Cognitive Therapy and Research, Vol. 18, No. 2, 1994

Assessing the Dimensionality of Optimism and Pessimism Using a Multimeasure Approach[1]

Edward C. Chang[2] and Thomas J. D'Zurilla[2]
State University of New York at Stony Brook

Albert Maydeu-Olivares
University of Illinois at Urbana-Champaign

Weighted least-squares confirmatory factor analysis and exploratory factor-analytic procedures were used to assess the dimensionality of three self-report instruments designed to measure optimism and pessimism: the Life Orientation Test (LOT), the Hopelessness Scale (HS), and the Optimism and Pessimism Scale (OPS). The LOT was found to be bidimensional, the HS unidimensional, and the OPS multidimensional. The HS was interpreted as measuring a unipolar pessimism dimension. Factor analyses performed on an item subset from the OPS that fit the definition of optimism and pessimism as generalized outcome expectancies also supported the two-dimensional model of optimism and pessimism. Differential correlations between separate optimism and pessimism indices and a measure of psychological stress provided partial further support for a two-dimensional model of optimism and pessimism.

KEY WORDS: optimism; pessimism; cognitive assessment; factor analysis.

[1]The authors wish to thank Luz C. Emiliano for her steadfast assistance in data collection and management. The participation of the third author was made possible by a Postdoctoral Scholarship from the Ministry of Education and Science of Spain.
[2]Address all correspondence, including requests for reprints, to Edward C. Chang, 147-54 77th Rd., Kew Gardens Hills, New York 11367, or to Thomas J. D'Zurilla, Department of Psychology, State University of New York at Stony Brook, Stony Brook, New York 11794-2500.

0147-5916/94/0400-0143$07.00/0

The concepts of optimism and pessimism have stimulated a great deal of research interest in recent years. Studies have found that optimism is related to more adaptive coping behavior in stressful situations (Natali-Alemañy, 1991; Scheier & Carver, 1987), as well as greater physical and psychological well-being (Dember & Brooks, 1990; Natali-Alemañy, 1991; Scheier & Carver, 1985, 1987). Pessimism, on the other hand, has been linked to depression (Abramson, Metalsky, & Alloy, 1989; Beck, 1987), anxiety (Dember, Martin, Hummer, & Melton, 1989), and avoidant coping patterns (Natali-Alemañy, 1991; Scheier & Carver, 1987).

Although there is little doubt that optimism and pessimism are important for well-being, the specific nature of these concepts has not yet been clearly delineated. First of all, there are still no generally accepted definitions of optimism and pessimism. Most investigators have adopted Scheier and Carver's (1985) view of optimism and pessimism as generalized positive and negative outcome expectancies (which may or may not be linked to self-efficacy expectancies; see also Bandura, 1986). However, some investigators (Dember et al., 1989) have defined these concepts more broadly as a positive and negative outlook on life. Whereas Scheier and Carver's concepts are future-oriented, the latter view encompasses present perceptions and appraisals as well as future expectations. Thus, the measures of optimism and pessimism used in different studies may not always be reflecting the same cognitive processes. In view of these differences, it would be desirable to use multiple measures of optimism and pessimism when attempting to study the nature of these constructs.

Second, it is not clear if optimism and pessimism represent opposite poles on a single, bipolar dimension, or if these concepts are best conceived as two partially independent dimensions. If the latter view is correct, then it would be important to use separate measures of optimism and pessimism in research rather than one single measure. To date, however, the one-dimensional model has been most widely accepted, as evidenced by the popularity of Scheier and Carver's (1985) Life Orientation Test (LOT). Designed to measure generalized outcome expectancies, the LOT consists of eight 5-point Likert-type items (plus four filler items), four of which are positively word and the other four negatively worded. The test provides a single summary score, with high scores indicating a more optimistic orientation and low scores indicating a more pessimistic orientation. This single score assumes that one cannot be both optimistic and pessimistic at the same time; an optimistic outlook necessarily precludes a pessimistic outlook, and vice versa.

In recent years, the challenge to the traditional one-dimensional model of optimism has grown in intensity (e.g., Dember et al., 1989). An argument for a two-dimensional model can be made on both theoretical and empirical grounds. In transactional stress theory (Lazarus & Folkman, 1984), as well as social-learning theory (Bandura, 1986), cognitive appraisals and self-efficacy and outcome expectancies are conceived as situation-specific responses rather than dispositions or trait-like characteristics. From this perspective, even though there may be some generalization across situations, any given individual might be optimistic about certain situations and objects in his or her life (e.g., job, friends), while at the same time being pessimistic about others (e.g., marriage, sex life). A two-dimensional model of optimism and pessimism has also been suggested by some empirical findings involving three different self-report measures of optimism and pessimism: the LOT, the Hopelessness Scale (HS; Beck, Weissman, Lester, & Trexler, 1974), and the Optimism and Pessimism Scale (OPS; Dember et al., 1989).

