
Measuring the Consequences of Injustice

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The factor structure of measures of consequences of distributive injustice was explored. Study 1 reports confirmatory factor analyses of two samples of data in which university student subjects read vignettes about a student who worked at a particular job and was paid a low wage. Judgments of fairness and of happiness were clear and measurable consequences of underpay injustice. A Justice Emotions factor (anger and guilt) was also present, although this factor was not psychometrically sound. A method factor was also required to obtain an adequate fit to the data. In Study 2, the Justice and Happiness factors were replicated. Anger and Guilt formed separate factors. In an overpay situation, this structure did not fit the data. Exploratory factor analysis suggested the presence of two second-order factors (Happiness/Anger and Fairness/Guilt). Implications for both theoretical and methodological issues in the study of distributive justice are discussed.

People react differently to rewards or payments when those rewards are higher. This sentence must strike most readers as a statement of the obvious. First of all, it is consistent with our intuitive sense of human nature. Furthermore, social science research over three decades has provided ample empirical confirmation that changes in the level of outcomes received by an actor, especially relative to the actor's inputs, produce both affective and cognitive changes in the actor's psychological state (for reviews, see, e.g., Berkowitz & Walster, 1976; Bierhoff, Cohen, & Greenberg, 1986; Cook & Hegtvedt, 1983; Messick & Cook, 1983; Walster, Walster, & Berscheid, 1978).

The study of the psychological consequences of distributive justice has focused on the cognitive and emotional responses to various reward distributions as mediators of behavioral responses designed to eliminate perceived or actual injustice. Most theories of distributive justice argue that some function of the rewards received and input contributed in a relationship is compared with some comparison standard. The results of

this comparison determine the degree to which a distribution is judged as fair or unfair. These theories differ as to the specific comparison function that is proposed, ranging from simple ratios (e.g., Adams, 1965; Walster et al., 1978) to logarithmic functions (e.g., Jasso, 1980; Markovsky, 1985). The proposed source or sources of the comparison include other people (e.g., Walster et al., 1978), a generalized other (e.g., Berger, Fisek, Norman, & Wagner, 1983; Berger, Zelditch, Anderson, & Cohen, 1972), and one's own past rewards (e.g., Austin, McGinn, & Susmilch, 1980; Messe & Watts, 1983). In the last two decades there has been an increasing recognition that people may take information other than inputs and rewards—the needs of the recipients, for example—into account in determining distributive justice (cf., Cook & Hegtvedt, 1983; Deutsch, 1983, 1985; Leventhal, Krtuza, & Fry, 1980; Mikula & Schwinger, 1978).

Decisions regarding the fairness of a distribution are cognitive judgments. Traditionally, this cognitive process is then purported to lead to emotional outcomes. As Homans (1961) wrote:

The more to a man's disadvantage the rule of distributive justice fails of realization, the more likely he is to display the emotional behavior we call anger. Distributive justice may, of course, fail in the other direction, to the man's advantage rather than to his disadvantage, and then he may feel guilty rather than angry. (pp. 75-76)

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Anger and guilt have, historically, been the emotions most associated with injustice. Happiness and satisfaction have also been recognized as consequences of justice judgments. Several recent theorists have reversed the traditional causal relationship between the cognitive and emotional consequences of injustice, suggesting that the emotional consequences may precede and have an effect on the cognitive judgments of fairness (Scher & Heise, 1993; Sinclair & Mark, 1992).

From either of these perspectives, however, the emotional and cognitive components of the subjective experience of injustice are conceptually distinct. And, despite likely reciprocal effects between the emotional and cognitive components, these concepts should also be empirically distinct. As Messick and Sentis (1983) wrote, "although the concepts of fairness and satisfaction" (and, I would add, guilt and anger) "are interrelated, they are different concepts, and it is important not to confuse them" (pp. 61-62).

Unfortunately, these concepts have frequently been confused, and very little attention has been paid to whether they are not only conceptually distinct but are also empirically distinct. In fact, research in this area has only rarely attempted to examine the psychometric properties of measures of these theoretically relevant constructs. Typically, only one measure is used to assess a given construct, and even when multiple measures are used, information is rarely provided regarding the psychometric properties of combinations of these measures. Examination of only a few studies will serve to demonstrate the problem.

O'Malley and Becker (1984), for example, measured fairness by asking subjects a single question about the fairness of the distribution of wages between employees. They measured the affective consequences of the reward distribution with five items (relaxed-disturbed, content-distressed, restless-upset, satisfied-dissatisfied, and pleased-troubled). These latter measures were summed for subsequent analysis. However, O'Malley and Becker reported neither the correlations among the items on their emotion scale nor the reliability of the scale. No information was provided to indicate that these items form a single factor or that these "affective" measures were measuring something distinct from the measure of fairness. Anger and guilt were not measured at all in this study.

Similarly, Hegvedt (1990) measured feelings of satisfaction, deserving, gratefulness, anger, resentfulness, helplessness, and guilt. Some of these measures were combined, and others were treated individually in her analysis. However, Hegvedt did not report information as to whether her measures could be discriminated in a reliable way. Austin and Walster (1974) administered a

mood adjective checklist to subjects and also measured perceived satisfaction, fairness, and two judgments of the allocator of the reward. The mood questionnaire was combined into a unitary index of mood, whereas the latter four questions were summed to form "an index of fairness/satisfaction" (p. 214). No information was provided to confirm the unitary nature of either of the two constructs nor to demonstrate the independent nature of the two types of consequences of equity being examined. Furthermore, the second of their "indices" confounded fairness and satisfaction.

Although this is not a comprehensive survey of the literature in this area, the studies discussed above are among the psychometrically more sophisticated studies in this field. Typically, only one or two Likert-type items are used to assess each of the affective and justice-related consequences of the distribution of rewards. This generally precludes any psychometric analyses of the constructs that play such a central role in theories of distributive justice.

This article is designed to examine some of these psychometric properties. Specifically, data will be presented to examine whether typical measures that are used in studies of distributive justice do, in fact, measure separate affective and cognitive consequences of injustice, and to examine the typical structure of those consequences. The factor structure of the consequences of injustice will be examined with confirmatory factor analysis.

This type of analysis seems crucial in an area such as distributive justice in which research effort has been devoted to examining what conditions lead to different types of effects of injustice (e.g., Austin et al., 1980; Messe & Watts, 1983) and in which there have been attempts to delineate the theoretical ordering of these constructs (cf., Scher & Heise, 1993, for further discussion). If the constructs cannot be adequately measured, then it would be difficult if not impossible to answer these types of questions.

However, psychometric research is of more than methodological interest. An examination of the structure of responses to injustice can provide valuable information about the types of constructs that subjects meaningfully experience following injustice. Findings of reliable and valid factors forming after particular situations suggest that those are the types of consequences that arise in those situations.

The current research, then, seeks to address the structure of the consequences of injustice. It is an attempt to examine whether the constructs that have been proposed to follow from unfair distributions of rewards do indeed arise in such situations and whether those consequences can be reliably and distinctively measured.

STUDY 1

Method

Samples. Study 1 reports data from two samples. Sample 1 consisted of 153 students enrolled in sociology classes during the summer session at a large university in the midwestern United States. The students' ages ranged from 18 to 50 years, with a median age of 22. The sample was 55.8% female. Sample 2 consisted of 184 students (73.9% female) enrolled in sociology and psychology classes during the winter term at a small, undergraduate college in Western Canada. Subjects' ages ranged from 17 to 47 years, with a median of 20.

Procedure. For both samples, subjects read stories in which a student at their university took a temporary job cleaning out a well-known public place after an event. For example, in one version of this story for Sample 2, the student was hired to clean out a local theater after a performance. Each subject responded to only one story, although there was between-subject variability in some details of the stories. In all versions of the story, the student worked hard for 4 hours. For most versions of the story, the student was paid \$20.00 for his 4 hours of work. In some versions of the story for Sample 1, the student received a lower wage (\$7.50) but also received admission to the sporting event involved (either a football or a basketball game).

