Multiple Dimensions of Affective and Cognitive Disturbance: Latent-Variable Models in a Community Sample

Lawrence M. Scheier and Michael D. Newcomb

A clear understanding and confirmation of the structure of psychological distress has been hampered by different theoretical perspectives, ranges of measures, and methodologies. This study examined the latent construct structure of psychological distress as reflected in 27 self-report measures of psychological functioning from a community sample of 614 young adults. Models that hypothesized a single dimension of distress or 2 first-order factors (positive and negative affect) poorly fit the data. A model that fit well contained 9 first-order latent constructs, including Emotional Distress, Self-Derogation, Purpose in Life, Psychoticism, Depression, Anxiety, Hostility, Suicide Ideation, and Disorganized Thinking. Second and third higher order models achieved greater parsimony but were statistically inferior to the 9-factor model. Models are contrasted and discussed in terms of prior theory and current conceptualizations of mental health.

Several methodological and conceptual challenges have surfaced regarding models of psychological distress in nonclinical community samples (e.g., Millon, 1991). No single unified approach has emerged, nor has any single model been widely accepted by researchers and diagnosticians. Several important questions remain from these efforts.

Community surveys reveal that the prevalence of most diagnosable cases of mental disorders is relatively low (Robins et al., 1984). There is, however, a much greater prevalance of subclinical psychological distress in the general population, and it may remain undetected. Whether psychiatric classifications that conform to diagnostic clusters can be differentiated from a general subclinical distress condition remains relatively unexplored (Morey, 1991). For instance, Dohrenwend, Shrout, Egri, and Mendelsohn (1980) examined psychiatric symptoms in a community sample and identified eight related affective scales, which they collectively described as a dimension of "nonspecific psychological distress."

Three problems emerge from this and related studies: (a) cross-validation and replication of factor structures has been hampered by reliance on different extraction and rotation techniques; (b) many different structures have been imposed on the data, possibly leading to different interpretations; and (c) common variance of symptoms is captured at the item level (introducing measurement error) and represents a low level of dimensionality. We propose that a higher and more "pure" level of statistical abstraction is necessary and more appropriate. Using

latent-variable analyses, we reduce bias attributed to measurement error, enhance conceptualization, and represent multidimensional models.

Another problem of prior models of psychological distress underscores the need to distinguish methodological nuances that affect theoretical observations. For example, several researchers have suggested that Bradburn's (1969) two-dimensional (orthogonal) model of positive and negative well-being may result from statistical artifacts tied to dichotomous response formats. These include limiting variances, possibly creating floor and ceiling effects, and lowering correlations through restricted ranges (Warr, Barter, & Brownbridge, 1983).

We remedy these methodological and conceptual problems in the following ways: (a) testing several dimensional models ranging in representation from a low level of specificity to a higher level of conceptualization; (b) expanding prior conceptualizations by using a wider array of measures tapping not only affective distress and neuroticism but also cognitive processes, psychotic thinking, suicidal ideation, and measures of anxiety and hostility; (c) using latent-variable confirmatory techniques, which permit us to evaluate empirically previous and current conceptual models; and (d) using self-report data from a community sample (clinical data predisposes findings toward specific diagnoses and high levels of distress evident in persons seeking treatment).

Method

Data are from an ethnically mixed community sample of 614 young adults (slightly more than one third non-White, 71% female, mean age = 25.5 years). Only 5% have not graduated from high school, the predominant living arrangement is with a spouse (42%), and over two thirds are employed full-time. More extensive description of the sample, study, and data collection are presented elsewhere (Newcomb, 1992). The sample is the sixth wave of data collection (1988) of a 12-year project and represents a retention rate of 38%. Subject loss over the 12 years was only minimally due to systematic influences related to psychological functioning and should not bias the results (Newcomb, 1992).

Lawrence M. Scheier, University of California, Los Angeles, now at Department of Educational Psychology, Temple University; Michael D. Newcomb, Division of Counseling and Educational Psychology, University of Southern California.

Correspondence concerning this article should be addressed to Michael D. Newcomb, Division of Counseling and Educational Psychology, University of Southern California, Los Angeles, California 90089–0031.