To begin with, Scheier and Carver's (1985) own original factor analysis of the LOT produced equivocal results. They performed a principal-axes factor analysis (Pearson correlations, eigenvalues > 1, oblique and orthogonal rotations) on a sample of 624 undergraduates which resulted in two factors that corresponded to the positive and negative items in the LOT. Thus, using this procedure alone, a two-factor structure corresponding to optimism and pessimism seemed appropriate for this data. Scheier and Carver then performed a maximum-likelihood confirmatory factor analysis, using Pearson correlations, and found that both a one-factor solution and a two-factor solution fit the data adequately, as indicated by the chi-square goodness-of-fit index. However, a chi-square nested test revealed that the two-factor solution was significantly better. Nevertheless, Scheier and Carver still concluded that the LOT should be considered unidimensional because (1) all of its items loaded at least .50 on the first unrotated factor, and (2) a relatively high correlation was found between the factors in the two-factor solution (r = .64). This last argument is at least questionable since a correlation of .64 between the two factors is not large enough to warrant the conclusion that the LOT is unidimensional.

Aaron Beck developed the HS to reflect the negative expectancies that individuals may have about themselves and their future lives. Described as a measure of pessimism (Beck et al., 1974), the HS consists of 20 true–false items of which 11 are worded negatively (negative expectancies) and nine are worded positively (positive expectancies). The test is keyed so that higher scores indicate greater pessimism or "hopelessness." Beck et al. performed a principal-components analysis (Pearson correlations, eigenvalues > 1, orthogonal rotation) on the HS for a sample of 294 suicide attempters. Three factors were extracted, which were labeled "Feelings About the Future," "Loss of Motivation," and "Future Expectations." These factors were interpreted as the affective, motivational, and cognitive

aspects of hopelessness. However, a close inspection of these item subsets reveals that the labels assigned to the factors do not adequately summarize the content of the items. Instead, the first factor could be conceived as measuring optimism (positive expectancies), whereas all but two of the remaining items appear to be reflecting pessimism (negative expectancies). It would be important to replicate this analysis using different factor-analytic procedures (e.g., confirmatory factor analysis) in order to determine whether a two-factor solution might be more appropriate for the HS data than a three-factor solution.

More recently, Dember et al. (1989) developed the OPS to measure optimism and pessimism in the broadest sense of the terms. Optimism was defined as a bias in perceptions and expectancies in favor of the positive features of life, while pessimism was defined as a negative bias. The OPS consists of 56 Likert-type items, 18 of which reflect optimism and another 18 reflect pessimism. The remaining 20 items are filler items. Initially, the OPS provided a single summary score that was meant to place an individual on a continuum, with lower scores reflecting a more optimistic outlook on life and higher scores reflecting a more pessimistic outlook. However, when Dember et al. obtained separate optimism and pessimism scores and correlated them, they found a Pearson correlation of only −.52 between optimism and pessimism. This finding, considered in relation to the high internal consistency of the individual items subsets (Chronbach alphas = .84 and .86 for optimism and pessimism, respectively), caused the investigators to question the assumption that optimism and pessimism represent a single bipolar dimension.

In order to shed more light on this issue, Dember et al. (1989) performed a canonical correlation analysis on the two item subsets. After finding a canonical r of .74, using Pearson correlations, they concluded that optimism and pessimism are not polar opposites but, instead, partially independent constructs. However, no factor analysis was performed on this measure to investigate its dimensionality.

In the present study, we attempted to extend the work of Dember et al. (1989) by using factor-analytic methods to study the dimensionality of optimism and pessimism, focusing on the LOT, the HS, and the OPS. Although these tests are based on somewhat different definitions of optimism and pessimism, we hypothesized that each test is measuring two partially independent dimensions that could be conceived as optimism and pessimism. If the results supported our hypothesis, we then planned to examine the relations between the different optimism and pessimism indices and two external criteria: (1) academic performance (i.e., grade-point average) and (2) psychological stress. We chose these particular criteria because they are both important adaptational outcomes in a college student population,

from which the subjects for this study were drawn. In addition, we were interested in determining if a performance variable and a cognitive–emotional variable might be related differently to optimistic and pessimistic cognitions. We hypothesized that optimistic appraisals and expectancies would have more positive motivational consequences, resulting in better academic performance, whereas pessimistic appraisals and expectancies would have more negative emotional effects, thus increasing psychological stress (Bandura, 1986; Lazarus & Folkman, 1984).

METHOD

Subjects

The subjects for this study were 389 undergraduate college students who were enrolled in either the introductory psychology course or one of several intermediate-level psychology courses (abnormal, social, or personality) at the State University of New York at Stony Brook. This sample included 173 men and 216 women. Their mean age was 19.5 years. These subjects participated in the study in order to fulfill a course requirement or to obtain extra course credit.

Measures

This study focused on the three measures of optimism and pessimism that were described earlier: (1) the Life Orientation Test (Scheier & Carver, 1985), (2) the Hopelessness Scale (Beck et al., 1974), and (3) the Optimism and Pessimism Scale (Dember et al., 1989). Scheier and Carver reported a Chronbach alpha of .76 for the LOT and a test–retest reliability of .79 (4 weeks). Beck et al. reported a Chronbach alpha of .93 for the HS. Both the LOT and the HS have been found to have adequate construct validity, as reported by their respective authors. In addition, the HS has also been shown to predict eventual suicides (Beck, Steer, Kovacs, & Garrison, 1985). With regard to the OPS, Dember et al. reported Chronbach alphas of .84 for the Optimism scale and .86 for the Pessimism scale. Test–retest reliabilities (2 weeks) were reported to be .75 and .84 for Optimism and Pessimism, respectively (Dember & Brooks, 1989). Promising data on the construct validity of this measure have also been reported (Natali-Alemañy, 1991; Dember et al., 1989). Of particularly interest is the fact that the two scales have been found to correlate differentially with several dif-

ferent criterion measures (e.g., positive affect, anxiety, active coping, commitment to religion, social desirability).

