

## THE FACTOR STRUCTURE OF THE LIFE ORIENTATION TEST

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This study disputed the unidimensionality of the Life Orientation Test (LOT). The eight-item LOT was administered to undergraduates in its original mixed form and in consistent optimism and consistent pessimism forms. Within the original form, two factors of optimism and pessimism were identified. However, when items had the same connotations, only one factor emerged. Researchers should acknowledge the two-factor structure of the LOT or reconstruct the items to maintain the unidimensional interpretation of the test.

The Life Orientation Test (LOT; Scheier & Carver, 1985) is one of the most influential indexes of dispositional optimism (Marshall, Wortman, Kusulas, Hervig, & Vickers, Jr., 1992). Numerous studies have used the LOT to examine positive thinking and related research questions. The LOT consists of four optimism and four pessimism items. The eight-item LOT was intended to measure a unidimensional construct of dispositional optimism. In their original study, Scheier and Carver factor analyzed the LOT on a sample of 624 undergraduate students. Their exploratory factor analysis extracted two correlated factors ( $r = .64$ ) using the eigenvalue  $> 1$  rule. In their subsequent confirmatory factor analysis comparing a one-factor and a two-factor model, the two models showed comparable goodness of fit. The authors decided to treat the LOT as unidimensional. Almost all of the published studies using the LOT treat the test as unidimensional. Two studies,

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however, supported the two-factor structure and called for a reconsideration of the more prevalent unidimensional view of the LOT (Marshall & Lang, 1990; Marshall et al., 1992). It is important to reach resolution regarding the factor structure of this popular instrument. The purpose of the present study is to provide additional empirical evidence on the factor pattern of the LOT. As has not been done by previous studies, the present study examines the factor dimensionality of the LOT when its eight items are in their original mixed form and when the items are reconstructed to represent consistent optimism or consistent pessimism.

## Method

Subjects taking the LOT were undergraduate students enrolled in large sections of general education courses at a metropolitan university. They were predominantly White and were about equally divided between males and females. In one administration, the four pessimism items were rewritten into optimism items so that all eight items had a consistent connotation of optimism. For instance, the item "Things never work out the way I want them to" was changed into "Things always work out the way I want them to." In another administration, the four optimism items were changed into pessimism items, making the eight items consistently pessimistic. For example, "In uncertain times, I usually expect the best" became "In uncertain times, I usually expect the worst." A total of 129 students responded to the eight items of consistent optimism, and 149 responded to the eight items of consistent pessimism. Both versions of the LOT were administered using a 4-point scale ranging from 1 = *strongly disagree* to 4 = *strongly agree*. Another group of 108 students responded to the LOT in its original format using the 4-point scale as well as a 6-point scale. Using two scale points enabled an examination of the stability of the factor structure of the LOT, as some studies have shown factorial invariance across scales (Brown, Widing, & Coulter, 1991; Comrey & Montag, 1982; King, King, & Klockars, 1983; Schutz & Rucker, 1975). Scale options of pessimism items were reversed prior to data analysis to avoid negative factor loadings. Confirmatory factor analysis using LISREL 7 and principal components analysis using SPSS were conducted.

## Results and Discussion

The confirmatory factor analysis results supported the one-factor solution when the items were of consistent optimism or consistent pessimism. When items were of the opposite connotations as in the LOT's original wording, the two-factor model showed an overwhelming superiority over the one-factor model. Goodness-of-fit indexes from these two models are reported in Table 1. Standardized factor loadings and error/uniquenesses estimated from the one-factor model are reported in Table 2.

Table 1  
*Goodness-of-Fit Indexes Comparing One-Factor and Two-Factor Models*

Model	$\chi^2$	df	$\chi^2/df$	GFI	AGFI	RMR	$\Delta\chi^2$
Revised LOT of consistent item connotation							
Optimism <sup>a</sup> (n = 129)							
One-factor model	53.4	20	2.67	.903	.826	.036	
Two-factor model	52.1	19	2.74	.906	.822	.036	1.3
Pessimism <sup>b</sup> (n = 149)							
One-factor model	40.6	20	2.03	.937	.886	.041	
Two-factor model	38.5	19	2.02	.943	.891	.043	2.1
Original LOT of inconsistent item connotation							
4-point scale (n = 108)							
One-factor model	130.7	20	4.81	.747	.544	.118	
Two-factor model	53.6	19	2.82	.900	.801	.077	77.1
6-point scale (n = 108)							
One-factor model	101.3	20	5.06	.809	.656	.084	
Two-factor model	45.2	19	2.37	.910	.830	.074	56.1

