

# Measuring Emotional Contagion: An Examination of the Responsive Distress Scale

Reference: Westfall, R. S., Kirsch P. M. & Barchard K. A. (2014, April). *Measuring emotional contagion: An examination of the responsive distress scale*. Poster presented at the Western Psychological Association annual convention, Portland, OR.

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## Abstract

This study examined the psychometric qualities of the Responsive Distress Scale, a measure of emotional contagion experienced by individuals. Participants ( $n = 149$ ) completed the Responsive Distress Scale, in addition to several other measures. We then analyzed the psychometric qualities of internal consistency, convergent validity, individual item analyses, and conducted both exploratory and confirmatory factor analysis. Convergent validity was high and internal consistency was acceptable. After conducting item analyses it became apparent that three items were problematic for the scale. Through factor analyses, we extracted two factors and identified these two factors as *Negative Emotional Responsiveness* and *Event Responsiveness*. We determined that the measure taps into two distinct constructs, rather than one. Future research might profitably divide this scale into two distinct subscales or focus entirely upon items that explicitly mention responses to other people's distress.

## Introduction

A fascinating aspect of human interaction is the capacity to influence the subjective experiences of others. Behaviors, attitudes and emotions are all subject to changes from the surrounding social environment. One key aspect of this phenomenon is responsive distress. Responsive distress is defined as "the tendency to feel negative emotions when in the presence of others who are feeling negative emotions" (Barchard, 2001, p. 15). Responsive distress can be measured utilizing the Responsive Distress Scale (Barchard, 2001). The current study aims to examine the Responsive Distress Scale (RDS), specifically to (1) examine its internal consistency, (2) examine its validity, (3) conduct an item analysis in order to determine how the internal consistency and validity of this measure could be improved and (4) conduct an item-level factor analysis.

## Method

### Sample

The current study was conducted with 149 participants recruited from a large urban university, who participated in exchange for research credit. Data from participants who failed to complete all items were deleted prior to data analysis, leaving 52 males and 90 females. All participants were students enrolled in a psychology course at the time of the study. Participants ranged in age from 18 to 57, with a mean of 19.52 and a standard deviation of 3.94.

### Measures

The Responsive Distress Scale (Barchard, 2001; see Appendix A) is intended to measure an individual's propensity to experience negative emotions when in the presence of others who are feeling negative emotions. Half of the 10 items are reverse-coded and the scale is designed such that a higher score indicates a greater likelihood that the respondent experiences responsive distress. The measure uses a 5-point agreement scale (1 = *Very Inaccurate* and 5 = *Very Accurate*).

The Responsive Joy Scale (Barchard, 2001) is intended to measure an individual's propensity to experience positive emotions when in the presence of others who are feeling positive emotions. Four of the 10 items are reverse-coded and the scale is designed such that a higher score indicates a greater likelihood that the respondent experiences responsive joy. The measure uses a 5-point agreement scale (1 = *Very Inaccurate* and 5 = *Very Accurate*).

### Procedures

Data for the current study were obtained during one 90 minute session, although many participants returned a week later to complete other measures for the second part of the study. Upon arrival in the designated room, participants were seated at a computer and provided with a paper copy of the informed consent form. Completion of the measures was untimed and participants were aware that they could stop at any time. Both measures were completed via computer, under the supervision of trained research assistants.

## Results

### Internal Consistency

To examine the internal consistency of the Responsive Distress Scale, we calculated Interclass Correlation Coefficients as well as the confidence interval for the parameter (Feldt, 1965; Fleiss & Shrout, 1978). We found standardized alpha = .72, coefficient alpha = .73, 95% CI [.66, .79] and ICC (A,k) = .68, 95% CI [.60, .76]. Thus, coefficient alpha falls into a range often considered acceptable for research purposes. Using coefficient alpha, the Standard Error of Measurement (SEM) was calculated, resulting in a SEM = 3.24. The SEM may underestimate how far the observed scores are from the true scores, because the items are not strictly parallel ( $\chi^2(62) = 487.16, p < .001$ ).

### Validity

Convergent validity was assessed by correlating RDS total scores with total scores on the Responsive Joy Scale. Ideally, this correlation should be positive. The correlation was positive and strong ( $r(142) = .44, p < .001$ ). The strength of this correlation shows that individuals high in responsive distress also tend to be high in responsive joy.

*Item Analyses*

We conducted item analyses to determine which items reduce internal consistency within the RDS. Both the corrected item-total correlation and the alpha-if-item-deleted were computed (see Table 1). The alpha-if-item-deleted technique revealed that coefficient alpha would increase if item 6 were removed. Furthermore the corrected item-total correlation for item 6 was a meager .16. Thus there is agreement between both statistical techniques that item 6 is detrimental to internal consistency.