Twenty-seven measures of psychological distress and mental health were included in the analyses. Psychometric properties, sample items, and sources for these scales are presented in Table 1. These 27 measures are hypothesized to reflect nine first-order latent constructs: Emotional Distress, Self-Derogation, Purpose in Life, Psychoticism, Depression, Suicide Ideation, Anxiety, Hostility, and Disorganized Thinking. For Suicide Ideation, Anxiety, and Hostility, separate items were used as indicators of the construct, whereas for Purpose in Life and Psychoticism, no subscales were available, and we created three random parcels of items for each of the constructs.

Results and Discussion

One- and Two-Factor CFA Models

We first tested a one-factor model that allowed all 27 measures to load on a single latent dimension of distress (e.g., Dohrenwend et al., 1980). This model poorly fit the data, $\chi^2(304, N = 614) = 2206.6$, $p < .001$, Comparative Fit Index (CFI) = .74 (Bentler, 1990), and had a χ^2: df ratio exceeding 7 (optimal values are less than 2.0). Measures tapping affective disturbance had moderate-to-large factor loadings, whereas those tapping cognitive disturbance, psychoticism, suicidal thought, and anxiety were substantially smaller.

We then tested Bradburn's (1969) two-factor model of independent positive and negative affect. This model also tested our best approximation of Veit and Ware's (1983) preferred model containing two correlated dimensions of psychological distress and well-being. All positive affect or cognition measures were constrained to load on one dimension, whereas the negative scales were forced to load on a second dimension. Both latent factors were allowed to correlate, reflecting an oblique rather than orthogonal dimensional relation. This model also poorly fit the data, $\chi^2(303, N = 614) = 2162.1$, $p < .001$, CFI = .75, and likewise had a χ^2: df ratio exceeding 7. The correlation between positive and negative affect was $-.93$, significantly different from orthogonality, and contraindicated the independence suggested by others (Bradburn, 1969). The significant nested chi-square test between the unidimensional and bidimensional models, diff - $\chi^2(1, N = 614) = 44.5$, $p < .001$, indicated that the bidimensional model was an improvement over the unidimensional model; however, both models fit quite poorly. Therefore, our data do not confirm either the Bradburn (1969) two-factor independent model or the Veit and Ware (1983) two-correlated-factor model. Specifically, much residual covariance remains unexplained in all of these models, suggesting that alternate models may be more appropriate. Our measures did not perfectly replicate those in prior studies, however, and these slight

Table 1

Reliabilities and Sources for Measures Used in the Analyses

Measure	Sample item	Reliability	Item ranges	Principal sources
Emotional Distress				
Self-acceptance (4)	*Like myself for what I am*	.76	1–5	Stein, Newcomb, & Bentler (1986)
Depression (4)	*Future often seems hopeless*	.72	1–5	Newcomb, Huba, & Bentler (1981)
Self-Derogation				
Negative derogation (5)	*I feel I am a failure*	.74	1–2	Kaplan & Pokorny (1969)
Positive derogation (2)	*I am satisfied with myself*	.64[a]	1–2	
Magical Ideation	*Had feelings of not being human*		1–2	Eckblad & Chapman (1983)
magid 1 (10)		.64[a]		
magid 2 (10)		.61		
magid 3 (10)		.67		
CES–Depression				Radloff (1977)
Positive affect (4)	*I was happy*	.79	0–3	
Negative affect (5)	*I had crying spells*	.82	0–3	
Impaired motivation (8)	*I could not get along*	.73	0–3	
Impaired relations (3)	*People were unfriendly*	.59	0–3	
Purpose in Life	*I have discovered no mission or purpose in life*		1–7	Crumbaugh & Maholick (1964)
pil 1 (7)		.71[b]		
pil 2 (7)		.67		
pil 3 (6)		.67		
Suicide Behavior (4)	*Made attempts to kill self*	.76	1–5	Petrie & Chamberlain (1983)
	Think about ways to kill self			Newcomb & Bentler (1988)
	Told someone want to kill self			
	Imagine life end with suicide			
Anxiety (3)	*Feeling nervous, fidgety, or tense*	.75	1–5	Mellinger et al., (1983)
Hostility (3)	*Easily upset, irritated, annoyed*	.80	1–5	Mellinger et al. (1983)
Disorganized Thinking				
Thought disorganization (4)	*Can center on one idea easily*	.60	1–5	Newcomb, Huba, & Bentler (1981)
Deliberateness (4)	*Usually plan activities*	.77[c]	1–5	Stein, Newcomb, & Bentler (1986)
Diligence (4)	*Don't usually work hard*	.85[c]	1–5	

Note. Numbers in parentheses reflect the number of items in the scale. Unless otherwise indicated, reliabilities were computed using Cronbach's alpha. [a] Alphas in this case are reported as Pearson correlations because of limited number of items. [b] This scale is unidimensional and three random parcels were used; reliabilities were computed using Kudor-Richardson 20. [c] These alphas are computed as period-free and reflect the average of men and women, computed separately.

deviations may partially account for the substantial differences in results.