Note. GFI = Goodness-of-Fit Index; AGFI = Adjusted Goodness-of-Fit Index; RMR = root mean squares residual;  $\Delta\chi^2$  = chi-square difference test between the two-factor model and the one-factor model with 1 degree of freedom; LOT = Life Orientation Test.

a. The four pessimism items were rewritten into optimism items so that all eight items were of consistent optimism.

b. The four optimism items were rewritten into pessimism items so that all eight items were of consistent pessimism.

As can be seen in Table 1, the second factor resulted in significant chi-square reduction for the two original forms of the LOT of inconsistent connotation but not for the two revised LOT forms having consistent item connotations. Other goodness-of-fit indexes indicated the same conclusion. An inspection of Table 2 shows overall higher factor loadings and lower measurement errors when the items were of either optimism or pessimism than when the items were mixed. For instance, the average factor loading and error/uniqueness are .82 and .31, respectively, for the consistent optimism sample, whereas they are .64 and .57, respectively, for the original LOT consisting of half optimism and half pessimism items.

A principal components factor analysis using varimax rotation was conducted for the two original LOTs. Using the eigenvalue > 1 rule, which is widely accepted by researchers, two factors were extracted. The factor loadings are also reported in Table 2. Consistent with the principal components analyses by Marshall et al. (1992) and Scheier and Carver (1985), there were two distinct factors represented by substantial loadings in alignment with optimism versus pessimism. The two factors were correlated at .54 and .64 for the 4- and 6-point scales, respectively.

Table 2  
*Factor Loadings From One-Factor and Two-Factor Solutions*

Item	One-Factor Solution <sup>a</sup>				Two-Factor Solution <sup>b</sup>			
	(a)	(b)	(c)	(d)	(c)		(d)	
					F1	F2	F1	F2
1	.85/.27	.68/.54	.55/.69	.63/.61	.74	.25	.76	.26
3	.84/.30	.84/.29	.50/.75	.67/.55	.89	.07	.88	.22
4	.85/.28	.77/.41	.61/.63	.66/.56	.85	.23	.81	.27
7	.79/.37	.51/.74	.39/.85	.56/.69	.25	.43	.50	.37
2	.79/.37	.72/.48	.73/.47	.78/.38	.42	.64	.38	.72
5	.86/.27	.87/.24	.84/.29	.85/.28	.24	.88	.43	.74
6	.72/.48	.81/.35	.69/.52	.68/.54	.06	.86	.10	.87
8	.83/.31	.65/.57	.81/.34	.75/.43	.23	.81	.23	.84

Note. Column (a): The four pessimism items were rewritten into optimism items so that all eight items were of consistent optimism ( $n = 129$ ). Column (b): The four optimism items were rewritten into pessimism items so that all eight items were of consistent pessimism ( $n = 149$ ). Column (c): The original Life Orientation Test ( $n = 108$ ). Column (d): The original Life Orientation Test using a 6-point scale ( $n = 108$ ).

a. Reported are factor-loadings/error-uniqueenesses from a confirmatory factor analysis conducted within these four samples.

b. Reported are factor loadings corresponding to two factors (F1 and F2) extracted from a principal components analysis with varimax rotation using the eigenvalue > 1 rule.

These results confirm the previous findings of the two-factor structure of the LOT. Apparently, optimism and pessimism items are not bipolar indicators of a single trait continuum; they represent two correlated but distinct traits. It is not known (and perhaps not important to know) whether respondents responded to the content of the items, to the connotations of the items, or to both. Items on a test, inseparable from their affective and semantic representations, are used as indicators to differentiate individuals or things along certain dimensions called constructs. The LOT items in their original form separate individuals along two dimensions, not one. The definition and interpretation of the construct "dispositional optimism" has to be consistent with such empirical stratifications of individual differences. Validity of a test is broadly, although somewhat inaccurately, defined as the degree to which a test measures what it purports to measure. In this light, based on the results of the present study, either the construct of dispositional optimism has to be redefined to reflect the two-factor structure of the LOT or else the items of the LOT have to be reconstructed to achieve factorial consistency with the current unidimensional interpretation of the instrument.

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