In addition to the above measures, 299 subjects also completed the Derogatis Stress Profile (DSP; Derogatis, 1980, 1987). The DSP is a 77-item, multidimensional, self-report measure of psychological stress that is based on interactional stress theory. This instrument assesses perceived environmental stress (work, home, and health), stress-enhancing behavior patterns (e.g., driven behavior, low relaxation potential), and emotional distress (anxiety, anger, depression). Although scores can be computed for several different stress dimensions, the present study focused only on the total stress score. The DSP has very good reliability and promising data have been reported on predictive validity (Derogatis, 1987).

Procedure

All subjects completed the three self-report measures during group testing sessions that lasted approximately 1 hour. These testing sessions were held at different points throughout the semester. The optimism and pessimism measures were administered in the following order: OPS, HS, and LOT. When the DSP was administered, it followed the LOT. In addition, written consent was requested from all subjects for the release of information about their course grades from the Office of Records. Subjects were unaware of the purpose of the study until after they had completed all measures.

The dimensionality of the LOT, HS, and OPS was assessed using weighted least-squares confirmatory factor analysis, as implemented in LISREL 7 (Jöreskog & Sörbom, 1989, 1990), the weight matrix being the asymptotic covariance matrix of the estimated polychoric correlations. This method was chosen because it is the only estimation procedure that provides a large sample test of the dimensionality of a set of discrete ordinal variables (Bollen, 1989). In addition, we also performed an exploratory factor analysis on each of the tests so that we could compare our results with the findings of previous studies that used this approach to assess dimensionality.

Although there is presently no completely satisfactory exploratory factor-analytic methodology for discreet ordinal data (see Hattie, 1985; Roznowski, Tucker, & Humphreys, 1991), one highly recommended procedure involves the use of polychoric (or tetrachoric) correlations among the items rather than Pearson correlations (Hulin, Drasgow, & Parsons, 1983). The use of polychoric correlations requires the assumption that each test item represents a categorization of an underlying continuous normal variable. Using these correlations, a common factor model is subsequently estimated by ordinary (unweighted) least squares, or by principal-axes factor analysis with squared multiple correlations as initial estimates of the communalities (the two approaches tend to produce nearly identical estimates). All exploratory factor analyses reported below used unweighted least-squares estimations, with polychoric correlations when the items were Likert-type (i.e., LOT and OPS), and tetrachoric correlations when the items were dichotomous (i.e., HS).[3] The polychoric and tetrachoric correlations were estimated using PRELIS (Jöreskog & Sörbom, 1990). Oblique (oblimin) rotations were used in interpreting the two-factor solutions since we expected the extracted factors to be correlated.

RESULTS

Analysis of the LOT

Using weighted least-squares confirmatory factor analysis, one-factor and two-factor models were fitted to the LOT data. The fitted two-factor solution was an independent clusters solution with all positively worded (optimism) items loading on one factor and all negatively worded (pessimism) items loading on the second factor. A summary of the fit of both models is presented in Table I. As expected, the p-values associated with the chi-square tests showed that the one-dimensional model was inappropriate for this data, χ^2 (20) = 209.21, $p < .001$, Goodness-of-Fit Index (GFI) = .936, whereas the two-dimensional model fit the data quite well, χ^2 (19) = 18.13, p = .514, GFI = .994. The correlation between the two factors was −.54.[4] The matrix of factor loadings corresponding to the two-factor solution is presented in Table II.

Unweighted least-squares exploratory factor analysis was then applied to the LOT item pool. Both the eigenvalues-greater-than-1 criterion and the ratio-of-eigenvalue-differences criterion (also known as "scree plot") suggested that a two-factor solution is most appropriate for this data. These two factors accounted for 54.2% of the variance. Using an oblique (oblimin) rotation, the correlation between the factors was found to be

[3]All of the exploratory factor analyses reported here were replicated using principal-axes factor analysis with squared multiple correlations as initial estimates of the communalities and polychoric correlations. The results obtained by both methods were substantively identical.

[4]Throughout the analyses, none of the test items was reverse-scored. Thus, when two-factor models were fitted to the data, a negative correlation between optimism and pessimism indicates that higher levels of optimism correspond to lower levels of pessimism.

