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GENERALITY OF THE RELATIONSHIP BETWEEN ATTRIBUTIONS AND
DEPRESSION ACROSS ATTRIBUTIONAL DIMENSIONS AND ACROSS SAMPLES

by

Jacqueline B. Persons and Jeffrey M. Perloff

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Generality of the relationship between attributions and depression
across attributional dimensions and across samples

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Running head: Attributions and depression

Abstract

Two hypotheses implicit in the use of composite measures of attributions in tests of learned helplessness theory (but not implicit in the theory itself) were tested: the hypotheses that relationships between depression and the three types of attributions are equal in magnitude, and linear. To test these hypotheses, data from three published studies of the reformulated learned helplessness theory of depression (Abramson, Seligman, & Teasdale, 1978) were reanalyzed. The hypothesis that internal, stable, and global attributions are equally related to depression was tested and rejected. Increases in internal attributions were related to depression in one sample; increases in global attributions for negative events were related to depression in two samples; stability attributions for negative events were unrelated to depression. The relationship between attributions and depression was nonlinear in one of the three populations studied. Finally, a third hypothesis was tested: the hypothesis that the relationship between attributions and depression is equal across samples. The hypothesis was rejected: attributions for negative events were more highly related to depression in a psychiatric sample than in normal populations. Implications of these findings for learned helplessness theory and for the use of composite measures of attributional style are discussed.

The reformulated learned helplessness theory of depression (Abramson, Seligman, & Teasdale, 1978) states that individuals who make internal, stable or global attributions about the causes of negative events are more likely to become depressed if they experience a negative event than individuals who do not make these types of attributions. Many tests of the theory, however, actually test a much stronger version of the theory than the one described by Abramson, et al. (1978). The stronger hypothesis is that the relationships between depression and the three types of attributions are equal in magnitude, and the hypothesis that the relationships between depression and attributions are linear. These hypotheses are implicit in the use of composite measures of attributions that are widely used in tests of learned helplessness theory. If these additional assumptions are false, the theory may be incorrectly rejected, and the relationship between depression and attributions will be mismeasured.

Composite scores are regularly calculated from the individual items of the scale most frequently used to measure attributions, the Attributional Style Questionnaire (ASQ) developed by Peterson, Semmel, von Baeyer, Abramson, Metalsky, and Seligman (1982). The measure yields six scores, three for internality, stability and globality of negative events (IN, SN, GN) and three analogous measures for positive events (IP, SP, GP). Three composite scores, or indexes, are commonly used. The composite for negative events, N, is the sum of the mean internality, stability and globality scores for the six negative events: $N = IN + SN + GN$. The composite for positive events, P, is

the analogous score for positive events: $P = IP + SP + GP$. Sometimes a single composite total score, T , is calculated, usually by subtracting P from T : $T = N - P$.

Each of these indexes is formed by simply adding or subtracting the three or six dimensions of attributions; thus, N , P , and T are linear, equal-weight indexes. The use of any of these indexes to explain depression in tests of learned helplessness theory assumes that the three types of attributions have equal and linear effects on depression. If these assumptions are incorrect, use of the composites produces biased tests of the relation between attributions and depression (Perloff & Persons, 1988, in press).

The present study tests the hypotheses that the relationships between depression and attributions are equal and linear for all types of attributions. It also tests a third hypothesis: the hypothesis that the relationship between depression and attributions is equal across populations.

Learned helplessness theory does not propose to account for symptoms of depression in all populations. According to Seligman (1978):

. . . I suggest that learned helplessness is a model of a to-be-identified subclass of depressions. This subclass may cut across the usual ways of classifying clinical depression, and it should be found in the nonclinical population as well. (p. 169).

