disorder scales. These include a number of questions regarding perceived control over external demands.[2] Second, the inevitable overlap of stress and distress scales represents only one of a number of domains from which the distress scales draw. Besides items tapping perceptions of stress, common distress scales assess a broad range of symptoms including hostility, diminished self-esteem, depressed affect, anxiety, and psychosomatic complaints (e.g., PERI Demoralization Measure described in Dohrenwend, Shrout, Egri, & Mendelsohn, 1980; the General Health Questionnaire described in Goldberg, 1972).

There is no doubt that events can be appraised as stressful without resulting in these various psychological symptoms. Concretely, persons can

score high on the PSS *without* elevated scores on the other dimensions of psychological distress. This contention is, in fact, supported by data from several studies in which concurrently assessed symptomatology was partialed out of the relation between the PSS and various outcomes. This conservative analysis attributes any variance common to both the PSS and psychological symptoms to the symptoms, eliminating the possibility that any remaining effect of perceived stress is attributable to the overlap between symptoms and the PSS. Studies using this procedure indicate that PSS and depressive affect scales *independently* predict physical symptomatology (Cohen et al., 1983). Moreover, the PSS prospectively predicts psychological symptomatology when concurrently assessed psychological symptomatology is partialed out of the relations between the PSS and the outcome (Cohen, 1986). Finally, other prospective analyses indicate that the PSS predicts both physical symptoms and smoking cessation even after controlling for the influence of psychological distress (Cohen, 1986). In short, there is overwhelming evidence that the PSS does not measure the same thing as standard psychological distress scales.

Other evidence for the independence of the PSS and psychological distress is provided by studies indicating that psychological distress scores of those with high levels of social support are not influenced by perceived stress levels (Cohen, Mermelstein, Kamarck, & Hoberman, 1985; Cohen, Sherrod, & Clark, 1986). To the extent that a perceived stress scale and a psychological distress symptom scale measure the same thing, relations between the two scales would not be moderated by other variables. Yet the association between the PSS and disorder is moderated by social support; persons with high levels of support show less disorder under high PSS levels than do those with low levels of support. In sum, high scores on the PSS are not the same thing as elevated scores on psychological distress, but they do place people at risk for future distress.

Reducing ambiguity in interpretation. Because of the potential overlap between perceived stress and psychological distress, cross-sectional correlations between these concepts are subject to artifact, and therefore are particularly difficult to interpret. Like any measure, perceived stress scales should be used in conceptual and methodological contexts that allow relatively clear interpretation. When intended as a predictor of psychological distress, the scale is most appropriately used in prospective studies that control for initial distress level. In short, we advise avoiding cross-sectional correlations between scales that may contain some items that assess the same or similar concepts.

The question of discriminative validity is more difficult. When a perceived stress scale is used as a predictor of a nonconfounded outcome

(e.g., utilization of health services, physical health, or smoking cessation), are relations attributable to perceived stress or to psychological distress? There is no definitive answer. Because psychological disorder scales are not very good predictors of clinical disorder (see Dohrenwend, Shrout, Egri, & Mendelsohn, 1978; Lin, Dean, & Ensel, 1986), a good argument can be made that measures of psychological distress actually measure perceived stress. Consequently, what psychological distress scales and the PSS actually measure depends to a great extent on how one conceptualizes stress and disorder. At the very least, it is reasonable to argue that the PSS measures what it was designed to assess—the perceived degree to which environmental demands exceed abilities to cope.

Finally, it is important to emphasize that we are not arguing that perceived stress scales are *the* scales to use in stress research. Scales should be chosen as tools to answer specific questions and should be used in methodological contexts that help reduce ambiguities in interpretation. As discussed earlier, the PSS is especially appropriate in studies investigating factors influencing or influenced by stress appraisal.

In the remainder of this chapter, we present and discuss PSS data from a probability sample of the United States. This representative sample allows us to reexamine the psychometric characteristics of the scale, compare the usefulness of the PSS14, PSS10, and PSS4, and describe the distribution of perceived stress levels in the U.S. population. Of special interest are mean differences for subpopulation categories based on gender, age, socioeconomic status, race and ethnic background, smoking, and drinking status. These data provide norms for the scale as well as evidence for differences in perceived stress across subgroups in the population. We are also able to investigate the relations between the PSS and a wide range of health outcomes, including frequency of illness, serious and nonserious symptomatology, utilization of health services, health practices, and life satisfaction.

Method

Study Population

Respondents were 960 male and 1,427 female residents of the United States, 18 years of age and older (mean age = 42.8, standard deviation = 17.2), who completed a telephone interview conducted by Louis Harris and

Associates, Inc. in 1983. The 2,387 persons meeting the criteria for inclusion in the analyses represented 69.6% of the 3,430 eligible individuals with whom telephone contact was made (926 refused to be interviewed, and 117 terminated the interview prior to completion).

Sampling Techniques

Based on Bureau of Census information, a national area-probability sample was developed from the distribution of the adult, noninstitutionalized population of the United States. Stratification was done according to geographic regions (East, South, Midwest, and West) and by size of residential community (central city, non-central city, and rural areas). With counties as primary sampling units, a random digit dialing procedure was used to select telephone numbers to be called within each sampling unit. In the event that the dialed number was busy, it was redialed as many as four times at 15-minute intervals. For a ringing but unanswered phone, up to four call-backs were made at varying times and on different days during the sampling period. A total of 7,787 numbers were called. Of these, no contact was made with 1,819, because there was no answer after five dialings (1,138), the line was busy after five calls (142), the designated respondent could not be reached during the sampling period (97), or no appropriate contact had been made at the end of the sampling period, prior to the fourth call-back (442). Of the remaining numbers, 2,538 did not meet eligibility criteria; 456 were business numbers, 1,827 were not in service, and 255 were answered by individuals with whom there was a language barrier or who had a health condition that precluded their participation.

Once contact was established, interviewers described the purpose of the study and disclosed all information required under the Privacy Act. To further ensure an unbiased sample, the interviewer asked to speak to the person in the household who was 18 years of age or over and whose birthday had been most recent. Each interview required approximately 31 minutes to complete. Professional interview techniques developed by the Harris organization were employed to minimize refusal rates. Table 3.1 presents the demographic profile of the sample population obtained through these procedures along with comparable statistics from the 1980 U.S. Census. As can be seen, in those categories for which census data were available for comparison, the distribution of the Harris sample was similar to that of the U.S. Census. The sampling error at a 95% level of confidence for the full sample of 2,387 respondents was calculated at + or -2.0%.

Measures

Respondent information fell into six major categories: (1) perceptions of stress, (2) self-reported health and utilization of health services, (3) health behaviors, (4) life satisfaction, (5) help seeking behaviors, and (6) demographic data. Some of the measures were previously validated scales, some were variations of previous scales, and others were simply individual questions. We found that some of the latter could be grouped into scales, so that related information could be analyzed together. Each category of measures is discussed in turn.

We present psychometric evidence from the Harris sample in regard to internal reliability (Cronbach's alphas) for those instruments in which items are intended to measure the same construct and hence are expected to have high interitem correlations. In contrast, most instruments based on frequencies of events—for example, life events, number of illnesses, number of nights in a hospital—assume relative independence of items and are not expected to have high interitem correlations. Consequently, internal reliability statistics are not appropriate for these instruments.

