Examining the Psychometric Properties of the Empathic Concern Scale

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Abstract

This study was conducted to assess the psychometric properties of the 10-item Empathic Concern Scale. The measure was administered to 149 participants from the psychology department subject pool, and data analyses included measuring the reliability and validity of this scale, performing item analyses for internal consistency and validity, and performing a factor analysis on these 10 items. We correlated these items, individually and as a composite score, with a measure of Nonverbal Emotional Expression to assess for discriminant validity. The Empathic Concern Scale demonstrated adequate reliability and validity for research purposes, and that it was sufficiently dissimilar to the Nonverbal Emotional Expression Scale; however, some items on the Empathic Concern Scale appeared to have ambiguous meaning or complex sentence structure (e.g., used a negative grammatical term).

Introduction

The purpose of this paper is to examine the Empathic Concern Scale. This scale measures empathic concern, which is the tendency to feel concern or sympathy for those who suffer (Barchard, 2001). We will examine its internal consistency and its validity, conduct an item analysis in order to determine how the internal consistency and validity of this measure could be improved, and conduct an item-level factor analysis.

Method

Participants

Participants included in this study were students in the psychology department in Spring 2003. Most participants were undergraduate students enrolled in an introductory psychology course. All students completed this study to obtain research credit towards their psychology classes. The sample consisted of 149 participants, comprised of 54 males and 95 females. The group was comprised of a variety of ethnicities. These included Caucasian (52.3%), Hispanic (14.1%), Asian, (11.4%), African-American (10.1%), Pacific Islander (6.7%), Native American (1.3%), and Other (4.0%). The age of participants ranged from 18 to 57, with a mean age of 19.60 (SD = 3.91).

Measures

Empathic concern is the tendency to feel concern or sympathy for those who suffer (Barchard, 2001). The Empathic Concern Scale consists of 10 items, half of which are reverse-coded. It uses a 5-point accuracy scale (1 = *Very Inaccurate*, 5 = *Very Accurate*) The complete Empathic Concern scale is included in Appendix A.

The Nonverbal Emotional Expression Scale is the tendency to express one's feelings to others through bodily (i.e., nonverbal) expression (Tett, Wang, Gribler, & Martinez, 1997). The Nonverbal Emotional Expression scale consists of 12 items. It uses a 6 point agreement scale (1 = *Strongly Disagree*, 6 = *Strongly Agree*).

Procedure

The data were collected in the spring of 2003, in order to provide data for class projects in Psy 481 and 712. Collection was done in two sessions, which were conducted one week apart. The first session was approximately 90 minutes, and the second session was 60 minutes. Most of the sessions were completed in the Psychology Computer Lab, CBC B135. All measures were administered via the computer. Participants reviewed and signed a consent form, and then completed the measures in an untimed format. Sessions were supervised by research assistants of undergraduate and graduate standing. All assistants received training in experiment administration to ensure standardization of the instructions and procedures. In addition, all assistants received training on ethics in research with human subjects.

Results

Reliability

We assessed reliability using standardized alpha, coefficient alpha, and the Intraclass Correlation Coefficient, ICC(A, k). We obtained a standardized alpha of .74, coefficient alpha of .74 with a 95% confidence interval of .67 to .80 (Feldt, 1965), and an ICC(A,k) of .71 with a 95% confidence interval of .63 to .77 (Fleiss &

Shrout, 1978). For our analysis, we are most interested in coefficient alpha. Based on a coefficient alpha of .74, we consider our reliability to be at an acceptable level for research purposes. In addition, the Standard Error of Measurement (SEM) was calculated using coefficient alpha. We obtained an SEM of .30. Because the items are not strictly parallel, the SEM may underestimate how far the observed scores are from the true scores.

Validity

Discriminant validity was assessed by correlating total scores of Tett's Nonverbal Emotional Expression Scale with the Empathic Concern Scale. The correlation was small ($r(126) = .22$, $p = .01$). Considering the domains assessed by Tett's Nonverbal Emotional Expression Scale and the Empathic Concern Scale, we expected a small positive correlation. However, the small size of the correlation indicates that these scales are measuring different constructs overall, which confirms that the scale has discriminant validity.

Item Analysis

Internal consistency. To assess ways to improve internal consistency, we calculated the corrected item-total correlation and the alpha-if-item-deleted for each of the items on the Empathic Concern Scale. The results are in Table 1 below. Items 5 and 3 were found to have high consistency with the overall scale. Corrected item-total correlations with the composite score were high ($r > .50$), and resulted in the lowest alpha values if these items were deleted ($\alpha < .71$). We found that items 6 and 8 had low corrected item-total correlations ($r < .30$). However, using alpha-if-item-deleted, we did not find that removing any items would increase internal consistency as measured by coefficient alpha. If we wanted to increase internal consistency, then we would revise items 6 and 8 in an effort to relate them more strongly to the overall construct.