Table I. Goodness-of-Fit Indices for Weighted Least-Squares Confirmatory Factor Analyses of the LOT, OPS/GOE, and HS[a]

Measure		χ^2	*df*	*p*	GFI	RMSR
LOT						
Overall	1 factor	209.21	20	<.001	.936	.109
	2 factors	18.13	19	.514	.994	.036
Optimism	1 factor	.63	2	.729	1.000	.012
Pessimism	1 factor	1.13	2	.568	.999	.013
HS						
Overall	1 factor	153.33	170	.816	.981	.078
	2 factors	147.90	169	.878	.982	.077
OPS/GOE						
Overall	1 factor	204.34	77	<.001	.954	.081
	2 factors	124.03	76	<.001	.073	.061
	2 factors[b]	82.05	74	.224	.982	.050
Optimism	1 factor	17.90	14	.211	.990	.049
Pessimism	1 factor	25.95	14	.026	.990	.045

[a]*N* = 389; LOT = Life Orientation Test; HS = Hopelessness Scale; OPS/GOE = Optimism and Pessimism Scale/Generalized Outcome Expectancies; GFI = Goodness-Of-Fit Index (Jöreskog & Sörbom, 1990); RMSR = root mean squared residual.
[b]All second factor loadings that were significant at the $\alpha = .01$ level were freed.

−.52. The rotated solution matched perfectly the independent clusters solution fitted in the confirmatory analysis.[5]

Analysis of the HS

Confirmatory factor analyses by weighted least squares were also performed to test one-dimensional and two-dimensional solutions for the HS. As with the LOT, the fitted two-factor solution was an independent clusters solution, with one cluster being the positively worded items and the other cluster the negatively word items. A summary of the goodness-of-fit indices is presented in Table I. The *p*-values associated with the chi-square test indicated that a one-factor model and a two-factor model both fit the data well, χ^2 (170) = 153.33, p = .816, GFI = .981 for the one-factor model, and χ^2 (169) = 147.90, p = .878, GFI = .982 for the two-factor model. However, the correlation between the factors in the two-factor solution was found to be −.93, which clearly shows that a one-dimensional solution is most appropriate for the HS. A matrix of the factor loadings for the one-factor solution is presented in Table II.

[5]Only factor loadings ≥ |.2| were considered.

Table II. Factor Loadings Obtained by Weighted Least-Squares Confirmatory Factor Analysis[a]

LOT			OPS/GOE			HS	
Item	Optimism	Pessimism	Item	Optimism	Pessimism	Item	Pessimism
1	.668	.0	15	.581	.0	2	.740
4	.814	.0	17	.348	−.389	4	.434
5	.740	.0	23	.785	.0	7	.835
11	.450	.0	28	.398	.0	9	.632
3	.0	.641	47	.303	−.274	11	.877
8	.0	.891	52	.342	.0	12	.794
9	.0	.864	56	.410	.0	14	.857
12	.0	.715	2	.0	.588	16	.860
			5	.0	.766	17	.824
			8	.0	.761	18	.687
			14	.0	.749	20	.943
			20	.0	.706	1	−.734
			31	.0	.646	3	−.567
			49	.0	.660	5	−.520
						6	−.520
						8	−.422
						10	−.580
						13	−.270
						15	−.657
						19	−.760

[a]*N* = 389. LOT = Life Orientation Test; OPS/GOE = Optimism and Pessimism Scale/Generalized Outcome Expectancies; HS = Hopelessness Scale. The items were not reversed scored. All factor loadings are significant ($p < .01$). The interfactor correlations were −.541 for the LOT, and −.451 for the OPS/GOE.

Unweighted least-squares exploratory factor analysis with tetrachoric correlations was then applied to the HS. A one factor-solution accounted for 49% of the variance. When we attempted to fit a two-factor solution, a "Heywood case" (McDonald, 1985) was obtained, which indicates that a two-factor solution is grossly inappropriate for these data.[6] This is not surprising in view of the extremely high correlation that was found between the two factors in the above confirmatory analysis.

[6]A Heywood case is a phenomenon that occurs in computer programs when a command cannot be executed because the data are in some way incompatible with the particular command. In the present case, the computer could not extract two factors because there was only one in the data. For further information, the interested reader is referred to McDonald (1985, pp. 78-81).

Analysis of the OPS

Because confirmatory factor analysis by weighted least squares is very demanding computationally, this procedure cannot presently be performed on tests or subtests longer than about 30 items (Jöreskog & Sörbom, 1990). Thus, since the OPS has 36 items, only exploratory factor analysis was applied to the total item pool of this scale.

Unweighted least-squares exploratory factor analysis yielded eight initial eigenvalues greater than 1.0, which accounted for 59% of the variance. The ratio-of-eigenvalue-differences criterion suggested that three factors be retained. The iterated eigenvalues of these factors were 9.24, 2.16, and 1.58, accounting for only 36% of the variance. Although the ratio of the first eigenvalue to the second eigenvalue was large, the actual magnitude of the first eigenvalue was relatively small (accounting for only 26% of the variance), which casts doubt on the adequacy of a one-factor solution for this scale. Moreover, large residuals were found after fitting the model, which clearly showed that a one-factor model was inappropriate for these data.

In general, the rotated two-factor solution retrieved the hypothesized solution—i.e., two clusters corresponding to the positively worded and negatively worded items. However, these two clusters were far from disjoint, since 17 items showed a second loading $\geq |.2|$. Thus, a two-dimensional solution does not appear to be appropriate for the OPS. When three- and four-factor solutions were examined, their rotated solutions were not interpretable.

