

# International Journal of Offender Therapy and Comparative Criminology

<http://ijo.sagepub.com/>

---

## **Baseline Subjective Stress Predicts 1-Year Outcomes Among Drug Court Clients**

Thomas F. Garrity, Sallie H. Prewitt, Michelle Joosen, Michele Staton Tindall, J.  
Matthew Webster and Carl G. Leukefeld

*Int J Offender Ther Comp Criminol* 2008 52: 346 originally published online 7 August  
2007

DOI: 10.1177/0306624X07305479

The online version of this article can be found at:  
<http://ijo.sagepub.com/content/52/3/346>

---

Published by:



<http://www.sagepublications.com>

**Additional services and information for *International Journal of Offender Therapy and Comparative  
Criminology* can be found at:**

**Email Alerts:** <http://ijo.sagepub.com/cgi/alerts>

**Subscriptions:** <http://ijo.sagepub.com/subscriptions>

**Reprints:** <http://www.sagepub.com/journalsReprints.nav>

**Permissions:** <http://www.sagepub.com/journalsPermissions.nav>

**Citations:** <http://ijo.sagepub.com/content/52/3/346.refs.html>

>> Version of Record - May 6, 2008

OnlineFirst Version of Record - Aug 7, 2007

What is This?

# Baseline Subjective Stress Predicts 1-Year Outcomes Among Drug Court Clients

Thomas F. Garrity

*University of Kentucky, Lexington*

Sallie H. Prewitt

*Drug Court Case Specialist, Winchester and Richmond, Kentucky*

Michelle Joosen

*Erasmus University, Rotterdam, Netherlands*

Michele Staton Tindall

*University of Kentucky Center on Drug and Alcohol Research, Lexington*

J. Matthew Webster

Carl G. Leukefeld

*University of Kentucky, Lexington*

Psychological stress has long been known to predict negative changes in physical and behavioral health in the general population. The same relationships have been found in research on drug abusers. In this longitudinal study, 477 clients of two Kentucky drug courts were followed for 1 year to examine the relationship between subjective stress at intake and outcomes 1 year after the baseline of this 18-month drug court program. Greater baseline subjective stress was significantly associated with poorer employment, substance use, criminal justice, and health outcomes at 1-year follow-up, even after adjusting for selected demographic characteristics and baseline levels of the outcomes of interest. If these results are replicated in these and other drug courts, then a stress reduction treatment trial within the drug court context should be attempted and evaluated.

**Keywords:** *drug courts; drug abstinence; psychological stress; criminality; health status*

**D**rug courts have, by most standards, proven to be a successful criminal justice policy innovation. Beginning in 1989, drug courts have offered an alternative

**Authors' Note:** This research was supported by Grant No. R01-DA13076, from the National Institute on Drug Abuse, Carl G. Leukefeld, principal investigator, and Grant No. T32-DA007304, Thomas F. Garrity, program director. The authors wish to acknowledge the contributions of the following individuals in data collection and project management: Leslie Cena, Sherri Ballinger, Rance Lewis, Abby Cosentino, Allison Mateyoke-Scrivner, and Holly Hopper. T. K. Logan contributed to project planning and development. Please address correspondence to Thomas F. Garrity, PhD, Department of Behavioral Science, College of Medicine, University of Kentucky, Lexington, KY 40536-0086; e-mail: [tgarrit@uky.edu](mailto:tgarrit@uky.edu).

mode of criminal justice processing for offenders whose crimes stem from their drug abuse (Belenko, 2002; Logan, Williams, Leukefeld, & Minton, 2000). These courts typically require a 1- to 2-year program consisting of individual help and group sessions, which may address not only the substance abuse problem but also health, housing, employment, education, financial, family, and other areas as well (National Association of Drug Court Professionals, 1997). Offenders who successfully complete these activities may have their guilty pleas set aside, charges expunged from their records, and the judge may conditionally discharge the remainder of clients' probationary time, depending on their situations before entering drug court.