Stress measures. In addition to the 14-item PSS, there were four individual questions designed to tap the level of experienced stress, a life-events scale, and a number of questions regarding work-related stress.

The individual questions about experienced stress were:

(1) Have you ever personally experienced stress? (1 = yes, 2 = no)
(2) Are there things going on in your life now that you find very upsetting or bothersome? (1 = yes, 2 = no)
(3) How much stress do you experience during an average week? (1 = almost no stress to 4 = a lot of stress)
(4) Compared to a year ago, how much stress do you experience now? (1 = less now, 2 = about the same, 3 = more now)

The life-events scale consisted of 16 events representing potentially significant changes in the respondent's life. In all, 10 of the events are normally construed as negative (e.g., death of spouse, mate, or close family member, loss of employment, separation or divorce from spouse, serious illness or injury of respondent). Three of the events are normally considered positive (marriage, pregnancy, reconciliation with mate), and three more events could be considered either positive or negative (retirement, major change in health/behavior of family member, change in income). Respon-

Table 3.1
Comparison of Demographic Characteristics of Sample and of 1980 U.S. Population

	Percent of Harris Sample[a]	*Percent of 1980 U.S. Census Adult Population*
Sex		
male	39.9	47.4
female	60.1	52.6
Age		
20-29	24.0	26.4
30-44	33.6	28.1
45-54	13.3	14.7
55-64	13.4	14.1
65 & over (end sign)	15.7	16.5
Total annual household income		
$15,000 or less	33.3	37.5
$15,001-$25,000	24.2	22.9
$25,001-$35,000	20.3	19.1
$35,001-$50,000	13.6	12.7
More than $50,000	8.6	7.9
Ethnic origin		
black (non Hispanic)	7.8	10.2
white (non Hispanic)	86.5	82.7
Hispanic	3.7	5.3
other minorities	2.1	1.8
Work status		
employed	63.8	58.6
unemployed	5.3	4.5

NOTE: Table 3.1 includes only those categories for which equivalent data were available from both the census and Harris Poll. For this reason, the percentages shown do not sum to 100% in every category.

a. For purposes of comparing the Harris sample with U.S. Census data, only those respondents over 20 years of age were included in these calculations, leaving N = 2256 in the Harris sample.

dents identified the events that had happened to them in the last year and rated the impact of each event on a five-point scale ranging from -2 (extremely negative) to +2 (extremely positive). Separate scores were calculated based on the total number of life events that the respondent indicated had happened, on the sum of the reported impact of the events, and on the sum of the impact of events respondents reported as having had negative impact.

The last category of measures of potential stress was concerned with tapping characteristics of respondents' employment. The people who indicated that they were employed (either full or part time or in the military) were first asked how many hours they worked during an average week. Two more questions related to work load (frequency of overtime work and how often work load caused breaks and lunch hours to be skipped) and were rated on scales of 1 (never) to 5 (very frequently). These latter two responses were combined to yield a measure of *Workload Demand.*

A final measure of job characteristics consisted of five items to tap perceptions of work responsibilities, to which subjects responded on a scale of 1 (agree strongly) to 5 (disagree strongly):

(1) I am held accountable for the development of other employees.
(2) I am responsible for counseling my subordinates or helping them solve their problems.
(3) I take actions or make decisions in my job that affect the safety or well-being of others.
(4) My responsibilities in my job are more for things than for people. (Scores were reversed on this item.)
(5) I receive appropriate recognition for performing my job well.

A principal components factor analysis with varimax rotation revealed two factors, which, when combined, accounted for 60.4% of the total variance. The first factor consisted of items 1, 2, and 5 (39.0% of the variance) and was labeled *Job Responsibilities with Feedback.* Items 3 and 4 comprised the second factor (21.4% of the variance), which was labeled *Job Responsibilities without Feedback.* Cronbach's alpha was .56 for the With Feedback measure and .42 for the Without Feedback measure.

Measures of self-reported health and utilization of health services. Respondents were asked to rate their current health status on a five-point scale ranging from 1 (excellent) to 5 (poor). They were then asked about utilization of health services within the last year:

(1) Have you been a patient in a hospital overnight during the past year? (1 = yes, 2 = no)
(2) If yes, how many nights?
(3) How many times did you personally see a doctor about your health during the past year, not counting hospitalization?

(4) Aside from these visits or when you telephoned to make an appointment, how many times in the past year did you contact a doctor or other health professional by telephone to consult about your health?

The number of nights the respondent had spent in the hospital, the number of doctor visits, and the number of times a doctor had been called were summed to provide an index of *Health Services Utilization.*

A composite score of three questions regarding effects of health status on ability to perform usual activities was obtained by asking respondents how many days during the past month illness or injury had caused them to (1) be absent from work, (2) be unable to perform routine activities, or (3) have difficulty performing routine duties. The measure of *Inability to Perform Routine Activities* for health reasons was obtained by summing the number of days given in response to all three questions.

To measure *Frequency of Serious Illness,* a 13-item scale listing a variety of health conditions (e.g., migraine headaches, hypertension, heart disease, vascular disease, respiratory illness, cancer) was employed. Respondents were asked (1) Have you ever had [this condition]? and (2) Have you had it in the past year? Scores were generated for responses to each of these questions, so that the effects of ever having had a particular illness and having had it within the past year could be examined separately.

A final measure of self-reported health status was the Psychosomatic Index, the 12-item somatization subscale of the Symptom Checklist 90 (Derogatis, Rickels, & Rock, 1976). This scale includes items such as weakness, soreness, numbness, heavy feelings, headache, nausea, and faintness. Respondents indicated the degree to which each ailment had bothered them within the last month on a scale of 1 (not at all) to 4 (quite a bit). A principal components factor analysis with varimax rotation revealed three factors, which, when combined, accounted for 48.1% of the total variance. The first factor contained five items related to nonserious health conditions (weakness, soreness, numbness, heavy feelings, and pains in lower back). A second factor was composed of symptoms that might be considered indicative of more serious illness (faintness or dizziness, pains in heart or chest, and trouble getting one's breath). The third factor contained items that might be seen as simply describing cold or flu symptoms (headaches, nausea or upset stomach, lump in throat, hot or cold spells). These factors, for descriptive simplicity, were labeled *Nonserious Symptoms, Serious Illness Symptoms,* and *Flu Symptoms;* the alpha reliability coefficients were .71, .58, and .50, respectively.

Health behaviors. Respondents answered a variety of questions that elicited information about their healthful or unhealthful behaviors. First, they were asked two questions about their sleeping habits: (1) On average, how many hours do you sleep each day in total, including naps, as well as regular nightly sleeping periods? and (2) Of the time you spend sleeping each day, how many hours of sleep do you typically get in the longest single period of sleep? Second, subjects were asked how often they ate breakfast (1 = never to 7 = daily). Third, information was solicited about frequency (1 = never to 7 = daily) and quantity (1 = 1 drink to 5 = more than 5 drinks) of alcoholic beverage consumption. Fourth, respondents rated their cigarette smoking habits on a scale of 1 = currently smoke, 2 = once smoked, but don't anymore, or 3 = never smoked. Those who indicated that they were currently smoking were asked how many packs of cigarettes they consumed daily. As a fifth measure of health behavior, subjects rated how often they exercised strenuously for at least 20 minutes on a scale of 1 (never) to 7 (daily).