Nine-Factor CFA Model

The next series of models examined our conceptualization of the dimensions of distress as nine "primary" latent constructs. Multiple items (and scales) were used to reflect each construct and were constrained to load on one hypothesized factor. All nine factors were allowed to correlate freely. The fit of the model was good but not entirely adequate, and it required some minor modifications, $\chi^2(288, N = 614) = 758, p < .001$, CFI = .94; χ^2: $df = 2.63$.

Through a series of modifications, we added one complex factor loading and 20 residual covariances (Chou & Bentler, 1990). Estimated parameters between the initial and final model correlated almost perfectly ($r = .99$), indicating that we did not disfigure the model structure with these additions. These modifications improved the model fit to an acceptable level, $\chi^2(267, N = 614) = 403, p < .001$, CFI = .98; $\chi^2/df = 1.51$. Figure 1 depicts the factor structure and standardized loadings corresponding to the nine-factor CFA. Factor intercorrelations for this final (and initial) CFA model are given in Table 2. Overall, factor loadings are large and highly significant, indicating that we conceptualized our "primary" model correctly and that the measures selected were reliable indicators of the latent constructs.

Although many of the factor intercorrelations were high, all were significantly less than unity, indicating that no two constructs tap an identical dimension. This model reveals that all nine dimensions of psychological distress are highly correlated, but each contains unique aspects of cognitive and emotional distress.

Higher Order CFA Models

We also tested several second- and third-order hierarchical models. Given the moderate-to-large associations among the first-order constructs, we first tested a model with one second-order factor that tests whether the 36 correlations among the nine primary factors can be explained by one higher order factor of general distress. The goodness-of-fit indexes for this model were much better than the original one-factor model for all 27 measures, $\chi^2(294, N = 614) = 567, p < .001$, CFI = .96; χ^2: $df = 1.93$. The nested difference test between this higher order model and the nine-factor model was significant, indicating that the second-order factor did not fully capture all of the covariation among the nine primary factors, diff - $\chi^2(27, N = 614) = 164, p < .001$. Although others (e.g., Gotlib, 1984), using exploratory factor analysis, have suggested that a single undifferentiated factor can capture the associations among diverse clinical symptoms, we did not find that this singular "dimension" adequately represented our data.