Evaluative studies have shown that for society and many offenders, the drug court program has yielded important benefits. For instance, the review of Sanford and Arrigo (2005) concluded that there is consistent evidence that involvement in drug courts is associated with lesser probability of repeating drug-related criminal offenses, likelihood of rearrest, and resumption of drug abuse. These general conclusions are consistent with the meta-analytic results of Roman and colleagues (2003) on recidivism rates among drug court graduates reported in nationwide evaluations.

Despite these encouraging results, there is clearly room for program improvement. Program evaluations from several cities suggest that benefits are not universal (Goldkamp, White, & Robinson, 2001; Granfield, Eby, & Brewster, 1998; Listwan, Sundt, Holsinger, & Latessa, 2003). Attrition from the drug court program remains a problem, and judicial sanctions for violations of program requirements are common rather than exceptional (National Institute of Justice, 1998). Relapse to drug abuse and criminal activity during and after drug court are continuing problems for many clients.

The research literature on psychological stress and substance abuse may offer one possible approach to understanding and remedying persisting shortfalls in the accomplishments of drug court. Psychological stress has long been found in animal and human research to relate to initiation, intensification, and relapse to addictive drug use (Jacobsen, Southwick, & Kosten, 2001; McMahon, 2001; Shaham, Erb, & Stewart, 2000). Although these stress-related findings are generally known by researchers and clinicians in the drug abuse area, stress management has not been a prominent part of drug court programs. If, indeed, stress is as robustly predictive of some drug court outcomes as suggested by decades of research on stress and substance abuse, then consideration should be given to including a stress reduction component within drug court programs.

This report examines some preliminary data on the relationship between personal stress and several important drug court outcomes. The transactional model of stress and coping (Glanz, Rimer, & Lewis, 2002; Lazarus, 1966; Lazarus & Folkman, 1984) provides the conceptual underpinning for this research. The model posits a key role for "primary appraisal" whereby the individual assesses the potentially stressful event according to its threat valence; as such, the judgment or appraisal is influenced by characteristics of the appraising person (such as personal sensitivities and past experience with related events) and by characteristics of the event (such

as imminence and strength). If the appraisal presumes that a threat exists, psychophysiological arousal ensues, and attempts at effective coping responses may follow to lessen or eliminate the threat.

*Stress* in the present study refers to the subjective appraisal of the event as a challenge or threat to the person's values or goals. The personal discomfort of subjective stress indicates that the individual feels the need to expend effort to deal with the presenting challenges. This conceptualization appears most appropriate to the situation of newly inducted drug court clients, who are being presented with a variety of difficult demands for adaptation. These include recent arrest and conviction for crimes related to substance abuse, as well as the public humiliation this may entail; furthermore, these persons are threatened with prison time and the necessity of withdrawing from their substances of abuse, notwithstanding the loss of their social circles that supported the dependence. In addition to these acute challenges linked to their recent legal entanglements, many such individuals carry long-term burdens of stress related to low income, underemployment, and personal and family disruptions (Brady & Sinha, 2005).

If, indeed, primary appraisal of stress places persons at high risk for various negative drug abuse-related outcomes, then drug court clients may be at risk for failure in the drug court program. This conjecture leads to the research question that guided this study: Do drug court clients who enter the program at higher levels of subjective stress experience less desirable outcomes 1 year later than do their lower-stress counterparts?

## Method

### Participants

In sum, 525 clients entered the drug court programs of Fayette County and Warren County, Kentucky. These persons were eligible for drug court assignment and participation in this research if they admitted to having drug problems and if they had committed nonviolent crimes that involved personal drug abuse, drug commerce, or other crimes related in some way to involvement in illicit drugs. Research participants consented in writing to provide a variety of information about their drug use, lifestyle, and health. Of the 525 eligible drug court participants, 500 were interviewed; 7 refused participation; and 18 were terminated from drug court participation by the judges within 30 days of program entry and before the scheduled baseline interview date. At the 12-month follow-up, 19 participants could not be reached for interview and 4 were deceased—a 96.2% successful follow-up of living participants. Hence, the current study sample amounted to 477 drug court clients who were followed for 1 year after their intake into these drug courts. Table 1 presents selected demographic characteristics of the study sample.