Use of prescription and/or nonprescription medications was measured by responses to the question, "Do you ever take . . . ?" followed by a list of seven categories of drugs (prescription pain relievers, sleeping tablets, tranquilizers, medication for stomach distress, diet pills, over-the-counter pain relievers, and over-the-counter medication to relieve stomach distress). Two additional items asked if other prescribed or over-the-counter medications were being taken. A factor analysis (principal components with varimax rotation) yielded two factors, which together accounted for 31.6% of the total variance. The first factor consisted solely of prescription drugs (pain relievers, sleeping tablets, tranquilizers, and medications for stomach distress) and accounted for 18.2% of the variance. Nonprescription drugs and prescription diet pills made up the second factor accounting for 13.4% of the variance. Consequently, separate measures were derived by summing the number of drugs taken in two categories, one for prescription drugs and one for over-the-counter medications plus prescription diet pills.

For each type of drug taken by the respondent, a parallel question requested that frequency of usage be rated on a scale of 1 (less than one day a month) to 6 (daily). These data were subjected to the same factor analysis procedures described previously, resulting in three factors, which, in total, accounted for 40.8% of the variance. Frequency-of-use factor 1 was made up of over-the-counter pain relievers and other prescription and nonprescription drugs not specifically mentioned (15.8% of variance). The second factor included prescription pain pills, sleeping pills, and tran-

quilizers (12.9% of variance); the third frequency-of-use factor included both prescription and over-the-counter stomach medications and prescription diet pills (12.1% of variance). We labeled these factors *Other Drugs, Depressants,* and *Gastrointestinal/Obesity Drugs.* Separate scores for each category were derived by summing responses for the three types of drugs within that classification.

Life satisfaction measure. Using a scale of 1 (very satisfied) to 5 (very dissatisfied), respondents were asked to rate their degree of satisfaction with (1) their job, (2) themselves, and (3) life in general. Responses to these three items were summed to create a score of general life satisfaction. A principal components factor analysis produced only one factor, which accounted for 58.3% of the variance. The alpha coefficient of reliability was .63.

Measure of help-seeking behavior. Two questions were asked regarding whether, in the past year, respondents had considered seeking help for personal or emotional problems, and if so, whether they had actually sought that help. Responses to these items were then combined to generate a measure of help-seeking and were coded as 1 (considered and obtained help), 2 (considered seeking help, but did not), or 3 (did not consider seeking help).

Demographic data. Interviewers determined the respondent's sex, age, race, level of education completed, household income, and marital status. Further questions determined the number of people living in the respondent's household and how many of those were under 18 years of age. Data regarding employment included requesting the respondent's employment status and if working, his or her job title or primary job duties.

Results

The data were analyzed to provide information about the psychometric properties of the Perceived Stress Scale, the distribution of perceived stress across demographic factors, and the relation between perceived stress and a series of measures of health and health behavior. Because a large number of analyses were performed, a conservative alpha level of $p<.001$ was set for determining statistical significance. Post hoc contrasts between group means were considered *exploratory,* and Scheffé procedures were employed with alphas set at the traditional $p<.05$ level for these analyses.

Because the results reported here are based on cross-sectional data, no inferences of causality can be made. In other words, for relations reported between PSS scores and scores on other measures, we cannot say with any certainty whether stress acted as the causal agent, whether stress resulted from those related factors, or whether both factors were influenced by other variables.

Factor Analyses, Reliability Estimates, and Intercorrelations

The 14-item Perceived Stress Scale was factor analyzed, using a principal components method with varimax rotation. The principal components analysis revealed that 10 items loaded positively on the first factor at .48 or above. Items 4, 5, 12, and 13 had relatively low loadings of .17, .33, .11, and .39, respectively. The analyses further revealed that there were two factors with eigenvalues over 1.0 (Factor 1 = 3.6 and Factor 2 = 2.2), which together accounted for 41.6% of the total variance.

Examination of the highest loadings for each item indicated that the first factor (25.9% of the variance) weighted most heavily those items that were negatively worded (e.g., been upset, unable to control things, felt nervous and stressed), and the second factor (15.7% of the variance) reflected positively phrased statements (e.g., dealt successfully with hassles, effectively coping, felt confident). For purposes of measuring perceptions of stress, the distinction between the two factors was considered irrelevant. Consequently, scores for the PSS14 used in later analyses were obtained by summing responses (with the appropriate items reversed) to all 14 items. Cronbach's alpha coefficient for the internal reliability of the PSS14 was .75.

A somewhat shorter version of the Perceived Stress Scale, the PSS10, was derived by dropping the four items with relatively low factor loadings (items 4, 5, 12, and 13). The remaining 10 items were submitted to the factor analysis procedures described previously. In the principal components analysis of this shortened scale, all items loaded positively on the first factor at .42 or above. Once again, two factors emerged with eigenvalues over 1.0 (3.4 and 1.4, respectively), composed of negatively and positively worded items. Deletion of the four items resulted in a slight improvement in both the total explained variance (48.9% for both factors combined, Factor 1 = 34.4%, and Factor 2 = 14.5%) and internal reliability (alpha coefficient = .78). Thus it appears that the PSS10 may be at least as good a measure of perceived stress as the longer 14-item version of the scale.

A more abbreviated version of the PSS, a four-item scale consisting of items 2, 6, 7, and 14, was previously employed in telephone follow-up interviews in smoking cessation studies (Cohen, 1986; Cohen et al., 1983). In these prior studies, the PSS4 demonstrated adequate reliability and was shown to be a useful measure of perceived stress for situations requiring a very short scale. Responses to the four items from the present sample were factor analyzed using a principal components method. The analysis revealed only one factor with an eigenvalue over 1.0 (specifically, 1.8), which accounted for 45.6% of the variance. The alpha reliability coefficient for the PSS4 was .60.

To summarize, the three versions of the Perceived Stress Scale analyzed here all appear to demonstrate adequate internal reliability. With the large sample size provided by the Harris survey, we were able to determine that a somewhat shortened version of the original 14-item scale, the PSS10, appears to provide at least as good a measure of perceived stress as does the longer scale. The results of the preceding analyses also confirm previous indications that the PSS4 has adequate reliability for use in situations requiring a very brief measure of perceptions of stress. Normative data are reported later for all three versions of the Perceived Stress Scale (PSS14, PSS10, and PSS4).

Means and Standard Deviations

Mean scores for the entire sample (males and females combined) for the PSS14, PSS10, and PSS4 were 19.62, 13.02, and 4.49, respectively, with standard deviations of 7.49, 6.35, and 2.96. The ranges of scores for each measure were 0 to 45 (PSS14), 0 to 34 (PSS10), and 0 to 15 (PSS4). Table 3.2 presents the means and standard deviations of scores on the three Perceived Stress Scales for each category of demographic variables.