Table 1

Item Analysis to Improve Internal Consistency

	Item	Corrected Item-Total Correlation	Alpha-if-Item-Deleted
1.	Am concerned about others	.44	.71
2.	Feel sympathy for those who are worse off than myself	.47	.71
3.	Sympathize with the homeless	.51	.70
4.	Believe that criminals should receive help rather than punishment	.39	.72
5.	Believe the poor deserve our sympathy	.58	.69
6.	Feel little concern for others	.29	.73
7.	Have no sympathy for criminals	.32	.73
8.	Look down on any weakness	.26	.74
9.	Don't like to get involved in other people's problems	.32	.73
10.	Have little sympathy for the unemployed	.45	.71

Note. Coefficient alpha for the ten item test is .74.

Validity. To assess ways to improve the validity of our items, we correlated each item from the Empathic Concern Scale with the total score of Tett's Nonverbal Emotional Expression Scale. The results are in Table 2.

Table 2

Item Analysis to Improve Validity

	Item	Correlation with Tett's Emotion in Self: Nonverbal
1.	Am concerned about others	.20*
2.	Feel sympathy for those who are worse off than myself	.15
3.	Sympathize with the homeless	.04
4.	Believe that criminals should receive help rather than punishment	.05
5.	Believe the poor deserve our sympathy	.15
6.	Feel little concern for others	.18
7.	Have no sympathy for criminals	.01
8.	Look down on any weakness	.04
9.	Don't like to get involved in other people's problems	.33**
10.	Have little sympathy for the unemployed	.07

* $p < .05$. ** $p < .001$.

Because we are analyzing discriminant validity of modestly related scales, we expected correlations to be slightly positive or near-zero. Items 1 and 6 ($r(125) = .20$ and $r(126) = .18$) correlated significantly with the Nonverbal Emotional Expression Scale at the $p < .05$ level, while item 9 ($r(126) = .33$) correlated significantly with the Nonverbal Emotional Expression Scale at the $p < .001$ level. All other correlations were non-significant.

Factor Analyses

We extracted the First Principle Component to examine if all items are related to the same general construct. We did a Component Matrix Analysis and found that all of our items had salient loadings. The results are in Table 3 below. All reversed scored items had negative loadings as expected. Our analyses did not indicate that removing items would improve internal consistency.

Table 3
First Principal Component

	Item	Pattern Matrix Coefficient
1.	Am concerned about others	.62
2.	Feel sympathy for those who are worse off than myself	.69
3.	Sympathize with the homeless	.73
4.	Believe that criminals should receive help rather than punishment	.52
5.	Believe the poor deserve our sympathy	.78
6.	Feel little concern for others	-.35
7.	Have no sympathy for criminals	-.42
8.	Look down on any weakness	-.36
9.	Don't like to get involved in other people's problems	-.40
10.	Have little sympathy for the unemployed	-.52

To determine the number and nature of factors underlying the Empathic Concern Scale, we conducted a principle components analysis with multiple factors. The first step was to determine the number of factors, which we assessed using 5 evaluative criteria. According to theory, we hypothesized only 1 factor. Both the scree test and the Kaiser-Guttman rule indicated the presence of 4 factors. A Parallel Analysis test indicated 1 discrete factor, while the MAP test revealed 2 factors. We decided to test a 2-factor model, as the MAP test and Parallel Analysis are the best techniques and they indicate 1 or 2 factors. Based upon the various number of factor rules, we chose 2 because other tests estimated higher numbers of factors and 2 is closer to the hypothesized number of factors based on theory.

To determine the optimal rotation we examined several different rotations and selected the one that came closest to the ideal of simple structure, using the following criteria: fewest complex items, greatest hyperplanar count, and low correlation among the factors. Based on these criteria, the optimum factor rotation performed was a Promax rotation with a kappa value of 2, which yielded a low correlation between the factors ($r = 0.10$), the greatest number of hyperplanar factor loadings (N = 6), and zero complex items.

We extracted 2 factors, which are listed below in Table 4. Based on our factor rotation, items 1, 2, 3, 4, and 5 had salient positive loadings on Factor One. Item 7 had a salient negative loading on Factor One. We determined that the items that load on Factor 1 measured the desired construct, Empathic Concern. Items 6, 8, 9, and 10 had salient positive loadings on Factor Two. No items had salient negative loadings on Factor Two. Interestingly, items 6-10 were reverse-scored, and were intended to measure the same construct, empathic concern, as the positively keyed items (1-5), which all loaded on Factor One. It seems, with the exception of item 7, that Factor Two was merely measuring "Negatively Keyed Items." As a result, this factor was difficult to interpret meaningfully, and may be a garbage factor. In review of the first principal component (FPC) (see Table 3), all positively keyed items had salient positive loadings on the FPC and all negatively keyed items had salient negative loadings on the FPC. This single-factor model is preferred, as it is consistent with theory. We called our single factor Empathic Concern.