**Table 1**  
**Prevalence or Means and Standard Deviations of**  
**Demographic Characteristics**

Demographic	No. / <i>M (SD)</i>
Gender	
Male	309
Female	168
Age (years)	30.58 (8.74)
Education (years)	11.77 (1.98)
Race/ethnicity	
Non-White	183
White	294
Marital status <sup>a</sup>	
Unmarried	391
Married	84
Site (county)	
Fayette	240
Warren	237

Note: Total sample size is 477, but sample sizes for some analyses totaled fewer cases because of missing data.

a.  $n = 475$ .

## Procedures

Data were derived from the baseline and 12-month follow-up interviews of a multiwave intervention trial addressing enhancement of employment status of clients (Leukefeld et al., 2003). The drug court intervention program was designed to last for 18 months. Baseline data were collected between March 2000 and November 2002 in face-to-face interviews as soon as possible after first involvement in the drug courts. The baseline and 12-month follow-up interviews were conducted by trained and experienced interviewers at times convenient for the clients and in private settings within the drug court office or a local field office; interviewers gathered current and recent self-report information on subjective stress, employment, health, drug use, criminal behavior and criminal justice involvement, and demographic characteristics.

Research participants were recruited with permission of the judges in charge of the drug courts in Fayette and Warren counties, Kentucky. Fayette is a metropolitan county of more than 260,000, with the county seat in Lexington; Warren is a non-metropolitan county of more than 86,000 people, and the county seat is in Bowling Green. Each drug court contributed 250 participants to the initial study sample. Participants were volunteers who gave informed consent after thorough review of the nature and expectations of study involvement, according to the requirements of sponsoring university's institutional review group.

## Measures

To examine the associations between baseline subjective stress and selected drug court outcomes at 1-year follow-up, a baseline measure of stress, as well as baseline and follow-up measures of the outcomes, was needed. In addition, demographic characteristics of the participants were collected for use in analyses. Outcome measures were derived from or modeled on Addiction Severity Index measurement approaches (McLellan et al., 1992).

*Demographic characteristics.* Age and education level were measured in years as continuous variables. Other demographic variables were measured as categorical variables, including marital status (unmarried, married), gender (male, female), race (non-White, White), and site (Fayette and Warren counties).

*Outcome variables.* Recent and longer-term occupational status were measured with participant self-report of number of days in the 30-day and 1-year periods before follow-up, on which a legitimate job was held; data on the corresponding periods at baseline were also assessed for these and other outcome measures and were used in data analysis. Income from legitimate employment was measured by categories of dollar amounts ranging from zero to \$80,000 and above in the 1-year period before follow-up; a similar categorical approach was used to measure legitimate income in the month before follow-up, with categories ranging from under \$50 to \$4,000 and over. Because the distributions of these variables and those described below were bimodal or skewed, they were transformed with the square root function before analysis to minimize the effects of nonnormality.

Drug and alcohol use were measured at follow-up by self-reports of days of illicit drug use and alcohol use in the previous 30 days and year.

Criminal justice involvement variables were also measured at follow-up. First, numbers of days incarcerated in the previous 30 days and year were gathered by self-report at follow-up. Second, the number of types of criminal offenses in the previous year was queried; respondents were presented with a list of 12 types of crimes (e.g., damaged or destroyed property, stole something worth \$50 or less, sold drugs, had sexual relations with someone against their will) and were asked to identify the types of crime they committed during the previous year; this accounting yielded the number of different types of criminal acts committed. This variable was available for only the 1-year period.

Medical and emotional health problems were measured at follow-up by the number of days in the previous 30 days on which medical problems and emotional problems were experienced. The same data were gathered regarding the year before follow-up.