Sex. As is apparent from Table 3.2, on all three measures, females reported higher levels of perceived stress than did males. One-way ANOVAs revealed that, in all cases, these differences were statistically significant at the $p<.0001$ level or beyond.

Age. PSS scores decreased as age increased. Negative correlations between age of respondent and the three PSS measures were small but significant at $p<.001$: for PSS14, $r = -.13$; for PSS10, $r = -.13$; for PSS4, $r = -.11$. Since the age data are actually continuous, we have reported correlations with perceived stress here. However, norms (mean PSS scores and standard deviations) are reported for five age categories (18-29, 30-44, 45-54, 55-64, and 65 and over) in Table 3.2.

Income. When scores were classified by level of household income, the three PSS measures produced the same patterns of results. As Table 3.2 shows, perceptions of stress declined linearly as household income increased to the level of $35,000 per year. Beyond $35,000 per year, the trend was less consistent. Respondents with earnings between $45,000 and $50,000 per year reported less stress than did those in any of the other categories, while stress levels of those earning between $35,000 and $40,000 and those with incomes in excess of $50,000 were approximately the same as those in the $25,000-30,000 range. One-way ANOVAs indicated that the effect of household income on perceived stress was significant at $p<.0001$ for all three PSS scales.

Because response patterns were virtually identical for all PSS measures, only the results of the post hoc analyses for the PSS14 are reported here. Scheffé tests for differences between group means indicated that PSS scores for those with incomes of $5,000 or less were significantly higher than the scores of all respondents with incomes over $15,000, but did not differ from those in the $5,000-10,000 and $10,000-15,000 categories. Respondents with household incomes in the $5,000-10,000 range reported significantly higher levels of perceived stress than did those earning $25,000-30,000, $30,000-35,000, $45,000-50,000, and more than $50,000. Only those whose income was $30,000-35,000 or $45,000-50,000 reported significantly less stress than did those in the $10,000-15,000 group. None of the other comparisons between group means were significant at $p<.05$.

Education. The more education respondents had, the lower were their scores on the PSS14, PSS10, and PSS4. One-way ANOVAs showed that this effect was significant for all three measures at $p<.0001$ or better. The Scheffé procedure for testing differences between group means indicated that PSS scores were not significantly different for those with less than a high school diploma and those who were high school graduates. However, subjects with less than a high school education reported significantly more perceived stress than did all those with some education beyond a high school diploma. Of all the other possible comparisons, only the difference between high school graduates and respondents with an advanced degree was significant.

Race. In this sample, minority ethnic origin or race was associated with reports of perceived stress. Table 3.2 shows that respondents who classified themselves as "white" had lower scores on all three PSS measures than did those classified as black, Hispanic, or other minority. One-way ANOVAs

Table 3.2
Mean PSS14, PSS10, and PSS4 Scores and Standard Deviations for Demographic Categories

Category	PSS14 N	PSS14 Mean	PSS14 SD	PSS10 N	PSS10 Mean	PSS10 SD	PSS4 N	PSS4 Mean	PSS4 SD
Sex									
male	949	18.8	6.9	926	12.1	5.9	946	4.2	2.8
female	1406	20.2	7.8	1344	13.7	6.6	1384	4.7	3.1
Age									
18-29	649	21.1	7.2	645	14.2	6.2	648	4.9	3.0
30-44	762	19.6	7.3	750	13.0	6.2	756	4.5	2.9
45-54	298	19.1	7.1	285	12.6	6.1	290	4.4	2.9
55-64	300	18.3	8.1	282	11.9	6.9	294	4.2	3.1
65 & over	333	18.5	7.8	296	12.0	6.3	330	4.0	3.0
Annual household income									
$5K or less	170	23.1	8.5	153	16.4	7.4	162	5.9	3.5
$5-10K	233	21.8	8.3	216	15.0	6.7	232	5.2	3.3
$10-15K	309	20.9	7.4	303	14.1	6.2	308	5.0	3.0
$15-20K	277	19.4	7.5	270	12.8	6.3	275	4.4	2.8
$20-25K	247	19.5	7.0	242	12.8	6.0	245	4.4	2.8
$25-30K	255	18.6	7.3	248	12.1	6.1	252	4.1	2.8
$30-35K	181	17.8	6.6	178	11.6	5.6	181	3.8	2.6
$35-40K	134	18.8	6.4	130	12.5	5.5	131	4.2	2.5
$40-45K	93	18.3	6.3	91	11.7	5.3	93	4.1	2.5
$45-50K	72	16.1	5.8	70	10.3	4.7	71	3.1	2.3
over $50K	189	18.4	6.3	187	11.9	5.6	187	3.9	2.5
Education completed									
less than H.S.	400	21.3	7.8	369	13.4	6.8	399	4.9	3.4
H.S. grad	820	19.9	7.8	799	13.1	6.7	812	4.6	3.1
some college	580	19.6	7.5	555	13.1	6.2	568	4.5	2.9
4 yr. college	263	18.2	6.6	262	12.0	5.6	264	4.0	2.6
some grad. school	140	18.0	6.4	137	12.2	5.4	138	4.0	2.4
advanced degree	145	17.4	6.4	142	11.4	5.2	143	3.8	2.3
Race									
white	1995	19.3	7.4	1924	12.8	6.2	1974	4.4	2.9
Hispanic	100	21.3	7.8	98	14.0	6.9	100	5.1	3.2
black	185	21.5	8.1	176	14.7	7.2	183	5.1	3.4
other minority	51	20.5	6.7	50	14.1	5.0	51	4.9	2.3
Number of people in household									
one	407	18.9	7.8	372	12.6	6.6	400	4.3	3.1
two	755	18.9	7.4	729	12.3	6.2	745	4.2	2.9
three	442	19.7	7.6	431	13.2	6.5	438	4.6	3.0
four or five	627	20.4	7.3	615	13.7	6.2	623	4.7	2.9
six or more	124	21.6	7.5	123	14.4	6.2	124	5.3	3.0
Number of children in household									
none	948	19.0	7.3	911	12.5	6.1	933	4.2	2.8
one	412	20.1	7.6	406	13.4	6.5	412	4.8	3.1
two	377	20.4	7.4	371	13.6	6.2	373	4.6	2.9
three	147	20.9	7.4	146	14.0	6.4	148	5.0	3.0
four or more	60	22.6	7.8	60	15.1	6.6	60	5.6	2.9

(continued)