Table 1  
*Item Analysis to Improve Internal Consistency*

Item	Corrected item-total correlation	Alpha-if-item deleted
1. Am deeply moved by others' misfortunes	.51	.69
2. Am easily moved to tears	.58	.67
3. Suffer from others' sorrows	.41	.71
4. Am upset by the misfortunes of strangers	.42	.70
5. Would be upset if I saw an injured animal	.36	.71
6. Am calm even in tense situations	.16	.74
7. Am not easily disturbed by events	.29	.73
8. Am unaffected by the suffering of others	.33	.72
9. Rarely cry during sad movies	.53	.68
10. Remain calm during emergencies	.28	.73

*Note.* Coefficient alpha for the 10-item test is .73.

We also conducted item analyses to determine which items decrease convergent validity on the RDS. Individual items from the RDS were correlated with total scores on the Responsive Joy Scale (see Table 2). Statistically significant positive correlations were found between seven items on the RDS and the RJS total scores. Items 1, 2, 4, 8, and 9 had strong convergent validity were items 4, 2, 1, 8, and 9. Items 3 and 5 had moderate convergent validity. Items 6, 7, and 10 had low convergent validity with responsive joy.

*Factor Analyses*

The First Principal Component was extracted to see to what degree all items were related to the same general construct. Coefficient alpha for the First Principal Component equals .75 and none of the items had reverse pattern matrix coefficients. Two items (items 6 and 10) did not have salient pattern coefficients (see Table 3).

To determine the number and nature of factors underlying the RDS, we conducted a principal components analysis with multiple factors. The first step was to determine the number of factors. We used five criteria: theory, the Kaiser-Guttman rule, the Scree test, Parallel analysis and the MAP test. Based upon theoretical examination of the scale items, we postulated that there are two independent factors. The Kaiser-Guttman rule indicated that there could be as many as three factors; however the Scree test indicated two; consistent with theory. Both Parallel analysis and the MAP test suggested only one factor. Research suggests that Parallel analysis and the MAP test are accurate

Table 3

*First Principal Component*

Item	Pattern matrix coefficient
1. Am deeply moved by others' misfortunes	.70
2. Am easily moved to tears	.74
3. Suffer from others' sorrows	.60
4. Am upset by the misfortunes of strangers	.62
5. Would be upset if I saw an injured animal	.53
6. Am calm even in tense situations	-.13
7. Am not easily disturbed by events	-.37
8. Am unaffected by the suffering of others	-.52
9. Rarely cry during sad movies	-.69
10. Remain calm during emergencies	-.29

*Note.* Coefficient alpha for the first principal component equals .75.

complexity (0) and lowest inter-factor count (0): the Quartimax Rotation with Kaiser Normalization.

Table 2  
*Item Analysis to Improve Validity*

Item	Correlation
1. Am deeply moved by others' misfortunes	.36**
2. Am easily moved to tears	.37**
3. Suffer from others' sorrows	.25**
4. Am upset by the misfortunes of strangers	.40**
5. Would be upset if I saw an injured animal	.28**
6. Am calm even in tense situations	-.09
7. Am not easily disturbed by events	.16
8. Am unaffected by the suffering of others	.36**
9. Rarely cry during sad movies	.33**
10. Remain calm during emergencies	-.10

\*\*  $p < .01$ .

within one factor, whereas use of the Scree test may produce a result that is either a little higher or a little lower than the true number (Naser, Benson & Wisenbaker, 2002). As the theoretical prediction of two factors lands within the range suggested by the above tests, two factors were extracted and rotated.

To determine the optimal rotation for our factors, we evaluated several rotations based on four criteria: the number of complex items, the number of hyperplanar pattern matrix coefficients, the maximum absolute correlation between factors, and the average absolute correlation among factors. We utilized an Excel file application to assist in this process (Barchard, 2012). After evaluating eight rotations on these criteria, we selected the rotation with the highest hyperplanar count (6), the lowest

In the rotated pattern matrix, (see Table 4), items 1, 2, 3, 4, and 5 had positive, salient loadings on factor 1. Items 8 and 9 had negative, salient loadings on factor 1. All salient items on factor 1 involve responsiveness to negative emotional states experienced by the individual; therefore, we titled this factor *Negative Emotional Responsiveness*. Items 6, 7, and 10 had positive, salient loadings on factor 2. There were no negative, salient items on Factor 2. All salient items on factor 2 involve responsiveness to external events; therefore, we named this factor *Event Responsiveness*.