*Subjective stress.* The principal predictor of interest was subjective stress. As described above in the introductory description of the transactional model of stress

and coping, the individual appraises the presenting challenges and makes a subjective judgment regarding the level of threat, or the subjective stress involved. The Perceived Stress Scale (PSS) was selected as the measure of this variable (Cohen, Kamarck, & Mermelstein, 1983; Cohen & Williamson, 1988). The PSS was described by its authors as being "designed to measure the degree to which the respondents felt their lives were unpredictable, uncontrollable, and overwhelming" (Cohen, Tyrrell, & Smith, 1991, p. 607). The instrument consists of 14 statements that can be responded to on a 5-point scale ranging from *never* to *very often*; all statements refer to stress appraisals made in the past month. A representative question is "In the last month, how often have you been upset because of something that happened unexpectedly?" A list of the 14 items of the original PSS may be found elsewhere (Cohen et al., 1983). The coefficient alpha reliability of the PSS in the present study was .79. Cohen and colleagues (1983) reported evidence for acceptable internal consistency, test-retest reliability, and the concurrent and predictive validity of the PSS in two college student samples and a community sample. The distribution of the PSS in the present study is a close approximation of normal, with a mean of 27.73, a standard deviation of 8.03, and a range from 0 to 55. The PSS was measured at baseline data collection only. To our knowledge, the construct of subjective stress as measured by PSS has not been previously employed in drug abuse or criminology research.

Again, in relation to the transactional model of stress and coping, it should be noted that this study examines only the associations between primary stress appraisal and several downstream measures of outcome. Other elements of the model, such as psychophysiological arousal secondary to subjective stress and attempts at coping to diminish the perceived stress, are not being considered in this report. However, in an earlier report, associations between subjective stress (PSS) and several measures of coping behavior have been examined and reported (Garrity et al., 2006).

### Data Analysis

Analyses of covariance were performed for all outcomes of interest as the dependent variables. The independent variable for all analyses was subjective stress trichotomized into groups as close to equal size as possible. Covariates included the six demographic variables and baseline value of the outcome variable of interest in each analysis. Unadjusted group means from each analysis are presented with the corresponding *p* values derived from the Type III sum-of-squares analyses. This information provides indications of statistical significance of the associations of subjective stress with each outcome after adjustment for the potentially confounding influence of demographics and baseline value of the corresponding outcome variable. These analyses were compared with parallel multiple regression analyses with PSS treated as a continuous, rather than a categorical, variable; all covariates and the dependent variables were the same as those in the covariance analyses. The multiple regression results and overall conclusions were substantially the same as those from covariance analyses. Only the latter are described in the text of this report and presented in tables.

**Table 2**  
**Analysis of Covariance Among Stress Groups on Outcome Variables**

Outcome Variable	Low Stress		Medium Stress		High Stress		<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Days of legitimate work in past year	224	123	213	120	174	119	.036
Days of legitimate work in past month	17	13	18	13	13	13	.050
Total legitimate income in past year <sup>a</sup>	6.3	3.2	4.8	2.8	4.4	2.7	.000
Total legitimate income in past month <sup>b</sup>	9.9	5.3	8.8	5.0	7.6	5.3	.018
Days of alcohol use in past year	12.7	42.7	25.1	64.0	31.5	65.7	.005
Days of alcohol use in past month	1.1	4.8	1.9	6.3	2.9	7.8	.041
Days of drug use in past year	21.9	63.3	28.8	64.9	45.8	86.5	.031
Days of drug use in past month	1.6	6.3	1.4	5.5	3.2	8.5	.070
Days incarcerated in past year	57.3	82.0	62.8	83.9	90.4	96.9	.002
Days incarcerated in past month	4.8	9.3	4.4	9.4	7.4	11.1	.006
Number of types of criminal acts in past year	0.41	1.0	0.89	1.7	1.16	1.8	.005
Days with a medical problem in past year	19.8	60.5	36.9	88.5	46.2	99.1	.070
Days with a medical problem in past month	2.2	6.9	4.6	9.5	6.2	11.1	.009
Days with an emotional problem in past year	23.8	68.8	56.4	110.3	87.9	130.0	.043
Days with an emotional problem in past month	1.7	6.3	4.5	9.7	9.3	12.9	.001

