

Who's Stressed? Distributions of Psychological Stress in the United States in Probability Samples from 1983, 2006, and 2009¹

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Psychological stress was assessed in 3 national surveys administered in 1983, 2006, and 2009. In all 3 surveys, stress was higher among women than men; and increased with decreasing age, education, and income. Unemployed persons reported high levels of stress, while the retired reported low levels. All associations were independent of one another and of race/ethnicity. Although minorities generally reported more stress than Whites, these differences lost significance when adjusted for the other demographics. Stress increased little in response to the 2008–2009 economic downturn, except among middle-aged, college-educated White men with full-time employment. These data suggest greater stress-related health risks among women, younger adults, those of lower socioeconomic status, and men potentially subject to substantial losses of income and wealth.

Potentially stressful life events are thought to increase risk for disease when one perceives that the demands these events impose tax or exceed a person's adaptive capacity (Lazarus & Folkman, 1984). In turn, the perception of stress may influence the pathogenesis of physical disease by causing negative affective states. Stress is thought to influence a wide range of physiological processes and

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disease states, with existing evidence supporting stress as a risk factor in depression (Hammen, 2005; Kessler, 1997; Mazure, 1998; Monroe & Simons, 1991), cardiovascular disease (Krantz & McCeney, 2002; Rozanski, Blumenthal, & Kaplan, 1999), HIV/AIDS (Cole & Kemeny, 2001; Pereira & Penedo, 2005), delayed wound healing (Kiecolt-Glaser et al., 2005), upper respiratory infections (Miller & Cohen, 2005), autoimmune diseases (Heijnen & Kavelaars, 2005), and total mortality (Neilsen, Kristensen, Schnohr, & Gronbaek, 2008).

Up to now, comparing stress levels in our society in different years or decades has been impeded by the lack of studies of stress in probability samples of the United States, particularly studies that use valid and comparable measures. In this article, we take advantage of data that were collected using a validated measure of psychological stress that was incorporated into three national surveys that were conducted on three separate occasions over the course of 26 years. The surveys were conducted by professional polling organizations for their own purposes. The first was a telephone survey con-

Method

Design and Sample

Harris Panel Study. Respondents were 960 male and 1,427 female residents of the United States, 18 years of age and older (M age = 42.8 years, $SD = 17.2$), who completed a telephone interview conducted by Louis Harris and Associates, Inc., in 1983. Based on U.S. Bureau of Census information, a national area probability sample was developed from the distribution of the adult, non-institutionalized population of the United States. With counties as primary sampling units, a random-digit dialing procedure was used to select telephone numbers to be called within each sampling unit. The interviewer asked to speak to the person in the household who was both 18 years of age or over, and whose birthday had been most recent. The 2,387 persons meeting the criteria for inclusion in the analyses represented 69.6% of the 3,430 individuals with whom telephone contact was made (926 refused to be interviewed, and 117 terminated the interview prior to completion).

National Survey. The 2006 and 2009 surveys each consisted of 2,000 adults 18 years of age or older (2006: M age = 46.8 years, $SD = 14.7$; 2009: M age = 44.6 years, $SD = 15.5$) in the contiguous United States. The surveys were conducted in November 2006 and April 2009, respectively. Each sample consisted of individuals selected from the online segment of Synovate's Consumer Opinion Panel (SCOP), a national panel of households. Each sample was balanced to be representative of the general population based on region, sex, age, and household income data from the 2000 U.S. Census.

Members of the samples received a customized e-mail inviting them to participate in a specific survey. Panelists were given up to 3 days to complete the online survey by connecting to a link contained in the e-mail invitation. If

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for the PSS-10 were .78 in the Harris Poll sample, and .91 in both the 2006 and 2009 eNation samples.

Results

A , *A* *B* *A* *S* *A* *D* / : , *C* *f* *A* ,

We began by assessing the relation between each of the six individual demographic variables and psychological stress in each survey. We used multiple linear regressions when examining continuous variables (age, education, and income), and ANCOVAs when examining categorical variables (sex, race/ethnicity, and employment status). We also conducted a single linear regression for each survey where we entered all six of the demographic variables simultaneously (categorical variables were dummy-coded). This analysis provides the association of each demographic variable with perceived stress, independent of all the remaining demographics. Table 1 presents the observed means and standard deviations for each level of each demographic (continuous variables were categorized here for presentation). Table 2 presents statistics for both the individual (unadjusted) analyses and the analyses adjusted for the remaining five demographics.