Variables. After reading the stories, subjects completed questionnaires containing the dependent variables. The variables relevant to the affective and justice-related consequences appeared on two pages. The first page asked subjects to indicate how fair they thought the amount of money received was, how just the payment was, whether the subject would have been satisfied with the amount of money received, whether the student got the amount of money he deserved, and how contented they (the subjects) would have been with the amount of money paid. These variables were reported on 9-point scales ranging from -4 to +4. The endpoints were labeled (e.g., -4 = *Unjust* and +4 = *Just*), as was the 0-point (e.g., 0 = *Neither just nor unjust*).

On a second page, subjects were asked to indicate how much anger, guilt, and happiness they would feel at the time they were paid if they were the student in the story. These questions were answered on 7-point scales ranging from 1 to 7, with only the endpoints labeled (e.g., 1 = *Not at all angry* and 7 = *Extremely angry*).

Results

The means for all the variables are presented in Table 1. Because this study was designed to measure the consequences of injustice, the goal was to create situations in which the payment for the work done would always be

seen as unfair. It is clear that this was the case. The means of both the emotional and the cognitive variables are all within that half of the scale that would be expected for unfair conditions.

FACTOR ANALYSIS

An examination of the factor structure of measures of the consequences of injustice was carried out using confirmatory factor analysis to find the factor model that adequately reproduces the sample covariance matrices (see Table 1) for the data from the two samples. All of the models reported below were tested using the computer package EQS (Bender, 1989). The approach taken was to test three theoretically plausible models with the data from Sample 1 and, if a model was found to fit the data, to cross-validate that model with the data from Sample 2.

Specification of models. Three increasingly complex models seemed to be suggested by theoretical work in the area of distributive justice. The first possibility was that all of the variables measured in this study represent only one factor—that is, that there is a Consequences of Injustice factor, which may include several subscales theoretically but which is not empirically divisible. Therefore, Model A was a one-factor model, with all of the variables loading onto this single factor.

Although the one-factor model is plausible, a two-factor model corresponds more closely to both classic accounts of the relationship between judgments of injustice and emotional consequences (e.g., Adams, 1965; Homans, 1961; Walster et al., 1978) and more recent accounts of this relationship (e.g., O'Malley & Davies, 1984; Scher & Heise, 1993; Sinclair & Mark, 1991, 1992). The former accounts suggest that first a cognitive evaluation of injustice is made and subsequently that the emotional reactions are generated; the latter group of authors suggests that at least in some situations the emotional reaction may come first and/or may influence the cognitive judgments. Either of these causal orders suggests, at a minimum, a two-factor model, with one factor representing the cognitive judgments of fairness or justice and one factor representing the emotional reactions. Therefore, Model B was a two-factor model, with measures of the justice of the payment, the fairness of the payment, and whether the student got what he deserved for the work loading on the first factor, representing the cognitive effects of injustice, and all the other variables (satisfaction, contentment, guilt, anger, and happiness) loading on a second factor, representing the emotional reactions to injustice.

This division of the effects of injustice into cognitive and emotional components reflects a long-standing distinction in the literature on this topic. However, it can also be argued that there are two types of emotions that

TABLE 1: Means, Standard Deviations, and Correlations of Variables, Study 1

Variable	Mean	SD	1	2	3	4	5	6	7	8
Sample 1										
1. Fairness	-1.78 ^a	1.80	1.00							
2. Justice	-0.78 ^a	2.51	0.74	1.00						
3. Deservingness	1.60 ^a	1.73	-0.50	-0.42	1.00					
4. Satisfaction	-1.81 ^a	2.23	0.77	0.63	-0.38	1.00				
5. Contentment	-1.44 ^a	2.13	0.72	0.63	-0.37	0.82	1.00			
6. Happiness	3.06 ^b	1.38	0.56	0.45	-0.33	0.48	0.56	1.00		
7. Anger	3.31 ^b	1.79	-0.69	-0.62	0.43	-0.67	-0.70	-0.53	1.00	
8. Guilt	1.47 ^b	1.01	-0.24	-0.22	0.12	-0.17	-0.19	-0.09	0.26	1.00
Sample 2										
1. Fairness	-1.71 ^a	1.54	1.00							
2. Justice	-1.00 ^a	2.20	0.65	1.00						
3. Deservingness	1.39 ^a	1.77	-0.40	-0.36	1.00					
4. Satisfaction	-1.95 ^a	2.00	0.70	0.59	-0.37	1.00				
5. Contentment	-1.38 ^a	1.90	0.44	0.40	-0.30	0.63	1.00			
6. Happiness	3.05 ^b	1.42	0.35	0.32	-0.21	0.44	0.53	1.00		
7. Anger	3.30^b	1.81	-0.44	-0.39	0.41	-0.45	-0.53	-0.45	1.00	
8. Guilt	1.27 ^b	0.76	-0.03	-0.02	-0.14	-0.07	-0.05	-0.04	0.03	1.00

a. Mean ratings could range from -4 to +4; higher numbers indicate greater degree of variable.
 b. Mean ratings could range from 1 to 7; higher numbers indicate greater degree of variable.

are involved in reactions to injustice. One group of emotions is the negative reactions either to receiving less than is fair (anger) or to receiving more than is fair (guilt). These *justice-related emotions* reflect negative reactions to unfair distributions of rewards. A second group of emotions, however, reflects the positive reactions to fair rewards. Specifically, these emotions (e.g., satisfaction, contentment) reflect happiness at the fairness of the reward received. Aside from the fact that these latter emotions have a positive valence, they seem different in another way. Anger and guilt are emotions that seem specifically related to justice or moral concerns. In fact, some have argued that the experience of an injustice is the essential element of the prototypical anger script (Lakoff, 1987; Scher & Heise, 1993). On the other hand, happiness and contentment are (thankfully) more general emotions. They can be generated by any of a number of positive events, from good weather to good friends. Being adequately rewarded is only one of these causes.

To test whether the justice-related emotions and the satisfaction emotions are distinct concepts and are, further, distinct from the cognitive fairness judgments after a distribution, Model C was a three-factor model, with Factor 1 measured by the same variables as in Model B, Factor 2 measured by the satisfaction, contentment, and happiness variables, and Factor 3 measured by the anger and guilt variables.

Regardless of the separability of these two or three types of reactions to injustice, it is clear that they are related. No theoretical model specifies otherwise. (The distinctions among the models are based on different

causal relationships, among other things. However, the causal ordering is beyond the concern of this article.) Because of this relationship, correlations between the factors were unconstrained in Models B and C. To set the scale of the factors, the variances of all factors in all models were constrained to 1.

Model fit. Table 2 presents goodness-of-fit statistics for the estimation of the three models. Although several of the goodness-of-fit statistics appear to reflect fairly high degrees of fit (i.e., fit indexes greater than .90) in Sample 1, none of the three models produced an estimated covariance matrix that adequately (i.e., nonsignificantly) reproduced the sample covariance matrix—Model A: $\chi^2(20) = 53.15, p < .001$; Model B: $\chi^2(19) = 33.38, p = .022$; Model C: $\chi^2(17) = 28.42, p = .042$.

Based on the χ^2 statistic alone, then, it appears that none of these models adequately fit the data. However, it has been suggested that the GFI test of significance cannot be used as a true significance test in covariance structure modeling (e.g., Joreskog, 1969, 1993). Certainly, this test cannot be relied on as the only measure of fit. In the current case, other indicators of fit (see Table 2) suggest a fairly good fit, especially for Model B.