We next tested a two-factor second-order model. On the basis of the correlations obtained from the nine-factor CFA, Anxiety and Hostility were constrained to load on a second-order factor of Agitation, whereas the remaining seven primary factors loaded on a factor of Dysphoria (which was allowed to correlate with Agitation). This model was an improvement over the single-factor model: $\chi^2(293, N = 614) = 506, p < .001$, CFI = .97;
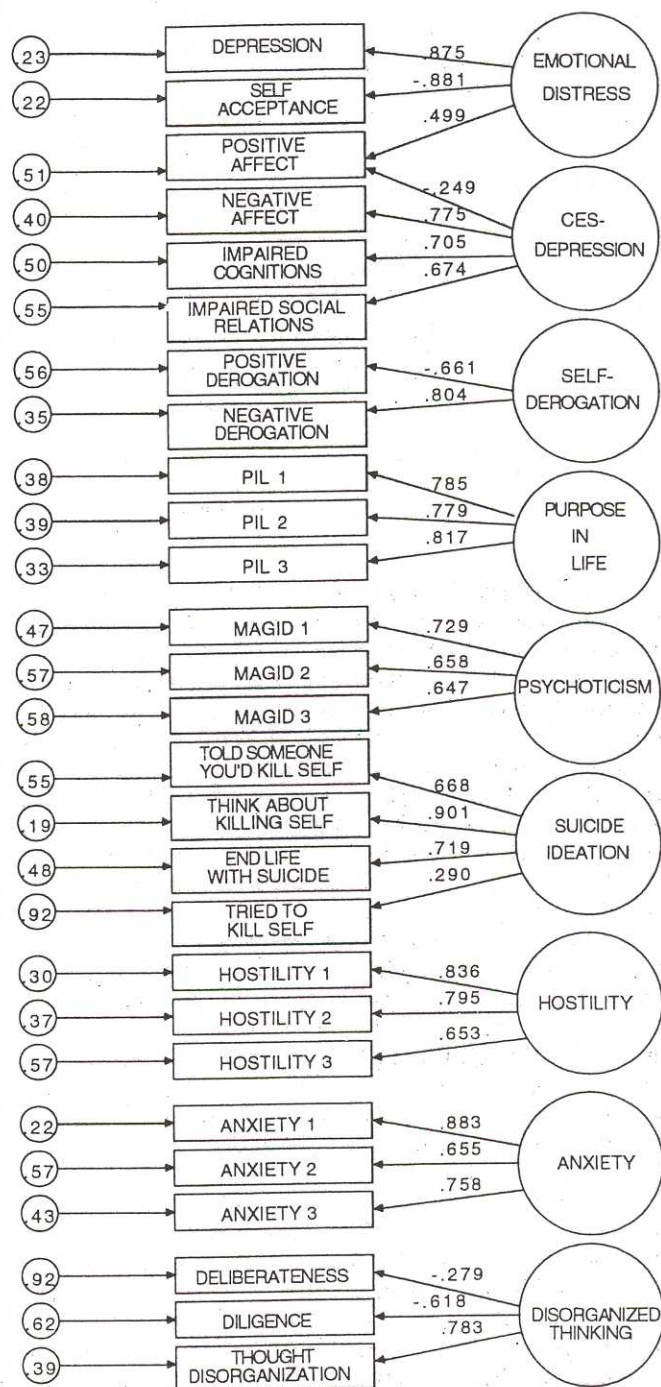

Figure 1. CFA model depicting nine first-order latent constructs. (All parameter estimates are significant at $p < .001$. Large circles are latent constructs, and rectangles are measured variables. Small circles with unidirectional arrows are residual variables (variances). Parameter estimates are standardized, and significance levels are based on critical ratios. *$p < .05$. **$p < .01$. ***$p < .001$.)

χ^2: $df = 1.73$, and was significantly different from the nine-factor primary model, diff - $\chi^2(26, N = 614) = 103, p < .001$.

The two second-order constructs of Agitation and Dysphoria were highly correlated (.70) but not identical when compared with an $r = 1.00$. Therefore, even though others (Eaton & Ritter,

Table 2

Intercorrelations Among the Latent Factors From the Nine-Factor Confirmatory Factor Analysis Model: Initial Model (Upper Triangle) and Final Model (Lower Triangle)

	Latent factors								
Latent factors	1	2	3	4	5	6	7	8	9
1. Emotional Distress	—	.90	−.86	.25	.61	.74	.53	.31	.67
2. Self-Derogation	.87	—	.77	.42	.64	.77	.59	.40	.62
3. Purpose in Life	−.85	−.76	—	−.28	−.60	−.69	−.53	−.38	−.64
4. Psychoticism	.26	.42	−.28	—	.28	.36	.24	.22	.28
5. Suicide Ideation	.59	.65	−.60	.28	—	.57	.36	.25	.34
6. CES Depression	.73	.76	−.67	.39	.58	—	.58	.41	.55
7. Hostility	.53	.58	−.53	.24	.37	.60	—	.57	.47
8. Anxiety	.33	.40	−.39	.20	.25	.45	.53	—	.38
9. Disorganized Thinking	.65	.59	−.59	.27	.34	.55	.46	.37	—

Note. All correlations significant at $p < .001$.

1988) have reported considerable overlap in symptomatology between anxiety and depression and suggest that common vulnerabilities may underlie both, they are not the same construct. Psychoticism had the smallest factor loading on the Dysphoria factor, and this construct may not capture the bizarre and schizotypic thinking tapped by Psychoticism (Wolf et al., 1988). Similarly, Disorganized Thinking may tap disrupted cognitions and a chaotic thinking style not entirely reflected by the higher order factors of Dysphoria or Agitation; the factor loading for Disorganized Thinking was much lower than the other remaining Dysphoria constructs, supporting a conceptual separation of these constructs.