As is apparent from Tables 1 and 2, the distributions of stress remained virtually identical across the three surveys (26 years). In all cases, women reported greater stress than did men; stress decreased with increasing age, education, and income; and minorities tended to report more stress than did Whites. The unemployed reported more stress than did the employed in 1983 and 2006, but not in 2009; and the retired reported the lowest level of stress across employment categories in all three surveys. Controlling for the remaining demographic variables had little effect on the results, except in the case of race/ethnicity, where the differences between Whites and minorities no longer approached significance when the controls were added to the equation (see adjusted statistics in Table 3). We also reran the race/ethnicity analyses from all three samples, controlling only for education, income, and employment status. As in the analyses containing all of the covariates, the association between race/ethnicity and stress no longer approached significance.

Table 2

	1983		2006		2009				
	F	F	F	F	F	F			
Sex									
Unadjusted	35.73	1,2268	<.001	22.35	1,1998	<.001	3.49	1,1998	<.07
Adjusted	25.42	1,2037	<.001	10.19	1,1930	<.001	7.11	1,1945	<.01
Race/ethnicity									
Unadjusted	5.88	3,2244	<.001	2.40	3,1960	<.07	2.14	3,1964	<.10
Adjusted	0.30	3,2037	<.83	0.28	3,1930	<.84	0.74	3,1945	<.53
Employment									
Unadjusted	25.23	3,1876	<.001	35.78	3,1688	<.001	22.50	3,1669	<.001
Adjusted	7.79	3,1720	<.001	7.78	3,1651	<.001	4.40	3,1638	<.01

N/A. PSS = Perceived Stress Scale (Cohen et al., 1983; Cohen & Williamson, 1988). Employment comparison limited to persons with the following employment statuses: employed full-time; employed part-time; unemployed; and retired.

Table 3

Covariate	1983			2006			2009					
	B	SE	β	B	SE	β	B	SE	β			
Age												
Unadjusted	-0.05	.01	-.13	<.001	-0.15	.01	-.29	<.001	-0.10	.01	-.21	<.001
Adjusted	-0.04	.01	-.11	<.001	-0.12	.01	-.23	<.001	-0.06	.01	-.13	<.001
Education												
Unadjusted	-0.64	.12	-.11	<.001	-1.17	.17	-.15	<.001	-0.81	.17	-.11	<.001
Adjusted	-0.27	.13	-.05	<.04	-0.71	.18	-.09	<.001	-0.45	.18	-.06	<.02
Income												
Unadjusted	-2.53E ⁻⁵	.00	-.17	<.001	-3.44E ⁻⁵	.00	-.14	<.001	-2.84E ⁻⁵	.00	-.14	<.001
Adjusted	-1.87E ⁻⁵	.00	-.12	<.001	-1.17E ⁻⁵	.00	-.05	<.05	-2.44E ⁻⁵	.00	-.12	<.001

N = 1,000. PSS = Perceived Stress Scale (Cohen et al., 1983; Cohen & Williamson, 1988). E⁻⁵ = × 10⁻⁵.

surveys, stress levels increased in Whites, $F(1, 3394) = 5.73, < .02$; men, $F(1, 1883) = 5.63, < .02$; those aged 45 to 54 years, $F(1, 933) = 19.89, < .001$; those aged 55 to 64 years, $F(1, 693) = 6.96, < .01$; those with 4-year college degrees, $F(1, 860) = 3.30, < .06$; those with advanced degrees, $F(1, 402) = 3.77, < .07$; and those with full-time employment, $F(1, 2106) = 10.44, < .001$. Analyses that collapsed across education levels (those with 4-year degrees and those with advanced degrees) and age (45–54-year-olds and 55–64-year-olds) indicate that stress increased between 2006 and 2009 for those with at least 4 years of college, $F(1, 1251) = 7.05, < .01$; and for those aged 45 to 64 years, $F(1, 1618) = 22.01, < .001$. By comparison, stress levels decreased between 2006 and 2009 among the unemployed, $F(1, 262) = 9.70, < .01$.

One inference that might be drawn from the preceding data is that the stress levels of individuals at the intersection of groups whose stress rose between 2006 and 2009 (i.e., men, Whites, 45–64-year-olds, college graduates, and those with full-time employment) would show the largest increase in stress during the period of the economic downturn. We explored this

events as having a more negative impact than do men (see review by Davis, Matthews, & Twamley, 1999). Second, psychological stress increased in a graded fashion with decreasing education and income. This is consistent with evidence for both the rise in stressful events and the decline in coping resources associated with decreasing socioeconomic status (Adler et al., 1994).

It is also consistent with evidence that increasing socioeconomic status (SES) is associated with decreasing risk for both morbidity and premature mortality (Adler et al., 1994). In the 1983 and 2006 surveys, the employed reported less stress than did the unemployed, although this was not true in 2009 during the economic downturn. Unemployment, though generally associated with significant psychological stress, may lose some of its potency as a personal stressor when experienced in the context of an elevated national unemployment rate (approaching 10% at the time of the 2009 survey). A major component of the stress associated with job loss is a loss of self-esteem and social status. Both of these threats to the self may be attenuated when job loss can be attributed to an external cause, such as the economy, rather than to individual failure. Also, many of the unemployed in the 2009 survey may have recently lost their jobs as a result of the economic downturn, as opposed to earlier surveys probably tapping many people who had been unemployed for some time.