Although dozens of studies of learned helplessness theory have examined the relationship between depression and attributions in a wide variety of populations, few studies have examined variations in the explanatory power of

the theory across populations. Sweeney, Anderson, and Bailey (1986) found that the relationship between depression and global (but not internal or stable) attributions for negative events differed across sample, with psychiatric patients showing stronger relationships than college students or normals. In contrast, Miller, Klee, and Norman (1982) concluded that learned helplessness theory may account for symptoms of depression in college students but not in psychiatric patients. However, they based their conclusions on their study of a psychiatric patient sample, not on a comparative study. Peterson, Villanova, and Raps (1985) reported that studies of psychiatric patients and normals did not differ in the proportion of studies supporting learned helplessness theory. However, they did not assess the strength of the relationship between attributions and depression for the two types of samples; they simply classified studies as supporting or not supporting the theory. Using this method, samples of college students and psychiatric patients might both show relationships between attributions and depression that meet standard criteria of statistical significance, but the magnitudes of the relationships might differ considerably.

The present study reanalyzes data from three published studies of the relationship between depression and attributions in three populations: college students, pregnant women, and psychiatric inpatients (Blaney, Behar, & Head, 1980; O'Hara, Rehm, & Campbell, 1982; Persons & Rao, 1985). First, we assume that relationships between attributions and depression are linear, and we examine the independent contributions to depression of the three attributional dimensions in the three study populations. Second, we test whether the individual attributional dimensions are equally weighted in their

relationship to depression. Third, we test whether the weights of the attributional dimensions are the same across all three samples. Finally, we test the linearity assumption itself for each of the three samples.

Method

Subjects

Subjects in the college student sample were introductory psychology students at the University of Miami. Data from Sample 2 collected by Blaney, et al. (1980) were reanalyzed here.¹ Seventy subjects with missing data were discarded from the sample, leaving 310 subjects.

Subjects in the pregnant women sample were women in the second trimester of pregnancy studied by O'Hara, et al. (1982). After 19 women with incomplete data were discarded from the sample, 151 subjects remained.

Subjects in the psychiatric inpatient sample were all 49 observations collected by Persons and Rao (1985) from psychiatric inpatients at the time of admission to the hospital.

Measures

All subjects completed the Beck Depression Inventory (BDI) and the Attributional Style Questionnaire (ASQ) developed by Peterson, Semmel, von Baeyer, Abramson, Metalsky, & Seligman (1982). Procedural details may be obtained from the original papers.

Beck Depression Inventory. The BDI is a 21-item self-report inventory of the severity of depressive symptoms. It has been shown to be a reliable and valid measure of depression in a wide variety of populations. (Beck, 1972)

Attributional Style Questionnaire. All subjects completed the ASQ.² The ASQ consists of 12 event descriptions (6 positive events and 6 negative events) about which the subject is asked to indicate one major cause of the event, were it to happen to him, and to rate the degree of internality, stability and globality of the cause. The measure yields six scores, three for internality, stability and globality of negative events (IN, SN, GN) and three analogous measures for positive events (IP, SP, GP).

Results

We first assume that the relationship between the attributional measures and depression is linear (the usual assumption in studies of this topic) and estimate the following equation:³

$$BDI = \beta_0 + \beta_{IN}IN + \beta_{SN}SN + \beta_{GN}GN + \beta_{IP}IP + \beta_{SP}SP + \beta_{GP}GP + \epsilon. \quad (1)$$

Based on our estimates of this equation, we test the hypothesis that the IN, SN, and GN attributions have unequal effects on BDI score.

Next, we test the hypothesis that the weights of the attributional dimensions are equal across the three samples. We test this hypothesis in two ways. First, we test the hypothesis that the coefficients on the attributional variables in Equation 1 are equal across populations. Second, we test the hypothesis that the relationship between attributions and depression is linear in all populations. If the degree of nonlinearity varies across populations, then the effect of an increase in an attribution on depression must vary across populations.