Note: Controlling for baseline levels of outcomes and demographic variables. Total sample is 477, but individual analyses total fewer cases due to missing data of one or more variables.

a. 0 = none; 1 = less than \$1,000; 2 = \$1,000-\$2,999; 3 = \$3,000-\$5,999; 4 = \$6,000-\$8,999; 5 = \$9,000-\$11,999; 6 = \$12,000-\$14,999; 7 = \$15,000-\$19,999 . . . 17 = \$80,000+.

b. 1 = less than \$100; 2 = \$100-\$199; 3 = \$200-\$299; 4 = \$300-\$399; 5 = \$400-\$499; 6 = \$500-\$599; 7 = \$600-\$699; 8 = \$700-\$799; 9 = \$800-\$899; 10 = \$900-\$999 . . . 16 = \$4000+.

## Results

Table 2 summarizes the results of the 15 covariance analyses in which groups based on low, medium, and high subjective stress were compared on each drug court outcome of interest. The *p* values were derived from covariance analyses of the relationships between subjective stress and each outcome after the influences of demographic and baseline levels of the outcome covariates were adjusted. Table 2 presents unadjusted stress group means to portray group differences more intuitively than the adjusted group means of the actual analyses would.

Among the employment-related outcomes, the high-stress group reported the least average days worked in the year between baseline and follow-up and in the month just before the 1-year follow-up. In both instances, the overall stress group differences were found statistically significant, even after adjustment for demographic and baseline levels of the corresponding outcomes. The finding that the work day differences among stress groups endured in the final month of the follow-up year suggests that the

influence of stress found during the whole-year follow-up may still be operative in the last month of the follow-up year as well as in the earlier portions of that year. And the continued statistical significance of the stress factor after adjustment for baseline values of the employment outcomes suggests that stress may still be operative independently of the continuity of employment pattern. The parallel findings relating to income were not surprising, given that income was likely to be associated with the number of days worked. The high-stress group reported the lowest levels of income in the previous year (\$6,000-\$8,999) as compared to the low-stress group (\$12,000-\$14,999). Similarly, the high-stress group reported the lowest income level in the month before the 1-year follow-up interview (\$600-\$699) as compared to the low-stress group (\$800-\$899).

Alcohol and drug use patterns during the year between baseline and 1-year follow-up demonstrate much the same results as were found among employment variables. The high-stress group reported, on average, less-desirable alcohol and drug use experiences than did the other stress groups—namely, greater number of days of usage in the year between baseline and 1-year follow-up. In regard to usage in the month before follow-up, only alcohol use revealed significant difference among stress groups, with high-stress respondents reporting the largest number of days of use. Stress groups did not differ significantly in terms of drug use in the month before follow-up. These results, as are true with all the covariance analyses, reflect stress–outcome relationships' net of influence of demographic characteristics and baseline levels of the respective outcome variables.

Drug court participants were commonly sanctioned by the presiding judges for failure to adhere to drug court requirements. Incarcerations of varying durations were the most common sanction. Hence, we were able to examine for variations in the number of days of incarceration experienced by drug court clients. The stress groups were found to differ significantly in the number of days in prison during drug court involvement. The high-stress group reported the greatest number of days incarcerated in both the year between baseline and follow-up and the month before follow-up interview. In the latter analysis, the medium-stress group reported slightly, but not significantly, fewer days in prison than did the low-stress group. The other criminal justice outcome involved the number of different types of offenses committed in the year between baseline and follow-up. Although that number was small, we nonetheless found that the stress groups differed significantly, with the high-stress group reporting the most types of offenses during the follow-up year. No 30-day measure of criminal activity was available for analysis.