We then tested a model with two second-order factors as done previously, but with Psychoticism and Disorganized Thinking removed as indicators of Dysphoria and allowed to covary with both the second-order factors and each other. This model was not significantly different from the previous two-factor model, diff - $\chi^2(3, N = 614) = 4.8, p > .05$, but remained significantly different from, although more theoretically parsimonious than, the nine-factor CFA model, diff - $\chi^2(23, N = 614) = 98, p < .001$.

The large associations among the second-order factors (Dysphoria and Agitation: $r = .70$), Disorganized Thinking, and Psychoticism suggested that these factors might be generated by a third-order factor. Figure 2 depicts this final third-order model. Comparatively, this third-order model and the model with two second-order and two primary factors are equally representative of the data, although the third-order model improves slightly in parsimony and explanatory power from previous higher order models. Again, the model with a third-order structure remains significantly different from the nine-factor model, diff - $\chi^2(25, N = 614) = 99, p < .001$. As depicted, the composition of the third-order factor varies considerably (more of Dysphoria and less of Agitation, Disorganized Thinking, and Psychoticism) and provides some indication of discriminant dimensional validity at the level of latent constructs (Morey, 1991).

Several limitations of our study are worth noting. First, the data are cross-sectional, and future research should consider the stability and change of these behaviors across different developmental periods. The fact that the sample had a large per-

centage of women and modest representation of minorities may also caution against overgeneralization. We also encourage cross-validation in terms of replication of factor structure (Skinner, 1986). Our choice of measures used to reflect the latent constructs was limited and can be expanded by other
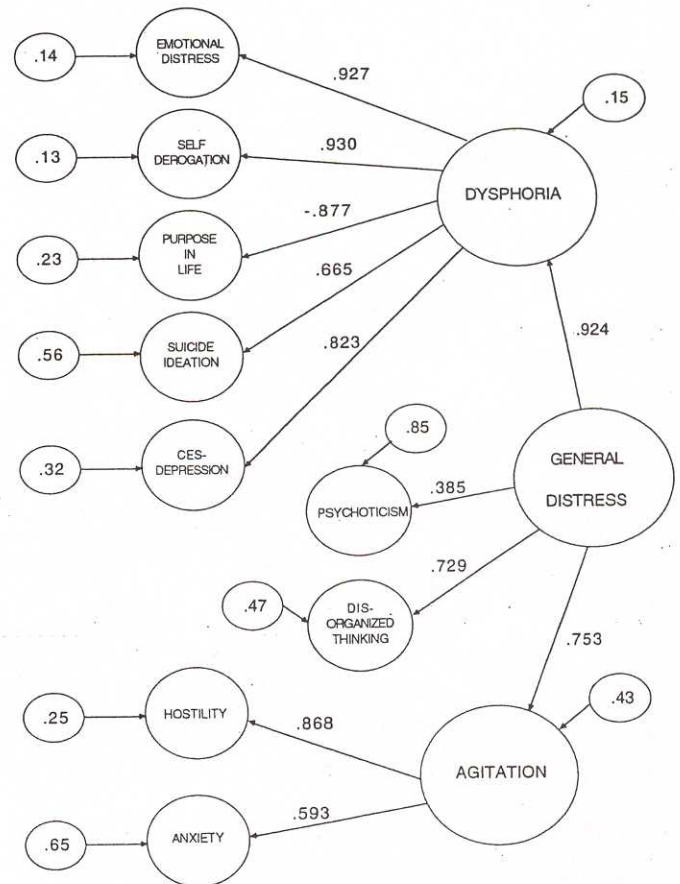

Figure 2. Third-order CFA model depicting General Distress. (For clarity, measured variables are not depicted but are provided in Figure 1. All factor loadings are standardized and significant, $p < .001$.)

researchers. The models presented and factors used to represent distress reflect a limited set of the full spectrum of disorders that are detailed in the revised third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 1987). Our measures, however, capture a substantial part of the most common and frequently reported forms of distress (Robins & Regier, 1991), and thus future dimensional models could be patterned after these results. Finally, it is possible that the obtained structures are sample-specific, and likewise the hypothetical constructs themselves may reflect sample-specific covariances; although the respectively large and consistent loadings within factors from the nine-factor CFA model attest to the psychometric soundness of the latent constructs.