Using the regression method, we obtained factor scores for our single-factor model described above. We then correlated these factor scores with the variable we used to assess validity, Tett's Nonverbal Emotional Expression Scale. The correlation between Empathic Concern factor scores and total scores on Tett's Nonverbal Emotional Expression Scale was significant ($r(124) = .21$, $p = .021$). This small, significant correlation was expected. Consistent with theory, there is a small positive relationship between Empathic Concern and Nonverbal Emotional Expression as measured by these scales. However, because the relationship is small, this evidence supports that the two constructs differ from one another.

Table 4
Factor Analysis Results for Rotated Factors

Item		Factor 1	Factor 2	h^2
3.	Sympathize with the homeless	**.84**	.07	.71
5.	Believe the poor deserve our sympathy	**.84**	-.03	.72
2.	Feel sympathy for those who are worse off than myself	**.75**	-.02	.57
4.	Believe that criminals should receive help rather than punishment	**.54**	-.07	.30
1.	Am concerned about others	**.53**	-.28	.39
7.	Have no sympathy for criminals	**-.38**	.15	.18
6.	Feel little concern for others	.07	**.82**	.66
10.	Have little sympathy for the unemployed	-.15	**.75**	.61
9.	Don't like to get involved in other people's problems	-.07	**.67**	.46
8.	Look down on any weakness	-.21	**.33**	.17
	Factor Intercorrelations	1	2	
	Factor 1	1.00	-.10	
	Factor 2		1.00	

Note. h^2 = communality. Salient factor pattern matrix coefficients are in boldface. No items were reverse-scored for this analysis. Factor 1 = Empathic Concern. Factor 2 = Garbage Factor.

Discussion

In this research, we sought to examine the quality of the Empathic Concern Scale (Barchard, 2001). In particular, the reliability and validity was explored through item analysis, first principal component analysis, and multiple-factor principal component analysis. It was determined that the reliability of the Empathic Concern Scale was acceptable for research purposes. Based on a discriminant validity analysis, the total scores on the Empathic Concern Scale had a low correlation with Tett's Nonverbal Emotional Expression Scale. Therefore, it is concluded that these tests measure different constructs. An item analysis using alpha-if-item-deleted determined that deleting items would not increase internal consistency; however, some items only had a modest relationship to the rest of the test. Nearly all of the items demonstrated discriminant validity: with the exception of Item 9, item correlations with the Nonverbal Emotional Expression total scores were either small or near-zero. The first principal component analysis demonstrated that the items measure the same general construct: all items had salient loadings on the first principal component in the hypothesized directions. However, when assessing whether the construct had multiple factors, results indicated that more than one factor may exist. Testing a two-factor model, the results were unable to be interpreted leading to a conclusion that a one-factor model using the first principal component as the single factor is preferred. Overall, these tests indicate that the Empathic Concern Scale is interpretable as one-factor measure with sufficient psychometric properties for research purposes. However, based on some low item-total correlations and only modest reliability, it is suggested that revising some items may improve the scale's psychometric features.

This study had a few notable limitations. One limitation is the presence of homogenous subsamples among the participants. Males and females may respond differently on the Empathic Concern Scale, but their data were combined in the analyses. This may have influenced internal consistency, factor structure, or discriminant validity of the scale. Future research may want to analyze each gender separately. In addition, restriction of range may occur in this data for two reasons. First, the participants were college students in a psychology course; this group may be generally higher than the average population on empathic concern, and few respondents in this sample may endorse low concern. Second, there may be a social desirability effect because people generally want to appear more empathic. This would increase empathic concern scores, limiting the occurrence of low scores and reducing variability. Restricting the range on this scale could decrease inter-item correlations, which would reduce coefficient alpha, decrease factor loadings, and impact the overall factor structure. Similarly, restriction of range could reduce the correlations with external variables, thus exaggerating discriminant validity. Also, as with any self-report measure, there are concerns about effort and honesty when responding. However, as there are no external motivations for a respondent to practice deception, these effects are estimated to be minimal.

Appendix A: Empathic Concern Scale

Please use the rating scale below to describe how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age.

1. Am concerned about others — Select One
2. Feel sympathy for those who are worse off than myself — Select One
3. Sympathize with the homeless — Select One
4. Believe that criminals should receive help rather than punishment — Select One
5. Believe the poor deserve our sympathy — Select One
6. Feel little concern for others — Select One
7. Have no sympathy for criminals — Select One
8. Look down on any weakness — Select One
9. Don't like to get involved in other people's problems — Select One
10. Have little sympathy for the unemployed — Select One

Appendix B: Empathic Concern Scale

Please use the rating scale below to describe how accurately each statement describes you. Describe yourself honestly and as you generally are now, not as you wish to be in the future.

1. Am concerned about others — Select One
2. Feel sympathy for those who are worse off than myself — Select One
3. Sympathize with the homeless — Select One
4. Believe that criminals should receive help rather than punishment — Select One
5. Believe the poor deserve our sympathy — Select One
6. Ignore the problems of others — Select One
7. Feel physical pain when I see others suffering — Select One
8. Feel emotional pain when I see others suffering — Select One
9. Believe people should handle their problems themselves — Select One
10. Worry about people who are unemployed — Select One

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