Interestingly, across all three surveys, retirees reported less stress than did individuals in any other employment category. These data are consistent with a review that argued that the presumed negative impact of retirement in relation to both relationships and health is largely unsubstantiated (Eckerdt & Sergeant, 2006). Finally, all three surveys showed psychological stress to decrease in a graded fashion with increasing age. The comparatively lower psychological stress among the oldest group may be partly or wholly attributable to those reporting greater stress having shorter life spans (e.g., Neilsen et al., 2008). However, this would not account for the graded relation of stress and age throughout the entire adult life course that we found in each of the surveys. A possible explanation for the lower reports of stress with increasing age is that as we grow older, we both interpret events as less stressful and develop better coping strategies. This interpretation is consistent with recent evidence that as people age, they focus less on negative emotions and savor positive aspects of life (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Lockenhoof, Costa, & Lane, 2008; Mroczek, 2001).

Although mean differences indicated the possibility that minorities experienced more stress than did Whites, these differences did not approach significance once controls were included for the other demographic variables, particularly education, income, and employment status. These data suggest

that the race differences that did exist before adjustment were likely attributable to minorities being of lower SES, rather than to personal experiences of racial/ethnic discrimination.

Finally, was there an increase in stress associated with the recent (2008–2009) economic downturn? We found that significant increases in stress occurred among Whites, men, 45–64-year-olds, those with full-time employment, and those with college educations. These associations were driven primarily by a substantial increase in psychological stress by those at the intersection of these demographic groups: White, college-educated, employed men between the ages of 45 and 64 years. This may be attributable to the threat of job loss, actual job loss, or loss of retirement funds in a group with limited time remaining in their work careers to recover.

This interpretation is supported by results from a 2009 Gallup poll (Price, 2009) that was conducted for the American Psychological Association and inquired about Americans' sources of stress. Specifically, among 45–54-year-olds, men reported increases in money- and work-related stress, while women reported decreases in these same areas. Health implications of increased stress in this group are suggested by recent evidence that displaced workers with larger losses in earnings suffer greater increases in mortality (Sullivan & Wachter, 2009). In contrast to the substantial increase in reports of stress in this group is the apparent resilience of other demographic groups in response to the economic downturn. This may, to some extent, be because events that are shared by others in the larger community are appraised as less stressful than events experienced only by an individual.

Overall, these data help identify populations who are most likely to experience the highest levels of stress and associated disease risk. This would include persons of lower SES and women. In contrast, the results also suggest that as we age, our experience of stress is attenuated, with the youngest adults actually experiencing the greatest level of stress. Similarly, the data on the economic downturn suggest that the greatest sensitivity to this problem may occur in relatively well-off middle-aged men, a group that generally reports relatively low levels of stress in their lives.

These data are correlational, and causal inference is not possible. However, many of the reverse causation explanations (e.g., stress causing sex or age group membership) are implausible, and the major demographic third-factor explanations are controlled for in the analyses. Also, although it seems likely that differences between 2006 and 2009 were attributable to changes in the economy, it is possible that some other cultural changes during this period drove the changes in stress levels that we found.

It would have been quite interesting to examine changes in stress that occurred between 1983 and the polls that were conducted 23 and 25 years

later. In fact, there were small increases in almost every demographic category (see Table 1). However, the 1983 poll was based on telephone interviews, while the later ones were based on Internet questionnaires. Consequently, it was impossible to determine whether these increases were attributable to change over the time period or to mode of data collection.