We calculated the factor scores for the RDS using the regression method. We then correlated these factor scores with total scores on the Responsive Joy Scale. The correlation between factor scores on the negative emotional responsiveness factor and total scores on the Responsive Joy Scale was high ( $r(142) = .54, p < .001$ ). The correlation between factor scores on the event responsiveness factor and total scores on the Responsive Joy Scale was weak and nonsignificant ( $r(142) = .10, p = .23$ ). These results support our previous assertion that there is a strong relationship between some parts of the RDS and the Responsive Joy Scale.

### Discussion

The goal of the present study was to examine the psychometric qualities of the Responsive Distress Scale. The RDS was designed to measure whether individuals are responsive to distress in others. Internal consistency and convergent validity with the Responsive Joy Scale were acceptable. However, the item-level factor analysis revealed that the current measure taps into two distinct constructs. Items loading on factor 1 appeared to measure responsive distress related to emotions expressed by others and items loading on factor 2 appeared to measure responsive distress related to external events. The RDS is intended to measure “an individual’s propensity to experience negative emotions when in the presence of others who are feeling negative emotions” (Barchard, 2001). However, these factor analysis results demonstrate that a second construct is also being measured. Future research should either create separate subscales for each of these two constructs or should focus exclusively on items that discuss reactions to others’ distress.

Certain limitations are present in the current study. Previous research has found gender differences occur regarding emotional contagion. Specifically, females exhibit higher levels of emotional contagion for all emotions except for anger (Kevrekidis, Skapinakis, Damigos, & Mavreas, 2008). This could be problematic when examining the results of the current study. Women would be expected to get higher scores than men on many (but not all) of the RDS items and on all of the items on the criterion variable (the Responsive Joy Scale). Analyzing the data together confounds between group differences with within group differences. Future researchers looking at the RDS may wish to conduct separate analyses for men and women to eliminate the potential impact of gender effects on the results. A second limitation of our study is that our sample contained a much larger number of women than men. This could be problematic as well. If the correlations for men and women differ, the overall correlation will reflect the numerically larger group if there are no mean differences. This may create the impression of a relationship for the other subgroup, even if none exists.

Table 4  
*Factor Analysis Results for Rotated Factors*

Item	Factor		h <sup>2</sup>
	1	2	
rd1_1# Am deeply moved by others' misfortunes	<b>.71</b>	-.01	.51
rd1_2# Am easily moved to tears	<b>.70</b>	-.23	.55
rd1_4# Am upset by the misfortunes of strangers	<b>.66</b>	.08	.45
rd1_9# Rarely cry during sad movies	<b>-.64</b>	.27	.48
rd1_3# Suffer from others' sorrows	<b>.61</b>	-.01	.37
rd1_8# Am unaffected by the suffering of others	<b>-.59</b>	-.20	.38
rd1_5# Would be upset if I saw an injured animal	<b>.54</b>	-.01	.30
rd1_6# Am calm even in tense situations	.08	<b>.86</b>	.75
rd1_7# Am not easily disturbed by events	-.28	<b>.41</b>	.25
rd1_10# Remain calm during emergencies	-.09	<b>.83</b>	.70

Note. h<sup>2</sup> = communality. No items were reverse-scored for this analysis. Salient factor pattern matrix coefficients are in boldface. Factor 1 = Negative Emotional Responsiveness. Factor 2 = Event Responsiveness.

### References

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## Appendix A

### Instructions

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.

<u>Very Inaccurate</u>	<u>Moderately Inaccurate</u>	<u>Neither Inaccurate nor Accurate</u>	<u>Moderately Accurate</u>	<u>Very Accurate</u>
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>

- |     |   |   |   |   |   |   |
|-----|---|---|---|---|---|---|
| 1.  | Am deeply moved by others misfortune      | 1 | 2 | 3 | 4 | 5 |
| 2.  | Am easily moved to tears                  | 1 | 2 | 3 | 4 | 5 |
| 3.  | Suffer from others' sorrows               | 1 | 2 | 3 | 4 | 5 |
| 4.  | Am upset by the misfortunes of strangers  | 1 | 2 | 3 | 4 | 5 |
| 5.  | Would be upset if I saw an injured animal | 1 | 2 | 3 | 4 | 5 |
| 6.  | Am calm even in tense situations          | 1 | 2 | 3 | 4 | 5 |
| 7.  | Am not easily disturbed by events         | 1 | 2 | 3 | 4 | 5 |
| 8.  | Am unaffected by the suffering of others  | 1 | 2 | 3 | 4 | 5 |
| 9.  | Rarely cry during sad movies              | 1 | 2 | 3 | 4 | 5 |
| 10. | Remain calm during emergencies            | 1 | 2 | 3 | 4 | 5 |