Table 3.2 Continued

Category	PSS14 N	PSS14 Mean	PSS14 SD	PSS10 N	PSS10 Mean	PSS10 SD	PSS4 N	PSS4 Mean	PSS4 SD
Marital status									
widowed	215	18.9	8.0	190	12.6	6.7	214	4.3	3.1
married/living with mate	1439	19.0	7.2	1399	12.4	6.1	1427	4.2	2.8
single never wed	451	20.9	7.0	442	14.1	6.0	444	4.9	2.8
divorced	198	21.3	8.7	190	14.7	7.4	195	5.3	3.4
separated	46	23.5	7.9	43	16.6	7.1	44	6.1	3.3
Employment status									
in the military	16	17.8	5.8	16	11.4	6.4	16	2.7	3.2
retired & not working	311	18.2	7.8	280	11.7	6.4	312	3.9	3.0
employed full time	1235	18.9	6.9	1211	12.4	5.8	1223	4.2	2.7
homemaker	270	19.3	8.0	256	12.9	6.8	264	4.4	3.1
employed part time	254	21.0	7.7	250	14.3	6.6	253	5.1	3.1
student	78	22.6	7.4	77	15.3	6.6	78	5.6	3.0
unemployed	129	23.6	7.2	123	16.5	6.3	124	6.2	3.1
disabled/too ill to work	40	26.8	8.4	36	19.9	6.8	39	7.2	3.3
Profession									
proprietor	77	17.4	8.2	76	10.9	6.9	76	3.6	3.1
agriculture	22	17.6	6.1	22	10.3	5.6	22	3.9	2.3
professional	292	18.1	6.2	285	12.0	5.3	288	4.0	2.4
managerial	187	18.2	6.7	187	12.0	5.8	185	3.9	2.6
skilled	177	18.7	6.6	175	12.3	5.5	176	4.3	2.7
sales	112	19.3	7.4	110	13.0	6.3	110	4.5	2.9
clerical	244	20.0	7.8	239	13.5	6.5	243	4.7	2.9
service	200	20.5	7.4	195	13.7	6.2	199	4.8	3.0
unskilled	158	21.4	6.9	156	13.8	6.1	157	5.0	3.0

on these data revealed that the effect of race on PSS scores was statistically significant for all three measures at the $p<.001$ level or better. Between-group comparisons using the Scheffé procedure further revealed that means for whites were significantly lower than were means for blacks, but that the differences between mean scores for all other possible comparisons between groups were not statistically significant (due, in part, to their smaller *N*s).

Household composition. The number of people in one's household and the number of them who are children were also associated with perceptions of stress. As Table 3.2 shows, either living alone or with one other adult was least stressful. As the number of people in the household increased, so did PSS scores. Correlations between the number of people living in the respondent's household and PSS scores on the three scales were small, but significant at the $p<.001$ level or better: for PSS14, $r = .11$; for PSS10, $r = .10$; for PSS4, $r = .11$. A similar relationship was evident for number of children and PSS results. The correlations between respondents' perceived stress and number of children were all significant at $p<.001$ or better: for PSS14, $r = .11$; for PSS10, $r = .10$; for PSS4, $r = .10$. Because data collected on these two dimensions of household composition were continuous, we have reported correlations scores here. However, for the purpose of reporting mean PSS scores and standard deviations, these two variables were divided into the categories shown in Table 3.2.

Marital status. Perceptions of stress appeared to be related to marital status. One-way ANOVAs revealed that this effect was significant for each measure of stress at $p<.0001$. Surprisingly, respondents who were married or living with a mate did not differ in levels of perceived stress from those who reported that their spouses were deceased. These two groups had the lowest PSS scores, and Scheffé tests revealed that these scores were significantly lower than the scores of those who were single/never married, divorced, or separated. Respondents who had never been married did not differ significantly from those who were divorced or separated, nor were there significant differences between mean PSS scores of separated (but not divorced) and divorced individuals.

Employment. A final category of demographic variables concerned two aspects of respondents' employment: (1) employment status, and (2) profession. Mean PSS scores for the classifications within these two categories are shown in Table 3.2. One-way ANOVAs revealed effects for both employment variables on PSS scores that were significant at the $p<.001$ level or better. Those who said they were in the military, retired and not working, employed full time, or homemakers had PSS scores (on all

three scales) below the overall sample means. Scores of respondents who were employed part time, students, unemployed, or disabled/too ill to work fell above the overall sample means. The Scheffé procedure for multiple comparisons between groups revealed several differences between means. Those respondents who were disabled/too ill to work reported significantly more stress than did those who were in the military, retired, employed (either full or part time), or homemakers. Additionally, individuals who were employed full time or who were retired and not working had PSS scores significantly lower than did part-time employees, students, and the unemployed. Due, in part, to varying *N*s in the groups, the stress levels of part-time employees and military personnel were only significantly lower than those of the disabled/too ill to work group, and homemakers were significantly lower only than those respondents who were unemployed or disabled. Clearly, being either employed full time or retired and not working was associated with lower levels of perceived stress, and being either unemployed or disabled was related to higher reports of stress.

Data for those individuals who indicated that they were working either full or part time were further analyzed according to the job title or main duties of their jobs. For this classification, the patterns of scores were much the same on all three scales. Proprietors, agricultural workers, professionals, managers, and skilled workers scored below the overall sample means. Scores for sales workers were, on all three measures, very close to the sample means. Respondents with PSS scores above the overall sample means were clerical, service, and unskilled workers. Using the Scheffé procedure, PSS scores for unskilled workers were significantly higher than for proprietors, professionals, and managers. None of the other comparisons between groups was statistically significant.

Summary. The patterns of perceived stress scores for the demographic variables just reported indicate that a variety of personal characteristics were associated with perceptions of stress. Reported stress levels were consistently higher for females than for males. There was a small, but significant, negative correlation between PSS scores and age, suggesting that perceptions of stress tend to decline as age increases. Whites reported less stress than did those in minority groups, although only the difference between whites and blacks was statistically significant. PSS scores tended to decrease as respondents' level of formal education increased.

Factors associated with one's living and working environments were also found to be related to perceived stress. As would be expected, PSS scores generally decreased as household income increased. Reports of stress

increased as the number of people living in the respondent's household increased and as the number of children in the household increased. People who were currently either married or living with a mate and those whose spouses had died reported less stress than did those who had never been married or who were divorced or separated from their mates. Finally, being unemployed and/or disabled was found to be related to high levels of reported stress, while being employed full time or retired and not working was associated with lower PSS scores. Individuals whose occupations involved relatively higher degrees of status and control (proprietors, professionals, and managers)—and one might assume, more income as well—reported significantly less perceived stress than did unskilled workers.

Evidence for Construct Validity

In this section, we examine evidence provided by the Harris Poll data relevant for establishing the construct validity of the PSS measures. Included are relations between the PSS and other stress measures, health, health service utilization, health behaviors, life satisfaction, and help-seeking. In general, we expected that increased stress as measured by the PSS would be associated with increased stress as assessed by other instruments and questions, greater help-seeking, poorer health, more health service utilization, and poorer life satisfaction.

For dichotomous and noncontinuous variables, mean scores on the PSS14, PSS10, and PSS4 were calculated. For continuous variables, scores were correlated with PSS14, PSS10, and PSS4 responses. Data are presented for the entire sample. Because many variables were not relevant to large numbers of respondents, *N*s varied widely from one measure to another. Since the patterns of results were much the same for the three PSS measures, only the results for the PSS14 are discussed in this section. However, the mean scores and correlations for all three scales are presented in the tables of results.