Since the exploratory factor analysis of the total item pool of the OPS did not support any specific solution for this instrument, we decided to examine this issue further by performing separate exploratory factor analyses on the Optimism and Pessimism subscales. The analysis of the Optimism subscale yielded two factors with iterated eigenvalues greater than 1.0 (4.59, 1.13, .65), which accounted for only 32% of the variance. With regard to the Pessimism subscale, two iterated eigenvalues greater than 1.0 (6.32, 1.21, .89) accounted for 42% of the variance. In both cases, large residuals were found after fitting one- and two-factor models, which suggested that neither of these models was a good approximation for either OPS subscale. These results indicate that the OPS is a complex, multidimensional instrument which is very difficult to interpret theoretically. The complexity of this scale probably results from the extremely broad and vague definition of optimism and pessimism on which the scale was based, which is reflected in the content of its items. It appears that the developers of this scale tried to include virtually everything that anyone has ever said about optimism and pessimism. As a result, the scale probably confounds optimism and pessimism with a variety of other related and overlapping

psychological constructs (for example, self-esteem, life satisfaction, cognitive appraisal, mood, morale, etc.).

We decided to examine the theoretical issue further by inspecting the items of the OPS and selecting only those that seemed to fit best Scheier and Carver's (1985) definition of optimism and pessimism as generalized outcome expectancies. Using this conceptualization, we were able to identify seven "optimism" items (items 15, 17, 23, 28, 47, 52, and 56) and seven "pessimism" items (items 2, 5, 8, 14, 20, 31, and 49). The term Optimism and Pessimism Scale/Generalized Outcome Expectancies (OPS/GOE) will be used to identify this reduced version of the OPS in all subsequent analyses. When a one-factor confirmatory factor model was fitted to this data, the fit was rather poor, χ^2 (77) = 204.34, $p < .001$, GFI = .954. Using the chi-square goodness-of-fit index, a two-factor independent clusters solution did not fit the data satisfactorily either, χ^2 (76) = 124.03, $p < .001$, GFI = .973, although this solution presented a better fit than the one-factor model, as reflected in the GFI index (see Table I).

When an unweighted least-squares exploratory factor analysis with polychoric correlations was applied to these data, both the eigenvalues-greater-than-1 criterion and the ratio-of-eigenvalue-differences criterion suggested that two factors be retained. These factors accounted for 39% of the variance. Using an oblique (oblimin) rotation, a correlation of −.44 was found between the two factors. Since items 17 and 47 showed loadings $> |.2|$ on the second factor, we repeated the two-factor confirmatory factor analysis on these data, freeing these two factor loadings. In this case, the chi-square fit was satisfactory, χ^2 (76) = 82.05, $p = .244$, GFI = .982. All of the factor loadings in this model were significant ($\alpha = .01$) and no other loadings were found to improve the model at this significance level. The correlation between the two factors was found to be −.45. The matrix of factor loadings corresponding to this model is presented in Table II.

Since the above two factor-solution was not an independent clusters solution, we fitted separate confirmatory one-factor models to the OPS/GOE optimism and pessimism item subsets in order to confirm their dimensionality. A summary of the goodness-of-fit indices is presented in Table I. According to the chi-square index, the optimism items fit the model well, χ^2 (14) = 17.90, $p = .211$, GFI = .990, whereas the pessimism items fit only marginally, χ^2 (14) = 25.95, $p = .026$. However, according to the GFI and root mean squared residual (RMSR) indices, the pessimism items fit the model as well as the optimism items, GFI = .990, RMSR = .045. Take together, these results indicate that the optimism and pessimism item subsets of the OPS/GOE can both be considered unidimensional.

Relations Between Optimism and Pessimism

Based on the above factor-analytic results, Optimism and Pessimism indices were obtained for the LOT and the OPS/GOE by summing the scores for the optimism and pessimism item subsets within each scale. The HS total score was then added as another measure of pessimism. All of these measures are based on the conceptualization of optimism as positive outcome expectancies and pessimism as negative outcome expectancies.

We assessed the reliability of each measure using Chronbach's alpha and coefficient omega (Ω). It has been shown that, when a test is unidimensional, coefficient omega provides a better lower bound to the test's reliability than coefficient alpha (McDonald, 1970). The reliability estimates, intercorrelations, means, standard deviations, and skewnesses for the five indices are presented in Table III. As the table shows, all of the measures have adequate reliability, although the HS and LOT indices are clearly stronger in this regard than the OPS/GOE indices. As expected, the intercorrelation matrix shows that the Optimism indices are consistently more highly related to each other than to the Pessimism indices, and vice versa. All LOT and OPS/GOE indices showed an approximately normal distribution. However, the HS showed a moderate degree of positive skewness in this sample (1.59).