Estimates of Equation 1 for the three data sets are reported in Table 1. The equations for the psychiatric inpatients and the pregnant women samples

are estimated using ordinary least squares regressions. However, as shown in Figure 1, the distribution of the college students' BDI scores is censored: 16 percent of the sample had BDI scores of zero.⁴ Therefore, we estimated the equation for the college student sample using tobit, a technique designed to deal with the censoring of distributions (see Judge, Griffiths, Hill, & Lee, 1980).⁵

Insert Table 1 about here
 Insert Figure 1 about here

As shown in Table 1, the coefficients on GN and SP are statistically significantly different from zero at the .05 level and have the theoretically predicted signs in both the psychiatric inpatient and college student samples, as does the coefficient on IN in the psychiatric inpatient sample.⁶ Using a lower standard of significance, .10, the coefficient on IN in the pregnant women sample is significantly different from zero.

Tests of Equal Effects of Attributions on Depression

We use these estimated equations to test the first hypothesis. A test that the coefficients on the internal, stable, and global attributions for negative events are equal, $\beta_{IN} = \beta_{SN} = \beta_{GN}$, was rejected at the .05 level in the psychiatric inpatient sample (Table 2, row 1). The equality of the coefficients on the three positive attribution measures was rejected at the .05 level for the college student sample (row 2). Finally, tests that the coefficients on all six attribution measures are equal in absolute value, $\beta_{IN} = \beta_{SN} = \beta_{GN} = -\beta_{IP} = -\beta_{SP} = -\beta_{GP}$, were rejected in both the college student and the psychiatric inpatient samples at the .05 level (row 3).

Insert Table 2 about here

Thus, we can reject the hypothesis that all types of attributions are equally related to BDI. IN and GN are more highly related to BDI, than SN, which is unrelated to BDI in all three samples.

Tests of Equality of Coefficients Across Samples

We also use these estimates to test the hypothesis that attributions have equal effects across populations. Table 3 reports tests of the hypothesis that the coefficients on the attributional variables are equal across the college student, pregnant women and psychiatric inpatient samples. These tests are based on an ordinary least squares estimation of all three samples simultaneously.⁷

Insert Table 3 about here

The tests are reported for each of the three pairs of samples and for all three samples simultaneously. They show that each of the negative attributional style coefficients for the psychiatric inpatient sample differ from those of both of the other samples. However, we could not reject the hypothesis that the coefficients on the positive attributional style variables are equal across samples.

Table 3 also reports a test of the additional hypothesis that the IN, SN, and GN coefficients are equal to each other and equal across all three samples. That is, we test that both hypotheses one and two are simultaneously true for the attributions for negative events. We also test this hypothesis for the attributions for positive events, and for all six attributional measures. The equality of coefficients on negative attributions, on positive

attributions, and on all six attributional measures were rejected for all three samples collectively and for the psychiatric inpatients sample versus either of the other two samples.

A comparison of the coefficients on the attributions shown in Table 1 shows that each attributional style measure has a much larger absolute effect in the psychiatric population than in the other populations. For example, a one unit increase in GN raises the BDI by 3.92 in the psychiatric population, but by only 0.14 in the college population; the effect of GN on BDI in the pregnant women is not statistically significantly different from zero. Moreover, attributions explain more of the variation in depression in the psychiatric sample ($R^2 = 48$ percent) than in the other two populations (about 11 percent in each).

Tests that the Degree of Nonlinearity of Attributions Varies Across Samples

The tests reported above are premised on the assumption that the relationships between attributions and depression are linear -- that is, that the specification in Equation 1 is correct. Equation 1, of course, assumes linear relationships, and to our knowledge, all published studies of the relationship between attributions and depression have assumed linearity. However, if the degree of nonlinearity varies across populations, the effects of attributions on depression must also vary across populations. We tested the linearity assumption using the Box-Cox (1964) transformation.⁸ We used a maximum likelihood method to estimate a Box-Cox equation,

$$BDI^{(\lambda)} = \beta + \beta_{IN} IN^{(\lambda)} + \beta_{SN} SN^{(\lambda)} + \beta_{GN} GN^{(\lambda)} + \beta_{IP} IP^{(\lambda)} + \beta_{SP} SP^{(\lambda)} + \beta_{GP} GP^{(\lambda)} + \epsilon, \quad (2)$$

where $BDI(\lambda) = (BDI^\lambda - 1)/\lambda$ and similarly for the other variables, and ϵ is assumed to be $N(0, \sigma^2)$.