There are, however, two important reasons that we must conclude that these models are not sufficient to capture the relationships in the data. First, the major shortcoming of the χ^2 statistic is its sensitivity to sample size. With large samples, the χ^2 statistic is likely to be significant because of trivial differences between the sample covariance matrix and the covariance matrix

TABLE 2: Goodness-of-Fit Statistics for Tested Factor Models, Study 1

Model	Sample 1					Sample 2					
	χ^2 (df)	p	lv7VFI	CFI	CAIC	χ^2 (cif)	p	lv7vri	C I	A ₂	CAIC
Model A 53.15 (20)	.001	.933	.952	.953	-67.45	74.76 (20)	.001	.847	.891	.892	--49.54
Model B 33.38 (19)	.022	.969	.979	.979	-81.20	58.00 (19)	.001	.885	.922	.923	--60.08
Model C 28.24 (17)	.042	.973	.984	1.02	-74.27	57.77 (17)	.001	.866	.995	.920	--47.88
Model D 51.10 (19)	.001	.932	.954	.954	-63.48	67.11 (19)	.001	.858	.904	.906	--50.97
Model E 12.63 (14)	.555	1.00	1.00	1.00	-71.79	22.65 (14)	.066	.965	.983	.983	--64.36
Model F 11.67 (12)	.472	1.00	1.00	1.00	-60.69	12.95 (12)	.372	.996	.998	.998	--61.62

NOTE: NNFI = nonnormed fit index; CFI = comparative fit index; A₂ = Bollen's (1989) incremental fit index; CAIC = Bozdogan's (1987) consistent version of Akaike's information criteria (AIC).

implied by the model being tested. However, with small to moderate samples such as those included in the current article, a significant χ^2 is likely to represent "real" deviation between the model being tested and the process that actually generated the data.

Even ignoring the χ^2 test, furthermore, we should not accept any of these models. Recall that the analytic strategy proposed was to cross-validate any acceptable model in Sample 1 with the data from Sample 2. With the Sample 2 data, it is even clearer that none of the three models tested fit the data. Once again, all of the χ^2 tests indicate significant discrepancies between the sample covariance matrix and the matrix reproduced by the tested model. Further, for all three models, one or more of the goodness-of-fit statistics are below .90 (generally considered the minimal standard for an adequate fit). Therefore, we must proceed further in an effort to identify adequate models to represent the data.

The effects of method. One further element of the measurement of the variables was therefore considered. The dependent variables for this study were measured on two separate pages, and the variables had two different (although very similar) formats. The variables on the first page (fairness, justice, satisfaction, deservingness, and contentment) were measured on 9-point scales ranging from -4 to +4, with the endpoints and 0-point labeled. Subjects indicated their response to a complete question on each of these five scales. On the other hand, the variables on the second page (anger, guilt, and happiness) were measured on 7-point scales ranging from 1 to 7, with only the endpoints labeled. For these variables, subjects were told to indicate how much they thought the character in the story would feel each of several emotions. Each scale was preceded by the name of the emotion to be rated.

Normally, method factors are included in models when the manifest variables are obtained with two (or more) fairly different types of methods. For example, method factors might be included if both self-report and observational measures of aggression are taken, or if

both a standardized test and parent's reports of a child's social skills are measured. It does not seem likely that the few differences between the two types of self-report measures in the current study would make such a difference.

However, it is clear that none of the substantively interesting models are adequate. None of the models tested so far fit the data unambiguously (i.e., indicated good fit on all fit indexes). Furthermore, no other substantive modifications are suggested by the theoretical or empirical literature on distributive justice. Thus it seemed reasonable to explore the possibility that the unexplained covariation in the current data is due to the different methods used to measure the variables.

Such exploration could not lead to a convincing answer about the need for a method factor if there were only one sample of data to consider. However, given our ability to cross validate any models that fit in the first sample with the data from the second sample,² it is possible to proceed in this exploratory mode.

Model D was a model that proposed that all of the covariance in the sample data could be accounted for with two method factors, one representing the methods of the first page of the dependent variables and one representing the second page. The correlation between the factors was left unconstrained. This model did not fit the data in either sample (see Table 2). Therefore, it appears that although none of the substantive models fit the data, the variation in the data is not solely a methodological artifact.

Two additional models were tested. The intent was to test the two substantively interesting models, with the addition of method factors—in other words, to adapt Models B and C to include the method factors from Model D. However, only three of the manifest variables were measured on the second page, and all three of these are proposed to load on the Emotion factor in the two-factor model. In the three-factor model, one of these variables (happiness) loads on the Satisfaction factor, and two (anger and guilt) load on the Justice Emotions factors. This situation provides a variety of identification

TABLE 3: Standardized Parameter Estimates of the Three-Factor and Method Model, Study 1

	Substantive Factor Loadings							
	Justice		Satisfaction		justice Emotions		Method	
	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2
X1. Fairness	.907 (.119)	.579 (.168)	a	-a	-a	-a	.219 (.136)	.656 (.172)
X2. Just	.788 (.178)	.531 (.232)	a	a	a	a	.116 (.204)	.512 (.218)
X3. Deservingness	-.586 (.132)	-.498 (.173)	a	a	a	a	.000 (.145)	-.179 (.193)
X4. Satisfaction			.772 (.173)	.679 (.157)			.636 (.129)	.587 (.204)
X5. Contentment	a	a	.825 (.156)	.806 (.141)	-a	-a	.284 (.163)	.120 (.176)
X6. Happiness		a	.662 (.106)	.643 (.106)	a	a	a	a
X7. Anger	a	a			.951 (.223)	1.00 (.095)	-a	-a
X8. Guilt	a	a	a	a	.269 (.086)	.024 (.056)	-a	-a
Correlations of substantive factors								
Justice	—	—						
Satisfaction	.903 (.040)	.775 (.102)						
Justice Emotions	-.803 (.100)	-.773 (.115)	-.896 (.110)	-.669 (.056)				

NOTE: Standard errors are in parentheses.
 a. Parameters constrained to zero in estimation.

and estimation problems. Basically, there is no way to partial the covariation between the substantive factors and the method factors.

As a solution to this problem, only one method factor, representing the page 1 methods, was included in Models E and F. That is, the effect of the methods of page 2 on the guilt, happiness, and anger variables was left in the disturbance factors for each of these manifest variables. Model E, therefore, was a model with two substantive factors (Cognitive and Emotional Reactions, as in Model B above) and one method factor, with all of the cognitive variables, satisfaction, and contentment also loading on the method factor. Model F was a modification of the three-factor model (Model C above) with the same method factor as in Model E.

As can be seen in Table 2, both the two-factor (and method) model and the three-factor (and method) model adequately fit the data for both samples. Chi-square difference tests indicate that the multifactor models clearly fit the data better when a method factor is included. Comparing the two-factor model with a method factor to the same model without a method factor yields a $\chi^2(5) = 20.74$ for Sample 1, and $\chi^2(5) = 35.35$ for Sample 2, both $p < .001$. Similar comparisons for the model with three substantive factors are also significant—Sample 1: $\chi^2(5) = 16.57$, $p < .01$; Sample 2:

$\chi^2(5) = 44.82$, $p < .001$. The inclusion of a method factor clearly improves our ability to account for the covariation of these variables.

Choosing either Model E or Model F as preferred is a more complicated problem. In general, one should select the most parsimonious model that fits the data (Bender & Mooijaart, 1989; Mulaik et al., 1989). This would argue for the adoption of the two-factor model (Model E) if only the χ^2 fit statistics are taken into account.

Within Sample 1, furthermore, the fit statistics are essentially identical for the two models (except for Bozdogan's, 1987, consistent version of Akaike's information criteria [CAIC], which favors the two-factor model). However, within Sample 2, all of the fit criteria seem to support the three-factor model (again, with the exception of CAIC).

The χ^2 difference test comparing Models E and F with one another reflects this relative closeness in fit for Sample 1 and larger difference for Sample 2. The comparison is not significant in the first sample, $\chi^2(2) = .961$, but is significant for Sample 2, $\chi^2(2) = 9.69$, $p < .01$.

In addition, although the two-factor model has some precedence due to parsimony, the three-factor model has strong theoretical and historical support. As discussed above, it seems more than reasonable to distin-

guish the justice-related emotions from satisfaction in the measurement of the consequences of distributive justice. All things considered, then, the three-factor model appears to be preferred.