Another way to assess the relative independence of the optimism and pessimism constructs is to examine the relations between the Optimism and Pessimism indices and external criteria. The criterion measures used in this

Table III. Intercorrelations, Reliability Estimates, Means, and Standard Deviations for Optimism and Pessimism Indices[a]

	LOT-OPT	LOT-PES	OPS-OPT	OPS-PES	HS	α	Ω
LOT-OPT		−.43	.59	−.43	−.53	.71	.76
LOT-PES			−.35	.72	.67	.82	.86
OPS-OPT				−.40	−.43	.62	.71
OPS-PES					.64	.82	.86
HS						.85	.95
No. of items	4	4	7	7	20		
$\overline{M}$	9.61	5.94	21.40	14.96	4.12		
SD	2.93	3.33	2.35	3.79	3.90		
Skewness	−0.44	0.55	−0.06	0.47	1.59		

[a] N = 377. LOT-OPT = Life Orientation Test—Optimism index; LOT-PES = Life Orientation Test—Pessimism index; OPS-OPT = Optimism and Pessimism Scale/Generalized Outcome Expectancies—Optimism index; OPS-PES = Optimism and Pessimism Scale/Generalized Outcome Expectancies—Pessimism index; HS = Hopelessness Scale; all correlations are significant at $p < .001$.

study were the subjects' cumulative grade-point average (GPA) at the end of the academic year (the study was conducted during the fall semester) and their level of psychological stress as measured by the total score of the DSP. One hundred forty-seven subjects provided written consent to obtain their GPAs and 299 subjects completed the DSP. The Pearson correlations between the different Optimism and Pessimism indices and these criterion measures are presented in Table IV.

As the table shows, none of the Optimism and Pessimism indices are significantly related to academic performance. On the other hand, the correlations with psychological stress are all highly significant. Higher pessimism scores are associated with higher stress levels, while higher optimism scores are associated with lower stress levels. More importantly, the correlations associated with the three Pessimism indices are all higher than the correlations associated with the two Optimism indices.

In order to test whether optimism and pessimism were correlated differentially with psychological stress, we used the null hypothesis that optimism and pessimism would correlate equally with stress. Using the absolute value of the correlations, we tested this hypothesis by forcing all correlations between any Optimism and Pessimism indices and DSP to be equal. This was done by generalized least squares (Steiger, 1980) using MULTICORR (Steiger, 1987). A very poor fit was obtained, χ^2 (4) = 17.987, p = .0016, indicating that the correlations between the Optimism and Pessimism indices and psychological stress are *not* all equal.

An inspection of the correlations between the Optimism and Pessimism indices and DSP in Table IV clearly indicates that the relation between the OPS/GOE Optimism index and stress is significantly weaker than the relations between the Pessimism indices and stress. However, the con-

Table IV. Correlations Between Optimism and Pessimism Indices, Academic Performance, and Level of Psychological Stress[a]

	Optimism		Pessimim		
Criterion	LOT	OPS/GOE	LOT	OPS/GOE	HS
GPA[b]	.076	.001	−.052	−.011	−.082
DSP[c]	−.464[d]	−.345[d]	.553[d]	.526[d]	.559[d]

[a] GPA = cumulative grade-point average; DSP = Derogatis Stress Profile total stress score; LOT = Life Orientation Test; OPS/GOE = Optimism and Pessimism Scale/Generalized Outcome Expectencies; HS = Hopelessness Scale.
[b] n = 147.
[c] n = 299.
[d] $p < .001$.

Table V. Percentage of Subjects with High and Low Scores on Both Optimism and Pessimism[a]

	LOT		OPS/GOE	
	High optimism	Low optimism	High optimism	Low optimism
High pessimism	0.3	4.9	1.8	8.2
Low pessimism	6.7	0.5	4.4	0.0

[a]N = 389. LOT = Life Orientation Test; OPS/GOE = Optimism and Pessimism Scale/General Outcome Expectancies. High and low levels of optimism and pessimism are defined as 1 standard deviation above or below the mean, respectively.

trast between the LOT Optimism index and the Pessimism indices is less clear. Therefore, we tested whether the relation between the LOT Optimism index and stress was significantly different from the relations between the Pessimism indices and stress. In this case a relatively good fit was obtained, χ^2 (3) = 4.7699, p = .1879, which indicates that there are no significant differences among the correlations. Thus, it appears that only the OPS/GOE Optimism index differs significantly in its relation with psychological stress compared to the Pessimism indices.

The empirical evidence gathered so far concerning a two-dimensional model of optimism and pessimism indicates that the relation between these two constructs is negative; that is, higher levels of optimism are associated with lower levels of pessimism, and vice versa. In order to determine how likely it is to observe high or low levels of both optimism and pessimism, we computed separate two-way (Optimism × Pessimism) tables for the LOT and the OPS/GOE, in which subjects were classified as either high or low in optimism and pessimism concurrently if their scores were 1 standard deviation above or below the mean on each variable. These results are presented in Table V. As the table shows, only 1.8% of our sample would be considered both optimistic and pessimistic if assessed by the OPS/GOE, and only 0.3% if assessed by the LOT. Similarly, only 0.5% would be considered neither optimistic nor pessimistic if assessed by the LOT, and 0% if assessed by the OPS/GOE. Thus, it appears that individuals who score either high or low on both dimensions are extremely rare.

DISCUSSION

The present study used confirmatory as well as exploratory factor-analytic procedures to assess the dimensionality of three different self-report instruments that were designed to measure optimism and pessimism. It was hypothesized that each test was measuring two different, albeit related dimensions—one corresponding to optimism and the other corresponding to pessimism. Initially, only the factor analyses of the LOT supported our hypothesis. The results for the HS and the OPS showed that the former was unidimensional and the latter was multidimensional.