Comparisons between PSS scores and stress measures. Since respondents were asked how often *in the last month* they had experienced the circumstances described by the PSS, it was expected that PSS scores would be most closely related to other measures that were designed to tap perceptions of stress within the previous month. Consequently, measures with a longer time reference (such as "in the past year" or "ever") were expected to be somewhat less closely related to PSS scores. These

expectations were confirmed. A t-test revealed that mean PSS scores for subjects who indicated that they had *ever* experienced stress (mean = 19.3) were significantly ($p<.0001$) lower than scores of those who said there were things in life now that were upsetting or bothersome (mean = 23.2). Similarly, as Table 3.3 shows, PSS scores were correlated with reports of the amount of stress experienced during an average week ($r = .36$, $p<.0001$) and the amount of stress experienced now as compared to a year ago ($r = .26$, $p<.0001$).

Cohen, Kamarck, and Mermelstein (1983) found that PSS scores were moderately correlated with the number of life events that respondents indicated they had experienced within the last year. They also found that the correlation increased when respondents' perceptions of the events were taken into account. As shown in Table 3.3, PSS scores were correlated with number of life events ($r = .30$, $p<.0001$). However, in the present study, consideration of respondents' reports of the impact of these events did not increase the correlation, although, as would be expected, the correlation between perceived stress and negative impact ($r = -.27$, $p<.0001$) was higher than the correlation between PSS scores and overall impact ($r = -.10$, $p<.0001$). The life-events measures used in the Cohen et al. studies consisted of 99 items related to adjusting to the demands of college life (college student sample) and 71 items related to negative life events (smoking cessation sample). On the other hand, the life-events measure used in the present study contained only 16 events, some of which were negative, some positive, and some ambiguous. It may be that this much abbreviated scale was not as sensitive a measure of perceptions of life events as those used previously.

A final category of measures of potential stress had to do with certain characteristics of employed respondents' jobs. Correlations between PSS scores and these measures are shown in Table 3.3. Number of hours per week worked was inversely related to perceived stress ($r = -.10$, $p<.0001$), indicating that the more hours per week a person spent working, the lower were perceptions of stress. This relation was consistent with the finding reported above that part-time workers reported more stress than did full-time workers.

The two factors of the Job Responsibilities Scale, responsibilities with feedback and responsibilities without feedback, both correlated positively with PSS responses, indicating that the less responsibility a worker had, the higher were perceptions of stress. Further, the correlation between PSS scores and responsibilities with feedback ($r = .14$, $p<.0001$) was higher than for responsibilities without feedback ($r = .07$, $p<.002$).

Table 3.3
Correlations Between PSS14, PSS10, and PSS4 Scores and Stress Measures

Measure	*PSS14*	*PSS10*	*PSS4*
How much stress do you experience during an average week? (high scores = more stress)	.36 (1697)	.39 (1655)	.29 (1683)
Compared to a year ago, how much stress do you experience now? (high scores = more stress)	.26 (1694)	.26 (1653)	.23 (1680)
Life-events scales			
Number of events	.30 (2355)	.32 (2270)	.28 (2330)
Overall impact of events	-.10 (1765)	-.09 (1701)	-.09 (1746)
Negative impact of events	-.27 (1024)	-.27 (992)	-.26 (1015)
How many hours/week do you work?	-.10 (1485)	-.11 (1457)	-.12 (1472)
Job responsibilities scales (high scores = less responsibility)			
With feedback	.14 (1375)	.14 (1351)	.14 (1362)
Without feedback	.07* (1421)	.05,ns (1398)	.06,ns (1410)
Workload demand (high scores = high demand)	.03,ns (1228)	.06,ns (1205)	.03,ns (1217)

NOTE: The number of respondents in each condition is shown in parentheses. Unless otherwise indicated, all correlations are significant at $p < .001$ or better. *$p < .005$; ns = nonsignificant.

Surprisingly, the measure of Workload Demand was not related to PSS scores of respondents who were employed full time ($r = .03$, n.s.). Apparently, job responsibilities that cause an employee to work overtime and miss lunches and breaks were not generally associated with the employee's perceptions of stress.

In summary, PSS scores were moderately related to responses on other measures of appraised stress, as well as to measures of potential sources of stress as assessed by event frequency. It also appeared that jobs with more responsibilities, especially those in which the employee received feedback

about performance, were associated with *lower* levels of stress. However, certain aspects of employment that might typically be considered stressful, such as working overtime and missing lunches and breaks, were not related to perceptions of stress.

Comparisons between PSS scores and self-reported health and utilization of health services. As Table 3.4 shows, the individual question regarding health status was correlated with reports of stress ($r = .23$, $p<.0001$); the poorer that respondents perceived their health to be, the more stress they reported. Similarly, on the individual question about hospitalization, respondents who reported being hospitalized during the previous year had higher PSS scores (mean = 20.3) than did those who had not been in the hospital (mean = 19.5), although these differences were not significant at our set criterion of $p<.001$ (for PSS14, $p<.10$; for PSS10, $p<.01$; for PSS4, $p<.05$).

As expected, scores on the Health Services Utilization Scale were positively correlated with PSS scores ($r = .21$, $p<.0001$), as were responses to the measure of inability to perform routine activities ($r = .21$, $p<.0001$). Further, the number of serious illnesses respondents had ever had ($r = .15$, $p<.0001$), as well as the number of serious illnesses experienced within the last year ($r = .14$, $p<.0001$) were both positively related to perceptions of stress.

The three factors of the Psychosomatic Index were also related to PSS scores. Symptoms of potentially serious illness were positively correlated with perceived stress ($r = .27$, $p<.0001$), and the correlation was slightly higher for both factors concerned with symptoms indicative of less serious health conditions. For the Nonserious Symptoms factor, the correlation was .31 ($p<.0001$), and for symptoms possibly associated with flu, the correlation was .32 ($p<.0001$).

In summary, these results clearly demonstrate an association between self-reported physical illness and elevated stress as measured by the PSS. Both frequency of physical illness and symptoms of physical illness were positively related to reports of stress. Moreover, perceived stress was almost as closely related to serious symptomatology as to nonserious symptoms. Because these correlations are cross-sectional, no inferences of causality can be made. Although stress may have caused health problems, it is also possible that poor health elevated stress, or that a third factor, for example socioeconomic status, influenced both stress and health.

Comparisons between PSS scores and health behaviors. In general, relations between measures of various health behaviors and perceptions of stress were not impressive, as shown in Table 3.5.

Table 3.4
Correlations Between PSS14, PSS10, and PSS4 Scores and Self-Reported Health and Health Services Utilization Measures

Measure	*PSS14*	*PSS10*	*PSS4*
How is your health?			
(1 = excellent to 5 = poor)	.23	.22	.20
	(2353)	(2268)	(2327)
Index of inability to perform routine activities			
(high scores = more frequent difficulty)	.21	.23	.24
	(404)	(397)	(400)
Index of ever having had serious illness			
(high scores = more illnesses)	.15	.16	.13
	(2355)	(2270)	(2330)
Index of serious illness in last year			
(high scores = more illnesses)	.14	.15	.12
	(2355)	(2270)	(2330)
Psychosomatic index factors			
(high scores = more bothered)			
Non-serious symptoms	.31	.32	.26
	(2340)	(2258)	(2316)
Serious illness symptoms	.27	.28	.22
	(2350)	(2265)	(2325)
Flu symptoms	.32	.34	.27
	(2337)	(2254)	(2314)
Health services utilization scale			
(high scores = more utilization)	.21	.22	.18
	(288)	(277)	(287)

NOTE: The number of respondents in each condition is shown in parentheses. Unless otherwise indicated, all correlations are significant at $p < .001$ or better. ns = nonsignificant.