Parameters of the model. Table 3 reports the estimated parameters for this model. Several of these parameter estimates are worthy of comment. First, it is clear that the three substantive factors are correlated. Of course, this is completely consistent with theoretical models of the distributive justice process. Because, in conditions of injustice, either judgments that a distribution is unfair lead directly to affective consequences or the affective consequences lead to judgments regarding the fairness of the distribution, we would expect the emotional and cognitive components of these judgments to be highly correlated. They are.

A second set of noteworthy findings concerns the loadings on the Justice Emotions factor. This factor is much more strongly measured by the anger variable than the guilt variable. This is quite consistent with research on equity theory that has consistently found that people are much less distressed by overpayment (the purported preconditions of guilt) than they are with the anger-inducing conditions of underpayment (see Messick & Sends, 1979, 1983). This finding is also consistent with simulations carried out by Scher and Heise (1993), which suggested that guilt was not a strongly predicted outcome of overpayment.

CLASSICAL EVALUATION OF MEASUREMENT OF FACTORS

Before concluding the presentation of the results, it is worthwhile examining how well the various substantive factors can be measured by the items included in the current research. Two qualities of tests—reliability and validity—are typically considered within classical measurement theory (e.g., Lord & Novick, 1968).

Reliability. The reliabilities of scales formed by summing all the indicators for each substantive factor were estimated with Cronbach's alpha (Cronbach, 1951). To facilitate comparison of the reliabilities of the various scales, alpha estimates of reliability were adjusted, using the Spearman-Brown prophecy formula, to reflect the expected reliability if all scales had five items.³ Both the original reliability estimates and the adjusted estimates are reported in Table 4. Unless explicitly mentioned otherwise, the adjusted alpha estimates will be discussed below.

As can be seen in the table, even though these estimates ignore the method factor, the indicators of the various factors generally show moderate to good consistency in their measurement of the substantive factors. With the exception of the Justice Emotions factor in the three-factor model, the alpha coefficients are all above

TABLE 4: Reliability Estimates for the Two-Factor and Method Model and the Three-Factor and Method Model, Study 1

Factor	Sample 1		Sample 2	
	Coefficient Alpha	Alpha-SE	Coefficient Alpha	Alpha-SE
One-factor model	.8889	.8320	.8235	.7446
Fairness ^a	.7765	.8527	.7112	.8039
Emotions				
(two-factor model)	.8311	.8311	.7431	.7431
Satisfaction (three-factor model)	.8270	.8884	.7678	.8464
Justice Emotions				
(three-factor model)	.3425	.5656	.0336	.0800

NOTE: Alpha-SB = alpha estimated for a scale of five items, using the Spearman-Brown prophecy formula.

a. The Fairness factor is the same for both the two-factor and three-factor models.

.70. Most hover around .85. Thus these scales seem to be fairly consistent measures of the factors.

The measures of the Justice Emotions factor, however, are quite poor (especially in Sample 2). This problem with the measurement of the Justice factor most likely comes from the fact that the guilt and anger variables really reflect two separate constructs.

Psychometric properties of individual measures. Generally speaking, it is recommended that any substantive factor be measured with more than one indicator. However, it may be useful to examine the psychometric properties of the individual indicators of the various factors. With an explicit measurement model, estimated with structural equation modeling, it is possible to examine several estimates of reliability and validity that could not be examined in the absence of such a model (see Bollen, 1989). Using these methods, the reliability of a measure, defined as the ratio of the variance of the *true scores* on an observed variable to the overall variance of the observed score, can be determined. These reliabilities are reported in Table 5.⁴

The validity of the measures can be assessed by looking at the relationship between the observed measure and the factor score. These squared correlations between an observed variable and the substantive factors on which they load are also reported in Table 5.⁵

As can be seen, the Justice factor was best measured by the fairness question. In both samples, the reliability and validity of this measure were the highest of the various indicators of this factor. The anger variable is the best measure (of the two included here) of what I have called justice emotions. Its reliability approaches one in both samples. In fact, the reliability of the guilt variable was near zero in both samples, further pointing to the "failure" of this variable in the current study.

TABLE 5: Reliability and Validity of Individual Items, Study 1

Variable	Sample 1		Sample 2	
	Reliability	Validity	Reliability	Validity
Fairness	.87	.82	.77	.33
Justice	.63	.62	.55	.28
Deservingness	.34	.34	.28	.25
Satisfaction	1.0	.60	.80	.46
Contentment	.76	.68	.66	.65
Happiness	.44	.44 ^a	.41	.41 ^a
Anger	.92	.92 ^a	1.0	1.0 ^a
Guilt	.07	.07 ^a	.00	.00 ^a

a. These validities are equal to the corresponding reliabilities (see Note 5 in the text).

In looking at the best measure of the Satisfaction factor, the reliability and validity information provided here give conflicting recommendations. The measure of satisfaction appears to provide the most reliable measure of the factor, but the contentment variable seems to be most closely related to the overall factor.

STUDY 2

Study 1 provided two replications of a factor structure for people's reaction to injustice. These results seem to suggest that three factors—a positive affect factor, a justice emotions factor, and a fairness judgment factor—are affected when a person is underrewarded for their work.

However, there are a number of problems with the interpretation of these results. The Justice Emotions factor is particularly problematic from both a conceptual and operational perspective. The items that were set to load on that factor—guilt and anger—really represent two different aspects of injustice. Anger is commonly proposed to result from injustice due to receiving less than one expects or deserves. Guilt, on the other hand, is proposed (at least by some theorists) to arise from injustice due to receiving more than one deserves. Unfortunately, the presence of only one guilt item and one anger item did not allow for a test of the possibility that these two constructs are separable factors.

The traditional psychometric analyses do, however, provide some evidence that these items did not represent a unidimensional factor. Internal consistency reliability estimates were particularly low for this factor. The reliability of the individual items suggests that guilt is a particularly bad measure. The reliability of this item was essentially zero.

It seems clear, from the above, that the confounding of anger and guilt in the two samples was inappropriate. Study 2 attempted to examine the separate structure of guilt and anger by including multiple items for both of

these constructs, in addition to the Satisfaction and Justice factors included in Study 1. Study 2 was, therefore, based on a model with four substantive factors.

One reason why the guilt variable may not have provided good measurement of the consequences of the student's situation in Study 1 is because guilt is proposed to be a consequence only of overpay. In the underpay situations used in Study 1, guilt ratings may have been nonsensical to subjects. In Study 2, the amount of money paid for the work was systematically manipulated to provide a situation of underpay (replicating Study 1) and a situation of overpay. If the argument that guilt is nonsensical in the underpay situation is correct, I would expect that the guilt variables would continue to show poor psychometric properties in the underpay condition but would improve in that regard in the overpay situation. It might also be tentatively predicted that in the overpay condition, the anger variables would make no sense to subjects and, therefore, would have low reliability.

It should be repeated, however, that the prediction of distress in overpay situations has not stood up particularly well to empirical examination. If guilt is not a consequence of injustice under any circumstances, then we would expect the low reliability found in Study 1 to reappear in both conditions of Study 2.

More generally, of course, the manipulation of the amount of pay allows an exploration of the psychometric structure of traditional consequences of injustice in an overpay situation. It is entirely possible that the structure of the measures we have collected will be different under different situations. This, of course, would pose a substantial problem for researchers interested in comparing overpay to underpay situations.

To summarize, then, the two major goals of Study 2 were to more fully explore the nature of the Justice Emotions factor that was included in Study 1 and especially to explore the functioning of measures of guilt in distributive justice situations. Furthermore, the nature of the study allows the extension of our psychometric examination to situations of overpay as well as underpay.