References

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders (3rd ed., rev.).* Washington, DC: Author.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107,* 238–246.

Bradburn, N. M. (1969). *The structure of psychological well-being.* Chicago: Aldine.

Chou, C. P., & Bentler, P. M. (1990). Model modification in covariance structure modeling: A comparison among likelihood ration, Lagrange multiplier, and Wald tests. *Multivariate Behavioral Research, 25,* 115–136.

Crumbaugh, J. C., & Maholick, L. J. (1964). An experimental study in existentialism: The psychometric approach to Frankl's concept of noogenic neurosis. *Journal of Clinical Psychology, 20,* 200–207.

Dohrenwend, B. P., Shrout, P. E., Egri, G., & Mendelsohn, F. S. (1980). Nonspecific psychological distress and other dimensions of psychopathology. *Archives of General Psychiatry, 37,* 1229–1236.

Eaton, W. W., & Ritter, C. (1988). Distinguishing anxiety and depression with field survey data. *Psychological Medicine, 18,* 155–166.

Eckblad, M., & Chapman, L. J. (1983). Magical ideation as an indicator of schizotypy. *Journal of Consulting and Clinical Psychology, 51,* 215–225.

Gotlib, I. H. (1984). Depression and general psychopathology in university students. *Journal of Abnormal Psychology, 93,* 19–30.

Kaplan, H. B., & Pokorny, A. D. (1969). Self-derogation and psychosocial adjustment. *Journal of Nervous and Mental Disease, 149,* 421–434.

Mellinger, G. D., Balter, M. B., Uhlenhuth, E. H., Cisin, I. H., Manheimer, D. I., & Rickels, K. (1983). Evaluating a household survey measure of psychic distress. *Psychological Medicine, 13,* 607–621.

Millon, T. (1991). Classification in psychopathology: Rationale, alternatives, and standards. *Journal of Abnormal Psychology, 100,* 245–261.

Morey, L. C. (1991). Classification of mental disorder as a collection of hypothetical constructs. *Journal of Abnormal Psychology, 100,* 289–293.

Newcomb, M. D. (1992). Understanding the multidimensional nature of drug use and abuse: The role of consumption, risk factors, and protective factors. In M. D. Glantz & R. Pickens (Eds.), *Vulnerability to drug abuse* (pp. 255–297). Washington, DC: American Psychological Association.

Newcomb, M. D., Huba, G. J., & Bentler, P. M. (1981). A multidimensional assessment of stressful life events among adolescents: Derivation and correlates. *Journal of Health and Social Behavior, 22,* 400–415.

Petrie, K., & Chamberlain, K. (1983). Hopelessness and social desirability as moderating variables in predicting suicide behavior. *Journal of Consulting and Clinical Psychology, 51,* 485–487.

Radloff, L. S. (1977). The CES-D scales: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1,* 385–401.

Robins, L. N., Helzer, J. E., Weissman, M. M., Orvaschel, H., Gruenberg, E., Burke, J. D., & Regier, D. A. (1984). Lifetime prevalence of specific psychiatric disorders in three sites. *Archives of General Psychiatry, 41,* 949–958.

Robins, L. N., & Regier, D. A. (Eds.). (1991). *Psychiatric disorders in America: The Epidemiologic Catchment Area Study.* New York: Free Press.

Skinner, H. A. (1986). Construct validation approach to psychiatric classification. In T. Millon & G. L. Klerman (Eds.), *Contemporary directions in psychopathology: Toward the DSM-IV* (pp. 307–330). New York: Guilford Press.

Stein, J. A., Newcomb, M. D., & Bentler, P. M. (1986). Stability and change in personality: A longitudinal study from early adolescence to young adulthood. *Journal of Research in Personality, 20,* 276–291.

Veit, C. T., & Ware, J. E. (1983). The structure of psychological distress and well-being in general populations. *Journal of Consulting and Clinical Psychology, 51,* 730–742.

Warr, P., Barter, J., & Brownbridge, G. (1983). On the independence of positive and negative affect. *Journal of Personality and Social Psychology, 44,* 644–651.

Wolf, A. W., Schubert, D. S. P., Patterson, M. B., Grande, T. P., Brocco, K. J., & Pendleton, L. (1988). Associations among major psychiatric diagnoses. *Journal of Consulting and Clinical Psychology, 56,* 292–294.