First, for the entire sample, the total number of hours of sleep per day was not correlated with PSS scores ($r = -.01$, n.s.). Further, when the sample was stratified by age grouping, none of the correlations reached our criterion of $p<.001$, although for respondents 65 years of age and older, the negative correlation of $-.13$ approached significance at $p<.008$. The negative correlation of the PSS with number of hours in the longest period of sleep per day was small, although statistically significant ($r = -.08$, $p<.0001$), suggesting a general tendency for stress to be associated with a shorter period of sleeping. When these data were analyzed by age group, only PSS scores of respondents between 18 and 29 years of age were significantly correlated with number of hours in the longest period of sleep

Table 3.5
Correlations Between PSS Scores and Health Behavior Measures

Measure	*PSS14*	*PSS10*	*PSS4*
In total, how many hours/day do you sleep?	-.01,ns	-.02,ns	.01,ns
	(2347)	(2264)	(2322)
How many hours in the longest period of sleep each day?	-.08	-.07	-.05,ns
	(2308)	(2231)	(2281)
How often do you eat breakfast? (1 = never to 7 = daily)	-.09	-.09	-.07
	(2354)	(2269)	(2328)
How often do you drink alcohol? (1 = never to 7 = daily)			
Total sample	-.04,ns	-.04,ns	-.06
	(2350)	(2265)	(2324)
Drinkers only	-.07*	-.08*	-.07*
	(1568)	(1530)	(1556)
When you drink, how many drinks per day?	.10	.08	.09
	(1549)	(1513)	(1538)
If you smoke, how many packs per day?	.03,ns	.02,ns	.03,ns
	(704)	(683)	(697)
How often do you exercise strenuously for 20 min. or longer? (1 = never to 7 = daily)	-.06*	-.06*	-.05,ns
	(2335)	(2256)	(2313)
Licit drug use scale:			
Total number of drugs taken	.17	.19	.15
	(2355)	(2270)	(2330)
prescription drugs	.13	.16	.12
	(2347)	(2262)	(2322)
over-the-counter drugs	.12	.13	.10
	(2349)	(2266)	(2326)
Frequency of all drug usage	.16	.18	.15
	(2127)	(2059)	(2110)
depressants	.27	.26	.28
	(374)	(357)	(368)
gastrointestinal/obesity	.14	.14	.12
	(811)	(785)	(799)
other drugs	.09	.10	.08
	(2043)	(1977)	(2027)

NOTE: The number of respondents in each condition is shown in parentheses. Unless otherwise indicated, all correlations are significant at $p < .001$ or better.
* $p < .005$; ns = nonsignificant.

(r = -.13, p<.001). For subjects between 30 and 44 years of age, the correlation was marginal (r = -.09, p<.007).

Second, the frequency with which subjects ate breakfast was also related to PSS scores (r = -.09, p<.0001). This negative correlation indicates that people under stress eat breakfast less often than do those experiencing lower levels of stress.

Third, for the total sample of both drinkers and nondrinkers, frequency of drinking alcohol was not related to PSS scores (r = -.04, n.s.). Among respondents who indicated that they drank alcohol at all, number of drinks per day was positively related to higher PSS scores (r = .10, p<.0001). However, there was a marginal inverse relation between how many days alcoholic beverages were consumed and reports of perceived stress (r = -.07, p<.002). These data suggest that increased drinking under stress occurred on specific "drinking" days of the week, perhaps on weekends.

A fourth category of health behaviors concerned cigarette smoking. A one-way ANOVA revealed that respondents who said they were currently smoking had marginally (p<.004) higher PSS scores than those who had quit smoking or had never smoked. Table 3.6 presents mean PSS scores for this measure. However, among smokers, there was no relation between perceptions of stress and how many packs of cigarettes per day were smoked (r = .03, n.s.). Fifth, there was a small and marginally significant correlation between frequency of exercise and PSS responses (r = -.06, p<.003), with increased stress associated with infrequent physical exercise.

Finally, usage of licit drugs, as measured by (1) number of different drugs taken and (2) frequency of usage, was compared to PSS scores. Perceived stress was correlated with total number of drugs taken (r = .17, p<.0001), as well as with the two subcategories: number of prescription drugs (r = .13, p<.0001) and over-the-counter drugs (r = .12, p<.0001). In all cases, taking more varieties of medication was related to higher reports of stress. Frequency of all drug usage also increased with increased PSS scores (r = .16, p<.0001), as did usage of the three subcategories of drugs: other drugs, r = .09, p<.0001; depressants, r = .27, p<.0001; gastrointestinal/obesity drugs, r = .14, p<.0001.

In summary, perceptions of stress were only slightly related to self-reports of health behaviors. Small but statistically significant correlations were observed between elevated PSS scores and (1) shorter periods of sleep, (2) infrequent consumption of breakfast, (3) increased quantity of alcohol consumption, (4) usage of more licit drugs, and (5) frequency of licit drug usage. Marginal relations were also found between stress and smoking, lack of physical exercise, and fewer days per week of alcohol consumption (for

Table 3.6
Mean PSS Scores for Respondent Smoking Status

Status	*PSS14*	*PSS10*	*PSS4*
Currently smoke	20.4	13.7	4.8
	(708)	(686)	(700)
Once smoked, but quit	19.1	12.6	4.2
	(616)	(583)	(605)
Never smoked	19.4	12.8	4.5
	(1028)	(998)	(1022)

NOTE: The number of respondents in each condition is shown in parentheses.

those who drink). Smokers reported higher levels of perceived stress than did nonsmokers. Perceptions of stress were not associated with total hours slept per day nor, among smokers, with number of packs of cigarettes smoked per day. However, associations between stress and health practices may be underestimated because self-reports of many of these behaviors, particularly alcohol and drug consumption, may be subject to social desirability effects.

Comparison of PSS scores and Life Satisfaction Scale. Levels of perceived stress should be inversely related to reports of satisfaction with self, job, and life in general. This expectation was confirmed. High PSS scores were correlated with reports of increased dissatisfaction ($r = .47$, $p<.0001$). However, to some extent, this correlation may be artifactual, since it is possible that the two scales may be tapping the same underlying concepts.

Comparisons between PSS scores and measures of help-seeking behavior. We assumed that the need for help increases with an increasing stress level and hence predicted a positive relation between the PSS and help-seeking: Table 3.7 presents mean PSS scores for the help-seeking measure. A one-way ANOVA revealed that respondents who reported having considered seeking help in the past year for personal or emotional problems (whether they actually got help or not), had higher PSS scores than did those who had not thought about getting help ($p<.0001$). Scheffe tests for differences between group means revealed that, those who had gotten help did not differ from those who considered help but failed to receive it, but scores for both these groups were higher than scores of individuals who had not considered seeking aid. One interpretation of these

results is that people think about getting help only for problems that are bothersome enough to be stressful. Perhaps those who had not considered seeking aid had no serious emotional or personal problems in the past year and so actually experienced little stress.