One last element was added to Study 2. The method factor identified in Study 1 could not be uniquely identified as being due either to the type of scale used or to the page on which the questions appeared. Because such a factor was completely unexpected, no provision had been made to arrange items so that such a factor could be properly tested. In Study 2, care was taken to arrange the items so that both a Scale-Type method factor and a Page method factor could be evaluated.

Method

Subjects. A total of 201 students (67.7% female) at a large university in western Canada participated as part

of the requirements of their psychology courses. The age of subjects ranged from 18 to 50 years, with a median age of 21.

Stimulus story. Subjects read a story adapted from the stories used in Study 1. They read about a student named Tom who took a temporary job at the university library moving and reshelving books. The work took 4 hours, and the story stated that "Tom never imagined it would be this hard."

After finishing the work, one of the supervisors paid Tom. In the high-pay condition of the story, Tom was paid \$100. In the low-pay condition, he was paid \$20.

Dependent variables. Subjects responded to 15 variables designed to tap the four consequences of justice (fairness, happiness/contentment, anger, and guilt). Measures were arranged so that each of the proposed factors included measures collected on each of the two different scale formats used in Study 1. Also, the measures were arranged so that items from each factor appeared on each of the two pages. Aside from these restrictions, the items were arranged randomly.

The Fairness factor was measured by questions about whether Tom got the money he deserved (page 1, 9-point scale), whether the payment was just (page 1, 7-point scale), whether he got what the work was worth (page 1, 7-point scale), and whether the money paid was fair (page 2, 7-point scale). The Happiness factor was assessed with questions about how contented subjects would be if they were Tom (page 1, 9-point scale), Tom's happiness (page 2, 7-point scale), how satisfied they would be if they were Tom (page 2, 9-point scale), and how pleased they would be if they were Tom (page 2, 9-point scale). The Anger factor was assessed by questions about how furious subjects would be (page 1, 9-point scale), how irate they would be (page 1, 7-point scale), how angry they would be (page 2, 9-point scale), and how annoyed Tom would be (page 2, 7-point scale).

These three factors were measured with four items each. However, it was quite difficult to arrive at more than one measure that seemed to capture the essence of overequity guilt. This may be a reflection of the fact that guilt due to receiving too much is not a common experience in our culture. Subjects were asked about Tom's guilt (page 1, 7-point scale). They were also asked about two related emotions (how sheepish Tom would feel [page 1, 9-point scale] and Tom's embarrassment [page 2, 7-point scale]); these two latter emotions, however, seem more related to situations other than ones of receiving more than is deserved.

Results

COMPARISON OF HIGH- AND LOW-PAY CONDITIONS

Table 6 gives the means, standard deviations, and *t* test results of a comparison of the high- and low-pay groups

TABLE 6: Comparisons of High- and Low Pay Conditions, Study 2

Variable	Mean			df ^a	p
	a. Low Pay	High Pay	<i>t</i>		
Deserved	1.77 (1.22)	-0.107 (1.27)	10.74	201	<.001
Just	3.51 (1.40)	5.27 (1.41)	-8.94	200	<.001
Worth	3.28 (1.44)	5.62 (1.41)	-11.69	199	<.001
Fairness	3.32 (1.44)	5.52 (1.43)	-10.88	200	<.001
Contented	-1.04 (1.77)	2.80 (1.46)	-16.88	201	<.001
Happiness	3.54 (1.26)	5.63 (1.20)	-12.10	201	>.001
Satisfied	-1.02 (2.05)	2.79 (1.47)	-15.23	201	<.001
Pleased	-1.19 (1.96)	2.87 (1.64)	-16.04	201	<.001
Furious	-0.12 (2.20)	-3.05 (1.42)	11.31	201	<.001
Irate	3.53 (1.64)	1.74 (1.15)	9.05	200	<.001
Angry	0.36 (2.03)	-3.10 (1.37)	14.21	200	<.001
Annoyed	4.37 (1.66)	1.81 (1.07)	13.07	200	<.001
Guilt	2.27 (1.45)	2.08 (1.40)	0.91	193	ns
Sheepish	-1.12 (2.32)	-1.91 (2.06)	2.54	198	<.05
Embarrassed	2.67 (1.57)	1.77 (1.07)	4.72	199	<.001

NOTE: Standard deviations are in parentheses.

a. Degrees of freedom vary due to missing values.

for all dependent variables. As can be seen, all of the fairness, anger, and happiness measures were significantly affected by the pay manipulation in the appropriate direction. However, there is no effect of amount of pay on the measure of guilt, and the results on the other two supposed guilt variables are opposite to predictions of distributive justice models. Specifically, subjects said that Tom would be more sheepish and more embarrassed in the low pay condition than in the high-pay condition.

CONFIRMATORY FACTOR ANALYSES

Once again, confirmatory factor analyses, using the correlation matrices in Table 7, were conducted to examine the factor structure of the consequences of injustice.⁶ A model positing four substantive factors (Fairness, Anger, Happiness/Contentment, and Guilt) was estimated separately for the high- and low pay conditions. Neither of these models fit the data (see Table 8).

Method factors based on those found in Study 1 were then added to the models. Specifically, the four-factor model was estimated for each condition once with Scale-Type factors and once with Page factors. Because the method factor was, after Study 1, expected, the data were collected to allow two method factors of each type (i.e., 7-point and 9-point factors or Page 1 and Page 2 factors).

Low-pay models. As is apparent from Table 8, all measures of fit indicate a better fit for the model with a Page factor than for one with a Scale factor for the data of the low-pay subjects. Table 9 reports the standardized parameters of this model.

These results provide added confirmation to the findings from the two samples in Study 1 that in situations in

TABLE 7: Correlations of Variables, Study 2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. nese... ess	1.00	.04	-.22	-.06	-.35	-.46	-.43	-.48	.38	.38	.41	.32	-.16	-.20	.05
2. Justice	-.61	1.00	.42	.63	.26	.19	.28	.18	-.32	-.37	-.32	-.33	-.29	-.28	-.14
3. Worth	-.41	.61	1.00	.60	.45	.56	.57	.49	-.42	-.41	-.53	-.49	-.02	-.20	-.05
4. Fairness	-.55	.75	.59	1.00	.31	.40	.51	.41	-.40	-.38	-.55	-.47	-.23	-.31	-.19
5. Contentment	-.47	.58	.53	.54	1.00	.61	.68	.46	-.44	-.57	-.47	-.55	.06	.06	-.06
6. Happiness	-.36	.49	.51	.53	.51	1.00	.71	.61	-.56	-.46	-.64	-.61	-.06	-.03	-.09
7. Satisfaction	-.30	.56	.48	.72	.45	.52	1.00	.77	-.65	-.60	-.68	-.62	.03	.04	-.23
8. Pleased	-.33	.47	.44	.70	.56	.58	.80	1.00	-.48	-.53	-.64	-.56	-.04	-.02	-.22
9. Furious	.59	-.56	-.46	-.55	-.61	-.48	-.37	-.43	1.00	.67	.69	.63	.04	.06	.19
10. Irate	.56	-.52	-.40	-.45	-.56	-.34	-.33	-.39	.76	1.00	.66	.78	.12	.03	.27
11. Angry	.54	-.58	-.52	-.63	-.58	-.48	-.51	-.54	.71	.59	1.00	.77	.20	.06	.36
12. Annoyed	.57	-.64	-.54	-.68	-.56	-.52	-.35	-.58	.67	.59	.82	1.00	.18	.04	.26
13. Guilty	.06	-.07	-.06	-.10	-.06	-.01	.02	-.02	.21	.17	.20	.18	1.00	.38	.41
14. Sheepishness	.38	-.31	-.23	-.43	-.39	-.26	-.16	-.28	.53	.46	.33	.40	.24	1.00	.29
15. Embarrassed	.34	-.24	-.22	-.39	-.27	-.18	-.30	-.24	.41	.34	.40	.37	.23	.47	1.00

NOTE: Low-pay correlations are below the diagonal. High-pay correlations are above the diagonal.