The present findings for the HS also conflict with the results of the principle components analysis reported by Beck et al. (1974), which produced three factors that were subsequently labeled "Feelings about the Future," "Loss of Motivation," and "Future Expectations." The different results obtained in these two studies are probably due to the different data-analytic procedures used. Beck et al. used principal-components analysis with Pearson correlations, whereas the present study used weighted least-squares confirmatory factor analysis with tetrachoric correlations. Principal-components analysis attempts to account for the *variance* of the original variables, whereas the factor-analytic approach used in this study accounts for the *relationships* among the variables. Moreover, the present approach yields falsifiable hypotheses, which can be tested using appropriate methods, whereas principal-components analysis does *not* yield falsifiable hypotheses; therefore, it is more of a descriptive type of analysis (see McDonald, 1985).

An inspection of the items and format of the HS suggests that this scale is measuring a unipolar pessimism dimension rather than a bipolar optimism–pessimism dimension. The pessimism items in the scale seem to reflect *extreme* negative expectancies (e.g., "My future seems dark to me," "I might as well give up because I can't make things better for myself"), which is consistent with Beck's (Beck et al., 1974) original conceptualization of this scale as a measure of "hopelessness." Since a respondent must answer either *true* or *false* to each item, only extreme pessimists are likely to endorse the negative items. More moderate pessimists, like optimists, probably answer *false* to these items. Thus, while the HS may be quite sensitive to manifestations of extreme pessimism or hopelessness, it probably does not distinguish well between pessimism in the normal range and optimism. This may explain the different results obtained for the LOT and the HS in this study, and would also account for the positively skewed distribution of the HS scale in our sample. Therefore, while the present results indicate that the HS is a unidimensional test, these findings do not necessarily challenge the notion that optimism and pessimism are two partially independent constructs. In support of our interpretation of the HS, results and conclusions very similar to ours were recently reported by Young, Halper, Clark, Scheftner, and Fawcett (1992), based on an item-response theory evaluation of the HS in two different samples of subjects.

The initial factor-analytic results for the OPS failed to support either a one-dimensional or a two-dimensional model of optimism and pessimism. Instead, this complex multidimensional scale may be confounding optimism

and pessimism with a number of other related or overlapping psychological constructs. However, when we performed factor analyses on a set of items from the OPS that seemed to fit Scheier and Carver's (1985) definition of optimism and pessimism as generalized positive and negative outcome expectancies, the results tended to support the two-dimensional model of optimism and pessimism.

Taken together, the results of this study cast serious doubt on the validity of the traditional view of optimism and pessimism as polar opposites on a single dimension. Although the present findings are not conclusive with regard to a two-dimensional model of optimism and pessimism, the overall results can be interpreted as being quite consistent with this type of model, at least when the concepts of optimism and pessimism are specifically defined in terms of generalized outcome expectancies. The present results suggest further that the constructs of optimism and pessimism are only *partially* independent, with their interrelation being negative and of moderate intensity (*r*s ranging from −.4 to −.6 in the present sample), thus, making the cooccurrence of high and low levels of both optimism and pessimism extremely unlikely, as was shown in our sample.

Since this research was completed, a study was published by Marshall, Wortman, Kusulas, Hervig, and Vickers (1992) which also assessed the dimensionality of the LOT and the HS. Based on two samples of male navy recruits, these investigators concluded from their results that both the LOT and the HS were bidimensional, with one dimension corresponding to optimism and the other corresponding to pessimism. Although the present study and the Marshall et al. study used different subject samples (undergraduate students vs. navy recruits), it is not likely that the different results for the HS are due to the different subjects because the set of eigenvalues obtained from our sample when Pearson correlations were used match closely the eigenvalues reported by Marshall et al., who also used Pearson correlations. Thus, the two sets of data seem comparable.

A more important difference might be the fact that Marshall et al. (1992) used a modified version of the HS. Instead of employing the original true–false response format, these investigators used the same 5-point Likert-type format that is used in the LOT (ranging from *strongly disagree* to *strongly agree*). Considering our earlier discussion regarding the possible relation between the present findings for the HS and the true–false format of the scale, it is possible that the 5-point Likert-type format changed the nature of the HS from a unidimensional scale to a bidimensional scale. Thus, we believe that the results and conclusions concerning the HS in the Marshall et al. study should *not* be generalized to data obtained with Beck et al.'s (1974) original HS format (see also Young et al., 1992). The original HS and the modified HS may be tapping somewhat different constructs.

In addition to the use of a modified HS format, another methodological problem in the Marshall et al. (1992) study is that the estimation procedure used in their confirmatory factor analysis—i.e., maximum likelihood based on Pearson correlations—tends to yield *incorrect* chi-square goodness-of-fit tests (for a further discussion of this issue, see Bollen, 1989; Jöreskog & Sörbom, 1989). Therefore, the results and conclusions based on Marshall et al.'s methodology may be misleading.

The results found in this study concerning the relations between the separate optimism and pessimism indices and psychological stress are equivocal. Clearly, more research is needed on the comparative predictive power of these two constructs since recent findings have been reported which suggest that they have differential relations with a variety of criterion measures, including different types of coping strategies (Natali-Alemañy, 1991), positive versus negative affect (Marshall et al., 1992), extraversion versus neuroticism (Marshall et al., 1992), and religious commitment (Dember & Brooks, 1989).

