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

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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 prevalence 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, Shrut, 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).
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 $\chi^2:df$ 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 Vite 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 $\chi^2:df$ 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, $\text{diff} - \chi^2(1, N = 614) = 44.5, p < .001$, 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 Vite 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

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

Note. Numbers in parentheses reflect the number of items in the scale. Unless otherwise indicated, reliabilities were computed using Cronbach's alpha.

* Alphas in this case are reported as Pearson correlations because of limited number of items.  
  This scale is unidimensional and three random parcels were used; reliabilities were computed using Kuder-Richardson 20.  
  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; $\chi^2: df = 2.63$.

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; $\chi^2: df = 1.93$. 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, $\chi^2: df = 164, p < .001$. 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; $\chi^2: df = 1.73$, and was significantly different from the nine-factor primary model, $\chi^2(26, N = 614) = 103, p < .001$.

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,}
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 more directly than the higher order factors of Dysphoria or Agitation; the factor loading on 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, $\chi^2(3, N = 614) = 4.8, p > .05$, but remained significantly different from, although more theoretically parsimonious than, the nine-factor CFA model, $\chi^2(23, N = 614) = 98, p < .001$.

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, $\chi^2(25, N = 614) = 99, p < .001$. 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 percentage 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, $p < .001$.)](image)
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 relatively large and consistent loadings within factors from the nine-factor CFA model attest to the psychometric soundness of the latent constructs.

### References


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