TABLE 8: Goodness-of-Fit Statistics for Tested Factor Models, Study 2

Model	Low-Pay Models						High Pay Models					
	χ^2 (df)	p	NNFI	CFI	A ₂	CAIC	χ^2 (df)	p	NNFI	CFI	e ₂	CAIC
Four factors	173.59 (84)	.001	.877	.902	.904	-289.32	213.06 (84)	.001	.813	.851	.854	-255.21
Page factor	60.50 (69)	.757	1.01	1.00	1.01	-319.75	166.92 (69)	.001	.828	.887	.891	-217.74
Scale factor	109.97 (69)	.001	.931	.955	.957	-270.28	160.54 (69)	.001	.839	.894	.898	-224.17

NOTE: NNFI = nonnormed fit index; CFI = comparative fit index; e₂ = Bollen's (1989) incremental fit index; CAIC = Bozdogan's (1987) consistent version of Akaike's information criteria (AIC).

which a person receives unfair distributions, the *structure of injustice* includes separate fairness, anger, happiness, and guilt components, and that these different consequences of injustice can be accurately and discriminatively measured.

High-pay models. In situations in which persons have been overrewarded for their work, however, this structure does not seem to describe the data. Neither the inclusion of the Scale method factors nor the Page method factors led to a model that fit the data (see Table 8).

EXPLORING THE FACTOR STRUCTURE OF OVERPAY

Given the lack of fit of the predicted model, an exploratory factor analysis was conducted to begin exploring the factor structure in the high-pay condition. A scree plot suggests retention of five factors. Furthermore, the χ^2 test of the fit of the data to the factor model indicated that a four-factor solution failed to fit the data, $\chi^2(51) = 73.49, p < .05$, whereas the χ^2 test for the five-factor solution found that the difference between the estimated and actual data was not significant, $\chi^2(40) = 51.08, p = .11$. Therefore, five factors were extracted with a generalized least squares extraction and were subsequently rotated with an oblique (oblimin) rotation. The five factors in the final solution accounted for 66.9%

of the variance and produced a near simple solution, with three variables loading on more than one factor. (A variable was considered to load on a particular factor if the absolute value of its loading on that factor was greater than or equal to .300.)

The factor structure contains some elements of the originally proposed structure, but the major surprise in the solution is that variables measuring happiness were mixed with variables measuring anger. As can be seen in the lower portion of Figure 1, Factor 1 represents a satisfaction component, and Factor 2 represents the anger-related variables. (This factor is labeled *Irate* because the irate variable has the highest loading on the factor, and the anger variable has a higher loading on Factor 4 than on Factor 2.) In addition to the anger-related variables, however, the contented variable also loads on this factor. This is the first instance of the conflicting of the happiness and anger components mentioned above.

Factor 3 seems to capture most of the fairness component, with the fair, just, and worth variables loading on that factor. Factor 4 provides a second instance of mixing of anger and happiness components, with loadings by both of these variables. Two justice variables (deseriness and worth of work) also load on this factor.

TABLE 9: Parameters of the Low Pay Confirmatory Factor Analysis, Study 2

	Substantive Factors Loadings				Tactical Factors	
	Justice	Happiness	Anger	Guilt	Page 1	Page 2
X1. Deserved	-.690 (.113)	a	a	a	.261 (.120)	
X2. Just	.908 (.117)	a	a	a	-.054 (.112)	
X3. Worth	.723 (.136)	— ^a	— ^a	— ^a	.045 (.148)	
X4. Fairness	.864 (.128)	— ^a	— ^a	— ^a	— ^a	.409 (.102)
X5. Contentment	— ^a	.770 (.169)	— ^a	— ^a	-.259 (.173)	
X6. Happiness	— ^a	.700 (.128)	a	a	— ^a	.178 (.134)
X7. Satisfaction	a	.740 (.196)	a	a	a	.619 (.169)
X8. Pleased		.742 (.193)			— ^a	.498 (.173)
X9. Furious	a	— ^a	.760 (.201)	— ^a	.473 (.191)	
X10. Irate	a		.647 (.155)	— ^a	.549 (.158)	— ^a
X11. Anger	— ^a	— ^a	.885 (.174)	— ^a		-.108 (.177)
X12. Annoyed	a	a	.904 (.140)	a		-.112 (.142)
X13. Guilty	a	a	a	.362 (.176)	-.053 (.184)	a
X14. Sheepish	— ^a		— ^a	.666 (.261)	.378 (.247)	
X15. Embarrassed	— ^a		a	.662 (.179)		-.202 (.168)
Correlations of substantive factors						
Justice	—					
Happiness	.856	—				
Anger	-.842	-.813				
Guilt	-.579	-.390	.639	—		

NOTE: Standard errors are in parentheses.
a. Parameters constrained to zero in estimation.

Finally, the guilt variables are captured in one factor (Factor 5), although the anger variable also loads on this factor.

Second-order factor analysis. The first-order factor solution seems to suggest that although the Guilt and Fairness factors are reasonably well measured by the variables included here, the anger and happiness variables seem to be largely confounded in interesting ways. To further explore the nature of these relationships, the factor correlation matrix (see Table 10) was submitted to a factor analysis. The plot of the eigenvalues for this analysis suggests a two-factor solution. A generalized

least squares extraction was used, and two factors were rotated with an oblimin rotation. This solution is provided in the upper half of Figure 1. Factor 1 seems to represent the joint satisfaction/anger outcomes of over-reward, whereas Factor 2 represents the combination of the Fairness and Guilt factors.

CLASSICAL EVALUATION OF FACTORS

Once again, we can assess the alpha reliability of the factors found in the current study. For comparison to the reliability estimates in Study 1, all reliability estimates are adjusted, using the Spearman-Brown prophecy formula, to scale lengths of five items. Table 11 gives both the corrected and uncorrected reliability estimates for the four substantive factors of the confirmatory factor analysis in the low pay condition.

The Fairness, Anger, and Satisfaction factors all show quite high reliabilities. Consistent with a variety of other evidence, reliability estimates for the Guilt factor suggest that guilt is a less-than-unitary or straightforward consequence of injustice. Although the reliability of the Guilt factor was not as low as that for the Justice Emotions factor from Study 1 (which included guilt), it was still noticeably lower than the reliabilities of the other three factors.

Further evidence of the irregularity of guilt. comes from the high-pay data. The alpha reliabilities for the first-order exploratory factors (given in Table 12) are once again all quite high, with the exception of the Guilt factor. This suggests that the findings from Study 1 and from the low-pay condition are not due to the fact that guilt is only appropriate to overequity situations. Even when Tom received a high rate of pay, the guilt variables do not seem to cohere into a unitary factor.

Psychometric properties of individual items for the low-pay condition. Once again, the use of confirmatory factor analysis allows the calculation of reliability and validity estimates for the individual items. (Of course, these are calculated only for the low-pay data, where the model fit the data.) However, I reiterate that it is always recommended to use more than one item to measure any construct.

These single-item reliability and validity measures (see Table 13) once again suggest that the fairness variable was the best measure of the Justice factor. Also consistent with Study 1, the satisfaction variable provides a good measure of the Satisfaction factor; the pleased variable, which was not included in Study 1, also seems to be a good measure of this factor. The Anger factor is best measured by the angry or annoyed variables. The guilt measures all show fairly low reliability and validity. Of particular note is the guilt variable itself, with reliability and validity coefficients of less than .15.