The present results and those of Marshall et al. (1992) also call into question the conclusion of Smith, Pope, Rhodewalt, and Poulton (1989) that optimism is indistinguishable from neuroticism or negative affectivity. The studies reported by Smith et al. are based on the LOT as it is conventionally scored—i.e., a single summary score that is assumed to reflect the degree of optimism. Additional research is needed using separate indices of optimism and pessimism to determine if these two concepts might overlap to different degrees with neuroticism and negative affectivity. If this were found to be the case, then it would be important to determine if either optimism or pessimism might add significant incremental validity to the prediction of certain adaptational outcomes beyond that of neuroticism or negative affectivity. The results of such research could have important implications for the study of personality and health.

In closing, a major implication of the present study is that data from one optimism and pessimism instrument should not be integrated with the results obtained from another instrument until the relations among the different instruments (and their underlying constructs) are examined and clarified, especially when the items in the different instruments are not derived from the same specific definition or conceptualization of optimism and pessimism.

REFERENCES

Abramson, L. Y., Metalsky, G. I., & Alloy, L. B. (1989). Hopelessness depression: A theory-based subtype of depression. *Psychological Review, 96*, 358-372.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

Beck, A. (1987). Cognitive models of depression. *Journal of Cognitive Psychotherapy: An International Quarterly, 1,* 5-37.

Beck, A. T., Steer, R. A., Kovacs, M., & Garrison, B. (1985). Hopelessness and eventual suicide: A 10-year prospective study of patients hospitalized with suicidal ideation. *American Journal of Psychiatry, 142,* 559-563.

Beck, A. T., Weissman, A., Lester, D., & Trexler, L. (1974). The measurement of pessimism: The Hopelessness Scale. *Journal of Consulting and Clinical Psychology, 42,* 861-865.

Bollen, K. A. (1989). *Structural equations with latent variables.* New York: Wiley.

Dember, W. N., & Brooks, J. (1989). A new instrument for measuring optimism and pessimism: Test-retest reliability and relations with happiness and religious commitment. *Bulletin of the Psychonomic Society, 27,* 365-366.

Dember, W. N., Martin, S., Hummer, M. K., Howe, S., & Melton, R. (1989). The measurement of optimism and pessimism. *Current Psychology: Research and Reviews, 8,* 102-119.

Derogatis, L. R. (1980). *The Derogatis Stress Profile (DSP): A summary report.* Baltimore: Clinical Psychometric Research.

Derogatis, L. R. (1987). The Derogatis Stress Profile (DSP): Quantification of psychological stress. *Advances in Psychosomatic Medicine, 17,* 30-54.

Hattie, J. (1985). Methodology review: Assessing unidimensionality of tests and items. *Applied Psychological Measurement, 9,* 139-164.

Hulin, C. L., Drasgow, F., & Parsons, C. K. (1983). *Item response theory: Application to psychological measurement.* Homewood: Dow-Jones Irwin.

Jöreskog, K. G., & Sörbom, D. (1989). *LISREL 7: A guide to the program and applications.* Chicago: SPSS, Inc.

Jöreskog, K. G., & Sörbom, D. (1990). *SPSS LISREL 7 and PRELIS: User's guide and references.* Chicago: SPSS, Inc.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping.* New York: Springer.

Marshall, G. N., Wortman, C. B., Kusulas, J. W., Hervig, L. K., & Vickers, R. R. (1992). Distinguishing optimism from pessimism: Relations to fundamental dimensions of mood and personality. *Journal of Personality and Social Psychology, 62,* 1067-1074.

McDonald, R. P. (1970). The theoretical foundations of principal factor analysis, canonical factor analysis, and alpha factor analysis. *British Journal of Mathematical and Statistical Psychology, 23,* 1-27.

McDonald, R. P. (1985). *Factor analysis and related methods.* Hillsdale, NJ: Erlbaum.

Natali-Alemañy, R. M. (1991). *Moods, coping, and perception of daily life events: Are these factors related to optimism and pessimism?* Unpublished doctoral dissertation. University of Cincinnati, Cincinnati, OH.

Roznowski, M. A., Tucker, L. R., & Humphreys, L. G. (1991). Three approaches to determining the dimensionality of binary items. *Applied Psychological Measurement, 15,* 109-127.

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology, 5,* 219-247.

Scheier, M. F., & Carver, C. S. (1987). Dispositional optimism and physical well-being: The influence of generalized expectancies on health. *Journal of Personality, 55,* 169-210.

Smith, T. W., Pope, M. K., Rhodewalt, R., & Poulton, J. L. (1989). Optimism, neuroticism, coping, and symptom reports: An alternative interpretation of the Life Orientation Test. *Journal of Personality and Social Psychology, 56,* 640-648.

Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin, 87,* 245-251.

Steiger, J. H. (1987). *MULTICORR (Version 2.4).* Unpublished document, University of British Columbia, Vancouver.

Young, M. A., Halper, J. S., Clark, D. C., Scheftner, W., & Fawcett, J. (1992). An item response theory evaluation of the Beck Hopelessness Scale. *Cognitive Therapy and Research, 16,* 379-387.