One attraction of the Box-Cox transformation is that both the linear specification and the log-linear specification are special cases of this equation. For example, if $\lambda = 1$, the equation is linear (as in Equation 1 above); whereas if $\lambda = 0$, the equation is log-linear:

$$\lim_{\lambda \rightarrow 0} BDI^{(\lambda)} = \ln(BDI).$$

Thus, we test whether the equation is linear by testing the hypothesis that $\lambda = 1$. The Box-Cox transformation converts an equation with a nonnormal disturbance into one with a normal disturbance term, so that standard statistical tests based upon the assumption of normality (e.g., t-tests) may be used after the transformation.

The estimates for the pregnant women and psychiatric inpatient samples are reported in Table 4. We do not report Box-Cox estimates for the college student sample because the censoring of that distribution makes this transformation inappropriate.⁹ For the pregnant women and psychiatric inpatient samples, the estimated λ lies between zero and one. Using a likelihood ratio test, we cannot reject the linear specification for the psychiatric inpatient sample, but we strongly reject it for the pregnant women sample. We can reject the log-linear specification for both samples (Table 4).

Insert Table 4 about here

Figure 2 shows two histograms based on the BDI scores of the pregnant women. The one which is skewed to the left is the original one shown in Figure 1. The other histogram represents the Box-Cox transformation of the BDI score. It is much closer to the usual bell-shaped curve of the normal distribution.¹⁰

Insert Figure 2 about here

Because the analyses reported in Tables 1 - 3 are based on an assumption of linearity that proved to be invalid for the pregnant women population, we repeated those analyses using a nonlinear specification. The same coefficients are statistically significantly different from zero in the nonlinear analyses as in the linear regressions. Likelihood ratio tests of equality of coefficients as listed in Tables 2 and 3 also produced similar results.

To summarize, the hypotheses that the negative attributional dimensions are equal across populations was rejected; however, we could not reject the hypothesis that the coefficients on the positive attributional style variables are equal across populations. A Box-Cox test showed that the pregnant women sample has a nonlinear relationship between BDI and attributions, whereas the other two samples have linear relationships.

Discussion

Reexamination of data from three published studies of the relationship between attributions and depression shows that the internality, stability and globality dimensions of attributional style are not equally related to depression. Internal attributions were significantly related to depression in one population, and marginally significantly related in another; global

attributions for negative events were significantly related to depression in two of three populations studied. Stability attributions for negative events were unrelated to depressive symptoms in any of the three populations studied. These findings are consistent with those reported by Peterson, Villanova, and Raps (1985). In a review of 61 published studies, they found that 53% of studies of the relationship between internality attributions and depression reported positive results, and 78% of studies of globality attributions reported positive results, but only 46% of studies of stability attributions reported positive results.

A careful look at the details of learned helplessness theory and at the items of the BDI may explain the finding that internal and global attributions, but not stability attributions, are related to BDI score. According to learned helplessness theory, internal attributions for negative events lead to the depressive symptom of poor self-esteem. Three of the 21 items on the BDI appear to measure self-esteem (item 3, I feel I am a complete failure as a person; item 7, I hate myself; item 8, I blame myself all the time for my faults). Therefore, we might expect internal attributions for negative events to be positively related to BDI score.

People who make global attributions interpret a failure in one area of their lives as proving they are inadequate in many areas. The BDI, which is a weighted sum of the number of depressive symptoms, may be viewed as an indirect measure of the generality of a person's deficits. Therefore, we expect global attributions for negative events to be positively related to BDI score.

In contrast, learned helplessness theory predicts that stable attributions for negative events are associated with a stable, or long-lasting depression. The BDI does not measure the duration of depressive symptoms. Therefore, we do not expect stable attributions to be related to BDI score.