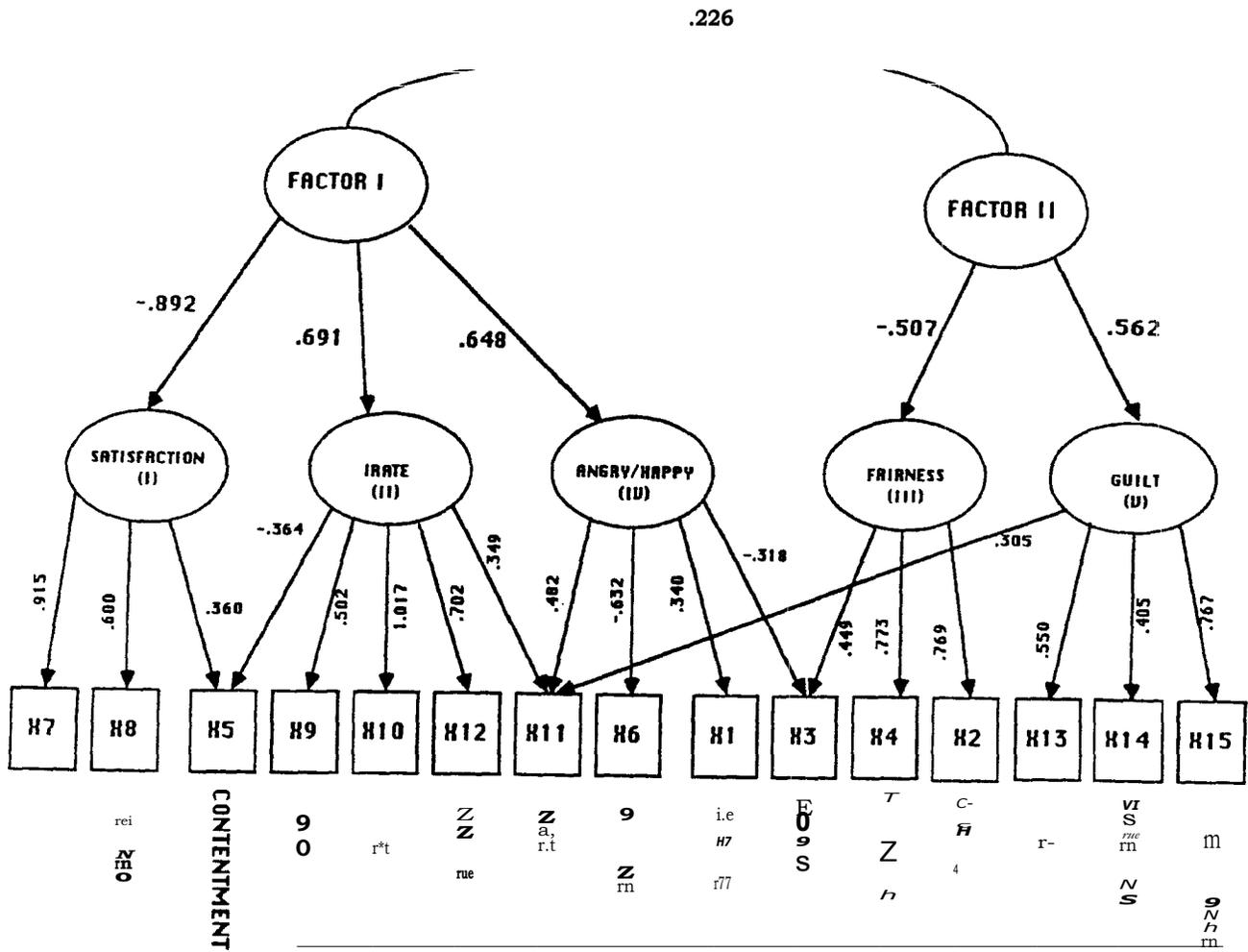


Figure 1 Factor model of high pay data, Study 2.

TABLE 10: Factor Correlation Matrix—Exploratory Factor Analysis of High-Pay Subjects, Study 2

	Satisfaction (Factor 1)	Irate (Factor 2)	Fairness (Factor 3)	Happiness/ Anger (Factor 4)	Guilt (Factor 5)
Satisfaction	1.00				
Irate	-.597	1.00			
Fairness	.117	-.227	1.00		
Happiness/ Anger	-.554	.482	-.205	1.00	
Guilt	.044	.125	-.280	.042	1.00

TABLE 11: Reliability Estimates for the Low Pay Condition, Study 2

Factor	Coefficient Alpha	Alpha-5B
Fairness	.8706	.8937
Anger	.8905	.9076
Satisfaction	.8640	.8881
Guilt	.5796	.6968

NOTE: Alpha-SB == alpha estimated for a scale of five items, using the Spearman-Brown prophecy formula.

DISCUSSION

The results of the studies reported here have both troubling and reassuring aspects for research in distributive justice. The good news is that the factor analyses

suggest that in the case of underreward, the four types of consequences of inequity that have traditionally been posited can be more or less reliably and distinctively measured with multiple indicators of each factor. This was the only model that consistently provided an adequate fit to the data. Furthermore, even when other models appeared to provide an adequate fit to the data,

TABLE 12: Reliability Estimates for the First Order Factors for the High-Pay Condition, Study 2

Factor	Coefficient Alpha	Alpha-CB
Satisfaction	.8373	.8956
Irate	.8853	.8853
Happy/Angry	.7806	.8164
Justice	.7984	.8686
Guilt	.5977	.6500

NOTE: Alpha-SB = alpha estimated for a scale of five items, using the Spearman-Brown prophecy formula.

TABLE 13: Reliability and Validity of Individual Items for the Low Pay Condition, Study 2

Variable	Sample 1	
	Reliability	Validity
Fair	.87	.79
Just	.63	.83
Deservingness	.34	.46
Worth	.53	.53
Satisfaction	.92	.54
Contentment	.67	.60
Happiness	.55	.51
Pleased	.84	.58
Angry	.81	.80
Annoyed	.84	.83
Furious	.80	.58
Irate	.69	.40
Guilt	.13	.13
Embarrassed	.47	.43
Sheepish	.58	.44

the model positing separate factors for the four components always provided a significantly improved fit. These four consequences appear to be clear and empirically distinct psychological results of injustice.

However, the point in the preceding paragraph that should be stressed is that adequate measurement came from multiple indicators. The common social psychological practice of using only one indicator for each dependent variable can be highly problematic. Although in some cases a single item can be a good measure (e.g., the fairness measure; see Tables 6 and 13), it was more often the case in the current research that single items had low reliabilities, low validities, or both. In studies in which there is only one indicator of a particular variable, it is not possible to assess whether this measure was one of the "good" single-item indicators. It is highly recommended, therefore, that researchers in this area include multiple indicators of their constructs. Even the inclusion of a second measure of each construct would be a substantial improvement, allowing some assessment of

the reliability and validity of the measurement of the Construct.

The Structure of the Consequences of Overreward

The fact that the consequences of underreward are empirically distinguishable is reassuring for researchers in this area. However, more troubling is the fact that these consequences did not seem to form the structure of the consequences of overreward. The lack of fit of the data to the four-factor structure in the overreward condition of Study 2 suggests that there is something quite different about overreward situations.

Traditional equity models (e.g., Adams, 1965; Walster et al., 1978) argued that overequity was something of a mirror image of underequity. That is, receiving less than is fair evokes anger, and receiving more than is fair evokes guilt; both of these negative emotions are then proposed to motivate attempts to restore equity to the situation. However, research attempting to show that people do feel negative emotions and distress following overequity has been mixed (cf., Messick & Sentis, 1979, 1983; O'Malley & Becker, 1984, for further examination of the effects of over-reward). The findings of the current study—that the consequences of overequity are complex and mixed—seem to suggest that one reason for the inconsistency of these findings may relate to a lack of direct comparability between overpay and underpay situations.

The structure of the consequences of overreward that is suggested by the exploratory analysis of these data provides a challenge to the traditional conceptualization of the emotional consequences of distributive injustice. Most theories of inequity have conceptualized these consequences as moving along a single dimension from anger (low reward) to happiness or contentment (equitable reward) to guilt (high reward). If the current results are confirmed, this unidimensional view would have to give way to a two-dimensional perspective, with an anger-happiness dimension and a fairness-guilt dimension. Presumably, movement along these two dimensions may be caused by different features of the distributive situation.