The final outcomes that were examined included indicators of the extent of physical and emotional problems experienced during the year of follow-up. The stress groups differed significantly on the number of days with medical and emotional problems in the month before follow-up and on the number of days with emotional problems in the year before follow-up. In all instances, the high-stress group reported more days with problems. The stress groups, however, did not differ significantly on the number of days on which they experienced medical problems in the year before follow-up.

All but two covariance analyses indicated that there was a statistically significant difference among the stress groups. The high-stress group reported the least favorable outcomes in all analyses, and the low-stress group reported the most favorable outcome in all but three analyses. Though not presented here in tabular form, we found that the strongest predictor of drug court outcomes involved the baseline level of the corresponding 1-year follow-up outcome; baseline levels of outcomes were strongest in 11 of the 15 covariance analyses. The latter finding is not surprising, of course, and confirms the commonplace that the best predictor of future behavior is past behavior.

## Discussion

This report, though not the first to highlight the possible role of stress among drug court clients, is to our knowledge the first to follow such clients for a substantial period after baseline assessment of subjective stress to examine later criminal justice, drug use, employment, medical, and emotional health correlates of stress. The results support the idea that there is a relationship between subjective stress in clients at the beginning of drug court involvement and important outcomes a year later. The covariance analyses made it clear that the initial stress level continued to be significantly associated with outcomes, even after adjusting for the relatively powerful predictive ability of baseline levels of the respective outcomes and demographic factors.

The study design did not enable us to describe the stress–outcome relationship as a causal one, but a possibility of causal connections is not undermined by these results. Certainly, the findings of this study are consistent with common findings in the broader stress literature of the damaging influence of stressful life events and subjective psychophysiological stress on physical and behavioral health (Everson-Rose & Lewis, 2005; McEwen, 2004; Nater, Gaab, Rief, & Ehlert, 2006). Research on stress as a provocation to drug use initiation, intensification, and relapse conceptualizes the latter as types of “chemical coping” when other forms of coping behavior are appraised as being less effective or more effortful by those confronting stressful events. The psychobiology of these stress–drug use connections is a subject of ongoing research (Brady & Sinha, 2005; Pierce & Kumaresan, 2006; Stewart, 2003).

These results suggest at least three directions for further research on the role of subjective stress in the drug court setting. First, because of the preliminary nature of these results, replication is essential. The findings need to be shown to be repeatable in these and similar settings and in drug court settings of various different geographic, cultural, and demographic characteristics. Second, the 12-month follow-up of the present study did not permit examination of the relationship of subjective stress at baseline and final program status at the end of the 18-month drug court intervention. Given the consistent associations found between stress at baseline and various indicators of poorer program results at 12 months (e.g., occupational, criminal justice, health, and drug use outcomes), one would expect worse program retention,

completion, and graduation at 18 months and more client terminations. Though plausible, such an issue cannot be settled with the data at hand and thus deserves further study. Third, assuming the successful replication of these findings, interventions that would reduce subjective stress among drug court clients should be identified and tested for effectiveness and acceptability among clients and drug court administrative staff and judges.

Stress reduction treatments have taken a variety of forms. Prescribed medications are available for treatment of various stress-related psychological states; such agents, though often effective, might be considered inappropriate for persons with substance abuse issues because of the strong abuse liability of many of these psychotropic medications. Cognitive-behavioral approaches to stress management generally entail promotion of rational appraisals to understand the stressful stimuli as being less threatening or more susceptible to effective coping responses; such responses might take the form of psychoeducational programs or meditation exercises such as "mindfulness-based stress reduction" (Marcus et al., 2003; Witkiewitz, Marlatt, & Walker, 2005). Biobehavioral stress management is exemplified by biofeedback, deep breathing, and yoga exercises, as well as massage therapy and acupuncture (Astin, 2004; Moyer, Rounds, & Hannum, 2004; Walling, 2006; Wickramasekera, 1999). Interventions commonly combine several of these approaches in multimodal stress reduction programs. Hence, it would require considerable research effort to evaluate the effectiveness and acceptability of the various single and combined programs of stress reduction for use with drug court clients. This program of research might eventuate in the inclusion of some form of stress reduction intervention as one of the "key components" prescribed for drug courts nationally (National Association of Drug Court Professionals, 1997).