The unequal effects of the three attributional dimensions on BDI, and the account of this finding offered here, suggest that precise tests of learned helplessness theory may require assessment of the particular deficits described by the theory, rather than global measures of depressive symptoms. Surprisingly few studies of this type have been conducted. Several investigators have examined the relationship between attributions and self-esteem, with mixed results (Ickes and Layden, 1978; Solley & Stagner, 1956; Fitch, 1970; Abramson, 1978; McFarland & Ross, 1982; Feather, 1969; Feather & Barber, 1983; Zautra, Guenther, & Chartier, 1985). Apparently only one published study has tested the hypothesis that stable attributions for helplessness situations determine the duration of depressive deficits. Eaves and Rush (1984) found that current episode length was correlated, as predicted, with stable attributions for failure. However, episode length was also correlated with internal attributions for failure. Two studies (Alloy, Peterson, Abramson, & Seligman, 1984; Pasahow, 1980) have tested the hypothesis that the generality of performance deficits arising from perceptions of uncontrollability depends on the subject's globality attributions; results were largely positive.

The present study also showed that the relationship between depression and attributions depends on the population studied. In the cross-population comparison presented here, attributions had larger effects on depression and

substantially more explanatory power in the psychiatric sample than in the normal populations. This finding is consistent with findings reported by Sweeney, Anderson, and Bailey (1986), and indicates that the explanatory power of learned helplessness theory is four times greater for the psychiatric population than for the college student population.

One possible explanation of the finding that relationships between attributions and depression differ across populations is that a sample selection bias is introduced by using samples that do not have full ranges of BDI scores. For example, the psychiatric inpatient sample has a much larger range of BDI scores than the other samples. These biases should have been reduced or eliminated, however, when we combined the three samples into one large sample, which had BDI scores ranging from 0 to 43. Even in the combined sample we were able to strongly differentiate the effects for the three types of subjects. Moreover, the estimated coefficients did not change much in the combined sample when compared with the individual samples, suggesting that any sample selection biases are small.

The findings that the three attributional dimensions are not equally related to depression, and that they are not always linearly related to depression, have important implications for the use of composite measures of attributional style, which assume equal weights and linear relationships. Composite measures are frequently used in empirical tests of learned helplessness theory; 42 of 104 studies of learned helplessness reviewed by Sweeney, et al. (1986) used composite scores.

This study shows that the use of an equal-weight composite measure for negative attributions (IN + SN + GN) is invalid for the psychiatric inpatient

sample. The composite for positive attributions (IP + SP + GP) is invalid for the college student sample. An overall composite (IN + SN + GN - IP - SP - GP) is invalid for both the psychiatric and college student samples.

The hypothesis that the attributional dimensions are equally weighted could not be rejected for the pregnant women sample. However, the failure to reject the null hypothesis that the weights of the components were equal in this sample may be a result of the inability to measure the coefficients precisely, as reflected in the large standard errors. Moreover, there is a marked departure from linearity in the pregnant women sample, showing that a linear composite score is inappropriate for this sample. Thus, linear, equal-weight composites are inappropriate for all three samples.

As Perloff and Persons (in press) show, the invalid use of these composites leads to biased estimates of the coefficients on the attributional variables. A calculation of the size of the coefficient biases resulting from the incorrect use of composites shows that they can be very large. The bias in the psychiatric inpatient sample is 112 percent. The invalid use of the composites biases both the coefficient and standard error estimates and thus results in either Type I or Type II errors in hypothesis tests. Therefore, we recommend against the general use of equal-weight composite measures.

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Author Notes

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Footnotes

¹We used only their second sample because in the first sample there was a time lag of several weeks between the assessment of depression and attributions.

²Persons and Rao note that they used two different sets of measures of the attributional style variables; however, based on t-tests, they report that they could not reject the hypotheses that the two sets of measures are identical. O'Hara, Rehm and Campbell note that not all the questions from the ASQ were used since some were inappropriate for use with a sample of pregnant women (e.g., dating behavior).