Discussion

The major goals of this chapter included (1) providing psychometric data on the three different versions of the PSS, (2) describing variations in stress levels for subgroups of the U.S. population, and providing PSS norms for each subgroup for use in evaluating scores from other samples, (3) comparing perceived stress scores to scores on other stress measures, and (4) examining the association between the PSS scales and a wide range of measures of health and health behavior. In this section, we discuss the evidence reported in regard to these issues, making recommendations when appropriate.

Which Scale Is Best?

The psychometric acceptability of the PSS14 was supported by evidence reported in an earlier paper (Cohen et al., 1983) and similarly supported in terms of reliability and construct validity by the data reported in this chapter. One of the unique goals of this chapter was to compare the psychometric qualities of the shorter versions of the PSS with the original 14-item scale. With the large sample size provided by the Harris survey, we were able to determine that the PSS10 provides as adequate a measure of perceived stress as the longer scale. Moreover, the PSS10 had a somewhat tighter factor structure and a slightly better internal reliability than the PSS14, and correlations between the PSS10 and various outcomes were equivalent to those found with the original scale. For this reason, we recommend use of the PSS10 in future research. The PSS4 demonstrated a moderate loss in reliability, but its factor structure and predictive validity were good. Although we recommend use of the 10-item scale when time allows, the PSS4 is appropriate for use in situations requiring a very brief measure of stress perceptions.

Table 3.7
Mean PSS14, PSS10, and PSS4 Scores for the Measure of Help-Seeking Behavior

Behavior	*PSS14*	*PSS10*	*PSS4*
Considered & obtained help	22.8 (383)	16.0 (378)	5.6 (379)
Considered, but did not obtain help	23.6 (136)	16.6 (135)	6.1 (136)
Did not consider seeking help	18.7 (1785)	12.1 (1709)	4.2 (1765)

NOTE: The number of respondents in each condition is shown in parentheses.

Distribution of Perceived Stress in the Population

We view the distribution of perceived stress across demographic characteristics as indicative of the likelihood that specific groups of people encounter stressful life events and/or appraise encountered events as stressful. Our data are consistent with traditional conceptions of groups who should be experiencing greater stress because of the demands of their environments and the lack of adequate resources for coping with events. These include persons with relatively low socioeconomic status (lower income, less education, more children, more persons in household), the unemployed and disabled, those in occupations with relatively low degrees of status and control, those who are divorced, separated, or never married, racial and ethnic minorities, females, and the young.

There are relatively few data on the distribution of stress in the population to compare with these. An exception is work reported by Henderson, Byrne, and Duncan-Jones (1981) on the distribution of life events in a community sample of 756 adults residing in Canberra, Australia. In their work, distributions of events were calculated from data collected from a 73-item stressful life-event interview. Data for both event frequency and event impact were similar, hence only the latter (closer to perceived stress) is discussed here. Consistent with the results presented earlier, event impact was found to decrease with age, and to be greater among the single, divorced, and separated than the married and widowed. However, no differences were found in the Australian study for either sex or income. Moreover, in contrast to our finding of a decrease in perceived stress with greater education in their study, event impact increased with

increased education. The discrepancies between the two studies may be attributable to differences in the sensitivity of the stress scales, cultural differences, and differences in the range of the demographic variables under consideration (e.g., income ranged from less than $1,000 to over $15,000 in the Australian sample compared with less than $5,000 to over $50,000 in the U.S. sample).

Perceived Stress and Other Stress Measures

In order to further establish the construct validity of the PSS, we examined the relation of the PSS14, PSS10, and PSS4 with other items and scales assessing stress within the survey. As expected, PSS scores were moderately related to responses on other measures of stress, as well as to measures of potential sources of stress. However, certain aspects of employment that might typically be considered stressful, such as working overtime and missing lunches and breaks, were not related to perceptions of stress. It also appeared that jobs with more responsibilities, especially those in which the employee received feedback about performance, were associated with *lower* levels of stress. This, of course, is consistent with the idea that persons with greater control over events are less likely to perceive them as stressful.

Perceived Stress, Health, and Health Behaviors

It is generally believed that stress detrimentally influences health status and interferes with the performance of health practices. Although the cross-sectional nature of our data did not allow causal analyses, we examined the concurrent data for evidence consistent with these hypotheses. Frequency of serious illnesses, and both serious and nonserious symptoms of illness were positively related to perceived stress. Small correlations were also observed between perceived stress and health practices. Elevated PSS scores were associated with: (1) shorter periods of sleep, (2) infrequent consumption of breakfast, (3) smoking cigarettes, (4) decreased frequency but increased quantity of alcohol consumption, (5) less frequent physical exercise, and (6) increased frequency and variety of licit drug use. On the other hand, perceptions of stress were not associated with total hours of sleep per day or number of packs of cigarettes smoked per day.

Summary and Conclusion

Perceived stress is assumed to be an important mediator of the pathway linking stressful events to poorer health and health practices. The data reported in this chapter establish associations between perceived stress and illness, illness symptoms, and a wide range of health behaviors. They also indicate that persons with less power and wealth in our society are more prone to generalized perceptions of stress. These data support the traditional views regarding the distribution of stress and effects of stress on health.

The analyses in this chapter also provide evidence that the PSS does an adequate job of measuring appraised stress. With the possible exception of life satisfaction, and minor physical symptoms, there is little or no overlap between the constructs measured by the PSS and what is assessed by the outcomes scales in this study. Hence these relationship data are not subject to a "confounding" explanation. The work is, however, cross-sectional and therefore no causal inference is implied in our report.

Finally, the PSS scale has been established as an economical tool for assessing perceived stress in the population. We reiterate, however, that perceived stress scales are not always appropriate. Scales should be chosen to address specific questions being posed in a research project, and used in methodological contexts in which alternative explanations are minimized. As discussed earlier, perceived stress scales should not be used in cross-sectional studies of the relation between stress and psychological distress.

APPENDIX A

Items and Instructions for Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate *how often* you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way; rather indicate the alternative that seems like a reasonable estimate.

For each question choose from the following alternatives:

0. never
1. almost never
2. sometimes
3. fairly often
4. very often

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous and "stressed"?
4. In the last month, how often have you dealt successfully with day to day problems and annoyances?
5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?
6. In the last month, how often have you felt confident about your ability to handle your personal problems?
7. In the last month, how often have you felt that things were going your way?
8. In the last month, how often have you found that you could not cope with all the things that you had to do?
9. In the last month, how often have you been able to control irritations in your life?
10. In the last month, how often have you felt that you were on top of things?
11. In the last month, how often have you been angered because of things that happened that were outside of your control?
12. In the last month, how often have you found yourself thinking about things that you have to accomplish?
13. In the last month, how often have you been able to control the way you spend your time?
14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

NOTE: Items 4, 5, 6, 7, 9, 10, and 13 are scored in the reverse direction.

Notes

1. The PSS scale is reprinted with permission of the American Sociological Association, from Cohen, S., Kamarck, T., and Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24,* 386-396.

2. One could argue that stress itself is a symptom of distress, hence, even if a particular dimension is not tapped in both scales, it should be.

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