Finally, the results reported in this article must be read with the awareness that study respondents were drawn from only two drug court jurisdictions in Kentucky. Although both participating courts adhered to national key component standards for drug courts, the client sample of the present study was clearly not a nationally representative probability sample of drug court clients. A second caveat is the exclusive reliance on self-report for all variables studied; such data are subject to distortions of memory and purposive deception, although there have been reassuring research findings on these matters (Darke, 1998; Harrison, 1997).

In summary, 477 clients of two Kentucky drug courts were followed for 1 year, from their intake into this therapeutic diversion program. These data provide support for the relationship between baseline subjective stress and follow-up performance on employment, drug use, criminal behavior, and health. The significant associations held even after adjustment for baseline levels of the respective outcomes and five demographic characteristics. These results suggest the need for further study of the robustness of these results and, if found reliable, randomized intervention trials of appropriate stress reduction methods in the drug court context.

## References

- Astin, J. A. (2004). Mind-body therapies for the management of pain. *Clinical Journal of Pain, 20*(1), 27-32.
- Belenko, S. (2002). The challenges of conducting research in drug treatment court settings. *Substance Use and Misuse, 37*(12-13), 1635-1664.
- Brady, K. T., & Sinha, R. (2005). Co-occurring mental and substance use disorders: The neurobiological effects of chronic stress. *American Journal of Psychiatry, 162*(8), 1483-1493.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385-396.
- Cohen, S., Tyrrell, D. A., & Smith, A. P. (1991). Psychological stress and susceptibility to the common cold. *New England Journal of Medicine, 325*(9), 606-612.
- Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan & S. Oskamp (Eds.), *The social psychology of health* (pp. 31-67). Newbury Park, CA: Sage.
- Darke, S. (1998). Self-report among injecting drug users: A review. *Drug and Alcohol Dependence, 51*(3), 253-263.
- Everson-Rose, S. A., & Lewis, T. T. (2005). Psychosocial factors and cardiovascular disease. *Annual Review of Public Health, 26*, 469-500.
- Garrity, T. F., Prewitt, S. H., Joosen, M., Staton Tindall, J., Webster, J. M., Hiller, M. L., et al. (2006). Correlates of subjective stress among drug court clients. *International Journal of Offender Therapy and Comparative Criminology, 50*(3), 269-279.
- Glanz, K., Rimer, B. K., & Lewis, F. M. (2002). *Health behavior and health education: Theory, research, and practice*. New York: John Wiley.
- Goldkamp, J. S., White, M. D., & Robinson, J. B. (2001). Do drug courts work? Getting inside the drug court black box. *Journal of Drug Issues, 31*(1), 27-72.
- Granfield, R., Eby, C., & Brewster, T. (1998). An examination of the Denver drug court: The impact of a treatment-oriented drug offender system. *Law & Policy, 20*(2), 183-202.
- Harrison, L. (1997). The validity of self-reported drug use in survey research: An overview and critique of research methods. In L. Harrison & A. Hughes (Eds.), *The validity of self-reported drug use: Improving the accuracy of survey estimates* (NIDA Research Monograph No. 167, pp. 17-36). Rockville, MD: National Institutes of Health.
- Jacobsen, L. K., Southwick, S. M., & Kosten, T. R. (2001). Substance use disorders in patients with post-traumatic stress disorder: A review of the literature. *American Journal of Psychiatry, 158*(8), 1184-1190.
- Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York: McGraw-Hill.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Leukefeld, C., McDonald, H. S., Staton, M., Mateyoke-Scrivner, A., Webster, M., Logan, T. K., et al. (2003). An employment intervention for drug-abusing offenders. *Federal Probation, 67*(2), 27-31.
- Listwan, S. J., Sundt, J. L., Holsinger, A. M., & Latessa, E. J. (2003). The effects of drug court programming on recidivism: The Cincinnati experience. *Crime & Delinquency, 49*(3), 389-411.
- Logan, T. K., Williams, K., Leukefeld, C. G., & Minton, L. (2000). A drug court process evaluation: Methodology and findings. *International Journal of Offender Therapy and Comparative Criminology, 44*(3), 369-394.
- Marcus, M. T., Fine, M., Moeller, F. G., Kahn, M. M., Pitts, K., Swank, P. R., et al. (2003). Change in stress levels following mindfulness-based stress reduction in a therapeutic community. *Addictive Disorders & Their Treatment, 2*(3), 63-68.
- McEwen, B. S. (2004). Protection and damage from acute and chronic stress: Allostasis and allostatic overload and relevance to the pathophysiology of psychiatric disorders. *Annals of the New York Academy of Science, 1032*, 1-7.
- McLellan, A. T., Kushner, H., Metzger, D., Peters, R., Smith, J., Grissom, G., et al. (1992). The fifth edition of the Addiction Severity Index. *Journal of Substance Abuse Treatment, 9*(3), 199-213.
- McMahon, R. C. (2001). Personality, stress, and social support in cocaine relapse prediction. *Journal of Substance Abuse Treatment, 21*(2), 77-87.