³It is possible that Equation (1) should include other variables as well. For example, the theory suggests that life events may enter the equation directly and interactively with the attributions (see Persons and Rao, 1985). For simplicity (but at the risk of biasing our estimates), we ignore the other possible variables in our empirical work here. In experiments with specifications which included a life events measure directly and interactively the results reported below held.

⁴As a result, there is a mass point (many observations at a single point) at zero. Thus, the histogram looks like a censored normal distribution (as if all the observations which would have been negative were set equal to zero). In contrast, in the psychiatric and pregnant women samples, no subject had a BDI score of zero and there are no mass points. The psychiatric sample histogram, in particular, has the usual bell-shaped curve of the normal distribution. As reported in Table 1, we cannot reject the assumption of normality in the

psychiatric sample.

⁵Because tobit is an asymptotic, maximum likelihood technique, asymptotic standard errors are reported. The relevant t-tests are also asymptotic. The tests of equality of coefficients reported in Table 2 below are likelihood-ratio tests (distributed χ^2) rather than the F-tests that are used for the other two samples.

⁶In the pregnant women sample we can reject normality, which implies that the usual t-tests and F-tests should be viewed with caution. The histogram for the pregnant women sample is not symmetric like a normal distribution, but is skewed to the left. We can reject the hypothesis that the errors are distributed normally at the .01 level (Table 1). Therefore, a nonlinear specification is more appropriate for this sample. Unbiased results based on nonlinear estimates are reported below.

⁷Such an estimation technique will result in biased statistical tests since two of the samples (pregnant women and college students) have nonnormal error terms. However, assuming that the error terms in all three samples are identically and independently distributed favors the assumption of equality across samples, so this bias favors the hypothesis that we reject.

⁸Another method of testing for nonlinearities is to include interaction and squared terms as well as the linear terms in Equation (1) and test whether the coefficients on these extra terms are statistically significantly different from zero.

⁹We did, of course, try the Box-Cox on this sample anyway. The estimated λ of -2.43 indicates the inappropriateness of this approach.

¹⁰We have rescaled the Box-Cox transformed variable so that the two histograms overlap on the same horizontal axis.

Table 1. Regression of BDI on attributional style variables in three samples.

	<u>College Students^a</u>		<u>Pregnant Women^b</u>		<u>Psychiatric Patients^b</u>	
	Coeffi- cient	Asymptotic Standard Error	Coeffi- cient	Standard Error	Coeffi- cient	Standard Error
Intercept	0.804	0.607	6.195	3.991	18.037	12.407
Internal- negative (IN)	0.061	0.066	0.824	0.472*	3.649	1.214***
Stable- negative (SN)	0.125	0.082	1.018	0.633	-1.491	0.928
Global- negative (GN)	0.144	0.064**	0.552	0.453	3.923	1.173***
Internal- positive (IP)	-0.086	0.091	-0.897	0.631	-1.908	1.257
Stable- positive (SP)	-1.276	0.107***	-0.096	0.721	-2.643	1.139**
Global- positive (GP)	0.123	0.079	-0.155	0.569	-0.689	1.221
R ²	.115		.105		.484	
df	303		144		42	
χ^2 test of normality (df for χ^2)			36.24*** (6)		2.37 (1)	

(a) Estimated using tobit (because the distribution is censored). The observed frequency of BDI > 0 is 84.2 percent; the predicted probability is 78.5 percent.

(b) Estimated using ordinary least squares.

* Reject the null hypothesis (the coefficient is zero) at the 0.10 level.

** Reject the null hypothesis at the .05 level.

*** Reject the null hypothesis at the .01 level.

Figure 1. Histograms of distributions of BDI score for the college student, pregnant women and psychiatric inpatient samples.