Austin et al. (1980) provide some evidence that is consistent with the notion that fairness and satisfaction are separate components of reactions to injustice. They demonstrated that perceived fairness was affected only by comparison of pay received with the pay received by others, whereas satisfaction was related to both these types of social comparisons as well as to expectancies (i.e., previous pay).

However, we should not overstate our confidence in these effects. Given the a posteriori, exploratory nature of these analyses, it would be premature to revamp the methodologies currently in use at this time. However, this research strongly points to a need for future research

to replicate the current findings and to develop theories of distributive justice that can include explanations of these findings.

Guilt

Several findings from the current studies converge to raise questions about the adequacy of the measurement of guilt. In both samples in Study 1, the Justice Emotions factor was not at all adequate. Although the problem with this factor was likely enhanced by the mixing of the concepts of anger and guilt, the results of Study 2 suggest that this does not explain all of the problems with the measurement of guilt. The reliability of the guilt factors in that study—in both the high-pay and low-pay data—are markedly lower than the reliabilities of the other factors. The alpha reliabilities of the guilt factors are both less than .70.

Forewarning that the measurement of guilt would be a problem came from the aforementioned difficulty in arriving at adequate multiple measures for the notion of overreward guilt. The items chosen (sheepish and embarrassed) seemed to be the closest to the concept desired, but they do not appear to have been sufficiently close to produce an internally consistent scale with the guilt variable. Furthermore, an examination of the factor loadings derived in the low-pay data (see Table 9) suggests that at least in that situation, the Guilt factor may more represent measurement of embarrassment or sheepishness than of guilt. The factor loadings from the exploratory factor analysis of the high pay data hint at the same thing. The embarrassment variable has the highest loading on the supposed Guilt factor.

Focusing more directly on these concepts of embarrassment or sheepishness may explain another anomalous finding regarding the guilt variables. Subjects indicated that the actor would be more embarrassed and sheepish in the low-pay condition than in the high-pay condition, a result opposite of the predicted result. (There was no significant difference in subjects' ratings of how guilty the actor would feel.) Perhaps subjects felt the actor would feel embarrassed about earning such a small amount, because it might appear to reflect poor work or poor worth. Subjects may also have been feeling embarrassed by the anger or annoyance they were feeling in this situation.'

The fact that there was no effect of the amount of pay on ratings of the actor's guilt is consistent with the mixed findings in the literature regarding the effects of overpay inequity. Simulations by Scher and Heise (1993) found that guilt would not be an expected emotional result of overpay. Subjects who receive more than some comparison standard generally are less likely to call these distributions unjust and less likely to feel distress than those who receive less than the comparison standard (Lane &

Messe, 1971; Messick & Sentis, 1979, 1983). With respect to the specific effects on guilt, the results are mixed; Hassebrauck (1986) and Hegtvedt (1990) both found greater ratings of guilt following overreward, whereas Gray-Little and Teddlie (1978) reported no differences in guilt across reward levels.

One explanation for why the question of whether or not guilt is experienced in overpay situations has yet to be conclusively answered may be because of the inability to adequately measure this construct. Further research and theoretical development should be directed to identifying the adequacy of this construct and finding sufficient ways to measure overpay guilt.

Another possible reason why the current research may not have found a difference between levels of guilt is that the high-pay condition may not have been perceived as overpay. Rather, the high-pay condition may have been perceived as fair pay. Guilt would only be expected to be aroused if the subjects perceived that the actor received more than was fair. However, if their perception was that in the high-pay condition subjects were receiving just what was fair, then they would still differ from the low pay subjects in measures of justice, happiness, and anger but would not differ on measures of guilt.

The Effects of Method

Another aspect of the current results is the need for a method factor to adequately account for the covariation between measures of the consequences of underreward. The simple fact that items appeared on the same page raised the correlations among the items. Although adequate measurement of the substantive factors could still be obtained in most cases, the need for the method factor suggests the fragility of covariation in the use of Likert-type dependent measures. If simply appearing on the same page can affect the relationship between variables, it is interesting to speculate on what other factors, unrelated to the content of the questions, could also affect this relationship. This should be of particular concern to researchers who are interested in examining the relationships between variables.

The order of items on a multipage questionnaire should therefore be given careful thought. Of course, one far too common way of dealing with order effects in general is inadequate. The selection of a single random order to present items (or, equally, stimulus materials) is not adequate to control for order effects. Counterbalancing or incomplete experimental designs (e.g., the Latin Square) should be seriously considered.

Role-Play Methodology

One final comment should be made about methodology. The research reported here used a role-play meth-

odology to assess the structure of the consequences of injustice. We must bear in mind that the reactions that subjects have when they are asked to imagine themselves in a particular situation may not be the same as if they were actually in that situation.

One factor that reduces (but certainly does not eliminate) the problems associated with this methodology is the fact that the main interest in the current article is the relationships between the different dependent variables, rather than the absolute levels of the variables. It seems reasonable to assume that although subjects engaged in a role-play may not experience the emotional and cognitive effects of the situation with the same force or intensity as would subjects actually in the situation, the relationships between the different variables should be similar whether subjects are actually in the situation or are just imagining themselves in the situation.

Conclusion

The current work provides strong confirmation of the theoretically predicted consequences of injustice, at least when that injustice came from underpay. Previous research in the area of distributive injustice has assumed that the consequences included cognitive judgments of unfairness and emotional consequences including happiness (or satisfaction), anger, and guilt. But, by failing to address whether these components were adequately measured in their research, the findings provided only indirect evidence that those consequences were in fact the way that responses to distributive injustice were actually organized. The current article, by psychometrically verifying the existence of these four consequences of injustice in the underpay situation, allows researchers to proceed with confidence in ascertaining the theoretical mechanisms whereby these consequences arise.

On the other hand, research must continue on the important questions about the consequences of injustice in the overpay situation. If the lack of comparability of the high- and low pay conditions is confirmed, it will raise serious methodological and theoretical issues for researchers who wish to compare the sequelae of different levels of reward.

NOTES

1. The stories varied on the places being deaned. There were five versions for Sample 1 and four for Sample 2. The stories also manipulated the status of the person who actually gave the worker the money and the order of completion of the variables reported here and other variables collected as part of another study. Further details are available from the author.

2. And with the data from Study 2.

3. Scale lengths of five items were used because the factor with the most indicators (the Emotions factor in the two-factor model) has five indicators.

4. These estimates assume that the specific error variance for each observed variable is zero. This is actually an unlikely assumption, making the reliabilities reported in the table conservative estimates.

5. Because the variances of the factors were constrained to one, and for those observed measures that load on more than one factor there is no correlation between the two factors, these squared correlations are equivalent to what Bollen (1989, p. 200) calls the "unique validity variance" of a measure. For those variables that load on only one factor, these validities are equal to the reliabilities discussed in the previous paragraph.

6. Covariance matrices were used in the actual analyses for both studies.

7. Although this study is a replication of the models tested' in Study 1, models with fewer factors were tested with the current data for comparison. Models with one substantive factor and models with two substantive factors (representing the cognitive and emotional outcomes of injustice, respectively) were tested. The only models that came even close to fitting were the one- and two-factor models that included the Page factor in the low pay data. Although these models had fairly high fit indicators (one-factor model: NNFI = .920; CFI = .943; $\Delta_2 = .945$; two-factor model: NNFI = .950; CFI = .965; $\Delta_2 = .966$), both models produced significant χ^2 tests—one-factor model: $\chi^2(75) = 126.69$, $p < .001$; two-factor model: $\chi^2(74) = 106.07$, $p < .01$. Furthermore, χ^2 difference tests comparing these models with the four-factor model are both significant—one-factor model: $\chi^2(6) = 66.19$, $p < .005$; two-factor model: $\chi^2(5) = 45.57$, $p < .005$. All other models, in both the high- and the low-pay data, had all or most of the goodness-of-fit statistics less than .900, and all models produced significant χ^2 tests, indicating lack of fit.

8. I am grateful to an anonymous reviewer for this latter suggestion.

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