- Moyer, C. A., Rounds, J., & Hannum, J. W. (2004). A meta-analysis of massage therapy research. *Psychological Bulletin, 130*(1), 3-18.
- Nater, U. M., Gaab, J., Rief, W., & Ehlert, U. (2006). Recent trends in behavioral medicine. *Current Opinion in Psychiatry, 19*(2), 180-183.
- National Association of Drug Court Professionals. (1997). *Defining drug courts: The key components*. Washington, DC: U.S. Department of Justice, Office of Justice Programs, Drug Courts Program Office.
- National Institute of Justice. (1998). *Drug courts and the role of graduated sanctions*. Washington, DC: U.S. Department of Justice, Office of Justice Programs.
- Pierce, R. C., & Kumaresan, V. (2006). The mesolimbic dopamine system: The final common pathway for the reinforcing effect of drugs of abuse? *Neuroscience and Biobehavioral Reviews, 30*(2), 215-238.
- Roman, J., Townsend, W., & Bhati, A. S. (2003). *Recidivism rates for drug court graduates: Nationally based estimates, final report* (Report No. 201229). Washington, DC: National Institute of Justice.
- Sanford, J. S., & Arrigo, B. A. (2005). Lifting the cover on drug court: Evaluation findings and policy concerns. *International Journal of Offender Therapy and Comparative Criminology, 49*(3), 239-259.
- Shaham, Y., Erb, S., & Stewart, J. (2000). Stress-induced relapse to heroin and cocaine seeking in rats: A review. *Brain Research Reviews, 33*(1), 13-33.
- Stewart, J. (2003). Stress and relapse to drug seeking: Studies in laboratory animals shed light on mechanisms and sources of long-term vulnerability. *American Journal on Addictions, 12*(1), 1-17.
- Walling, A. (2006). Therapeutic modulation of the psychoneuroimmune system by medical acupuncture creates enhanced feelings of well-being. *Journal of the American Academy of Nurse Practitioners, 18*(4), 135-143.
- Wickramasekera, I. (1999). How does biofeedback reduce clinical symptoms and do memories and beliefs have biological consequences? Toward a model of mind-body healing. *Applied Psychophysiology and Biofeedback, 24*(2), 91-105.
- Witkiewitz, K., Marlatt, G. A., & Walker, D. (2005). Mindfulness-based relapse prevention for alcohol and substance use disorders. *Journal of Cognitive Psychotherapy, 19*(3), 211-228.