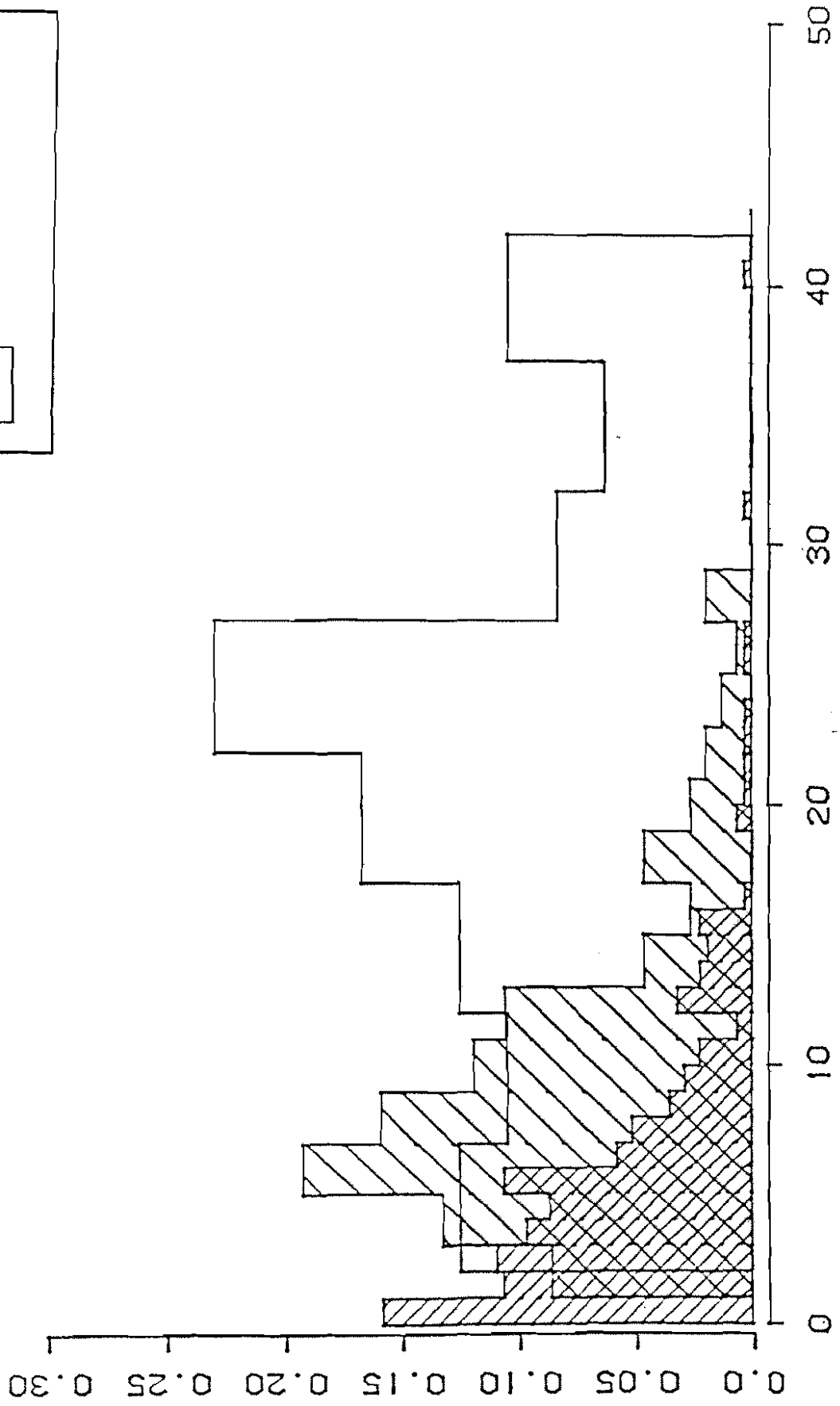
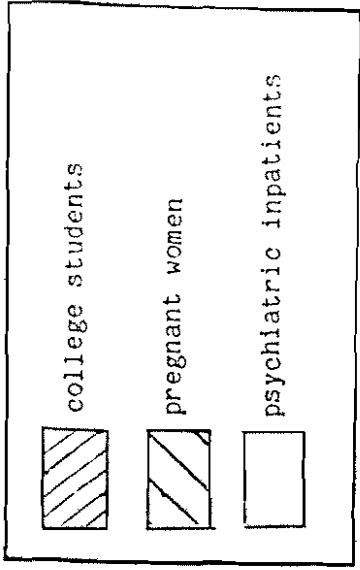


Table 2. Tests of composite attributional indexes in three samples, F(nr,df).