References

- Adler, N. E., Boyce, T., Chesney, M. A., Cohen, S., Folkman, S., Kahn, R. L., et al. (1994). Socioeconomic status and health: The challenge of the gradient. *American Psychologist*, *49*, 15–24.
- Burns, V. E., Drayson, M., Ring, C., & Carroll, D. (2002). Psychological stress and psychological well-being are associated with antibody status after meningitis C conjugate vaccination. *Psychological Medicine*, *64*, 963–970.
- Carstensen, L. L., Pasupathi, M., Mayr, U., & Nesselrode, J. R. (2000). Emotional experience in everyday life across the adult life span. *Journal of Personality and Social Psychology*, *79*, 644–655.
- Cobb, J. M. T., & Stepotoe, A. (1996). Psychosocial stress and susceptibility to upper respiratory tract illness in an adult population sample. *Psychological Medicine*, *58*, 404–412.
- Cohen, S., Doyle, W. J., & Skoner, D. P. (1999). Psychological stress, cytokine production, and severity of upper respiratory illness. *Psychological Medicine*, *61*, 175–180.
- Cohen, S., Janicki-Deverts, D., & Miller, G. E. (2007). Psychological stress and disease. *Journal of Personality and Social Psychology*, *298*, 1685–1687.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of psychological stress. *Journal of Personality and Social Psychology*, *24*, 385–396.
- Cohen, S., Tyrrell, D. A. J., & Smith, A. P. (1993). Negative life events, psychological stress, negative affect, and susceptibility to the common cold. *Journal of Personality and Social Psychology*, *64*, 131–140.
- Cohen, S., & Williamson, G. (1988). Psychological stress in a probability sample of the United States. In S. Spacapan & S. Oskamp (Eds.), *Psychological stress: Current theory and future applications* (pp. 31–67). Newbury Park, CA: Sage.
- Cole, S. W., & Kemeny, M. E. (2001). Psychosocial influences on the progression of HIV infection. In R. Ader, D. L. Felten, & N. Cohen (Eds.), *Psychosomatic medicine* (Vol. 2, 3rd ed., pp. 583–612). San Diego, CA: Academic Press.

- Culhane, J. F., Rauh, V., McCollum, K. F., Hogan, V. K., Agnew, K., & Wadhwa, P. D. (2001). Maternal stress is associated with bacterial vaginosis in human pregnancy. *Maternal & Child Health Journal*, 5, 127-134.
- Davis, M. C., Matthews, K. A., & Twamley, E. W. (1999). Is life more difficult on Mars or Venus? A metaanalytic review of sex differences in major and minor life events.

- Glass, G., & S. B. P. (1999). *Social stress and health*. *Journal of Health and Social Behavior*, 63, 92-99.
- Maes, M., Van Bockstaele, D. R., Gastel, A., Song, C., Schotte, C., Neels, H., et al. (1999). The effects of psychological stress on leukocyte subset distribution in humans: Evidence of immune activation. *Neuroimmunology*, 39, 1-9.
- Mazure, C. M. (1998). Life stressors as risk factors in depression. *Current Directions in Psychological Science*, 5, 291-313.
- McEwen, B. (2002). *Stress: The science of stress*. Washington, DC: Joseph Henry.
- Miller, G. E., & Cohen, S. (2005). Infectious disease and psychoneuroimmunology. In K. Vedhara & M. Irwin (Eds.), *Psychoneuroimmunology: The science of stress* (pp. 219-242). New York: Oxford University Press.
- Monroe, S. M., & Simons, A. D. (1991). Diathesis-stress theories in the context of life stress research: Implications for depressive disorders. *Psychological Bulletin*, 110, 406-425.
- Mroczek, D. K. (2001). Age and emotion in adulthood. *Current Directions in Psychological Science*, 10, 87-90.
- Neilsen, N. R., Kristensen, T. S., Schnohr, P., & Gronbaek, M. (2008). Psychological stress and cause-specific mortality among men and women: Results from a prospective cohort study. *Journal of Epidemiology and Community Health*, 168, 481-491.
- Pennebaker, J. W. (1982). *The heart and the mind*. New York: Springer-Verlag.
- Pereira, D. B., & Penedo, F. J. (2005). Psychoneuroimmunology and chronic viral infection: HIV infection. In K. Vedhara & M. Irwin (Eds.), *Psychoneuroimmunology: The science of stress* (pp. 165-194). Oxford, UK: Oxford University Press.
- Price, M. (2009). The recession is stressing men more than women. *Medical Care*, 40, 10.
- Pruessner, J. C., Hellhammer, D. H., & Kirschbaum, C. (1999). Burnout, psychological stress, and cortisol responses to awakening. *Psychosomatic Medicine*, 61, 197-204.
- Rozanski, A., Blumenthal, J. A., & Kaplan, J. (1999). Impact of psychological factors on the pathogenesis of cardiovascular disease and implications for therapy. *Circulation*, 99, 2192-2217.
- Ruiz, R. J., Fullerton, J., Brown, C. E., & Schoolfield, J. (2001). Relationships of cortisol, psychological stress, genitourinary infections, and fetal fibronectin to gestational age at birth. *Birth*, 3, 39-48.
- Stone, A. A., Mezzacappa, E. S., Donatone, B. A., & Gonder, M. (1999). Psychosocial stress and social support are associated with prostate-

- specific antigen levels in men: Results from a community screening program. *Health Psychology*, 18, 482-486.
- Sullivan, D., & Wachter, T. V. (2009). Job displacement and mortality: An analysis using administrative data. *Quality & Quantity*, 43, 1265-1306.
- van Eck, M. M., & Nicolson, N. A. (1994). Psychological stress and salivary cortisol in daily life. *Applied Psychology*, 43, 221-227.