Test	nr ^a	College ^b students	Pregnant ^c women	Psychiatric ^c patients
Negative attributional variables have equal weights ($\beta_{IN} = \beta_{SN} = \beta_{GN}$)	2	0.75	0.140	4.192*
Positive attributional variables have equal weights ($\beta_{IP} = \beta_{SP} = \beta_{GP}$)	2	7.42*	0.445	0.403
All attributional variables have equal weights ($\beta_{IN} = \beta_{SN} = \beta_{GN} = -\beta_{IP} = -\beta_{SP} = -\beta_{GP}$)	5	12.56*	0.760	2.794*
Degrees of freedom (df)		303	144	42

(a) nr = number of restrictions.

(b) Log-likelihood test statistic (which is distributed χ^2).

(c) F(nr,df) test statistic.

* Reject the null hypothesis at the .05 level.

** Reject the null hypothesis at the .01 level.

Table 3. F-tests of equality of coefficients on attributional variables across samples, $F(nr,df)$.

	nra	<u>Pairs of samples</u>			<u>All three samples</u>	
		College Pregnant	Pregnant Psychiatric	College Psychiatric	nra	
Intercept	1	14.952**	1.562	0.842	2	7.476**
Internal-negative (IN)	1	1.230	7.562**	12.555**	2	6.320**
Stable-negative (SN)	1	0.168	5.054*	4.536*	2	2.772
Global-negative (GN)	1	0.335	7.763**	6.652**	2	3.913*
Internal-positive (IP)	1	0.256	0.764	1.683	2	0.850
Stable-positive (SP)	1	1.959	3.510	0.903	2	1.997
Global-positive (GP)	1	1.075	0.241	1.560	2	1.048
Negative composite (IN + SN + GN)	5	0.485	5.675**	4.921**	8	3.583**
Positive composite (IP + SP + GP)	5	1.383	3.904**	2.651*	8	2.668**
Overall composite (IN + SN + GN - IP - SP - GP)	11	1.540	6.284**	4.785**	17	4.317**

Note. Degrees of freedom in the denominator = 489.

(a) nr = Number of equality restrictions (degrees of freedom in the numerator).

* Equality restrictions rejected at the .05 level.

** Equality restrictions rejected at the .01 level.

Table 4. Box-Cox transformation of regression of BDI on attributional style.

	<u>Pregnant Women</u>		<u>Psychiatric Patients</u>	
	Coefficient	Asymptotic Standard Error	Coefficient	Asymptotic Standard Error
Intercept	2.857	0.948***	12.083	5.700**
Internal-negative	0.400	0.225*	2.597	.931***
Stable-negative	0.266	0.320	-1.090	0.930
Global-negative	0.201	0.205	2.808	1.118**
Internal-positive	-0.395	0.406	-1.349	0.997
Stable-positive	-0.314	0.454	-2.199	1.201*
Global-positive	0.019	0.318	-0.551	0.945
λ	0.27		0.78	
R ²	0.071		0.476	
df	144		42	
Log-likelihood	-450.93		-170.19	
Likelihood Ratio Test Statistics:				
$\lambda = 0$	7.37***		19.19***	
$\lambda = 1$	46.08***		1.39	

* Reject the null hypothesis at the .10 level
 ** Reject the null hypothesis at the .05 level
 *** Reject the null hypothesis at the .01 level

Figure 2. Distributions of raw scores and transformed scores for the pregnant women sample.

