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Inequity at work: its measurement and association with worker health

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The equity theory of Adams (1963, 1965) predicts that people pursue a balance between their investments in and the rewards gained from their work, such that their own investment/reward ratio is the same as that of similar others. Disturbance of this balance is expected to result in a range of negative outcomes, even if people are comparatively well off. The current study among a representative sample of 1297 Finnish workers examined two assumptions of this theory more closely, namely (1) whether the relationship between inequity and selected health-related outcome variables is U-shaped (is receiving too much as detrimental as receiving too little?), and (2) whether the reference to 'similar others' should be included in the measure tapping inequity. Multivariate analysis of variance only partly confirmed the hypothesis that the relationship between inequity and selected outcome variables is U-shaped. The reference to 'similar others' in the measurement of inequity seems to be superfluous.

1. Introduction

Half a century ago, Leon Festinger (1954) argued that when people are uncertain about their opinions or abilities (that is, when objective information is not available), they evaluate themselves by comparing themselves to similar others. Adams (1963, 1965) incorporated this basic notion into his well-known theory of psychological equity. At the heart of this theory lies the assumption that people pursue a balance between their investments (or 'inputs', e.g. time, attention, skills, effort) in and the rewards ('outcomes', e.g. status, appreciation, gratitude and pay) gained from this relationship, compared to the input/ outcome ratio of similar others. Any disturbance of this balance is expected to have negative consequences; negative outcomes should occur not only when people receive less than what they are entitled to (judging from what others invest and receive), but also when they feel that they are *well off* in comparison to others. Thus, equity theory predicts that there will be a non-linear, U-shaped association between inequity and the criterion

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variables, such that the best possible outcomes will be obtained when one's input/reward ratio is about equal to that of others.

Over the last decade, a small body of research has addressed the relationship between inequity in exchange relationships at work and work outcomes such as job satisfaction, turnover, organizational commitment and burnout. This research generally supported the predictions generated by equity theory, in that inequity in various work relationships was shown to be associated with job dissatisfaction (Perry, 1993), lack of organizational commitment (Schaufeli, Van Dierendonck, & Van Gorp, 1996), absenteeism and turnover (Geurts, Schaufeli, & De Jonge, 1998; Iverson & Roy, 1994; Van Yperen, Hagedoorn, & Geurts, 1996), employee theft (Greenberg, 1990; Shapiro, Trevino, & Victor, 1995), and burnout (Van Dierendonck, Schaufeli, & Buunk, 1996; Van Dierendonck, Schaufeli, & Sixma, 1994; Van Yperen, 1998). From an epidemiological angle, the effects of an imbalance between work investments and rewards on worker health have been examined by Siegrist and his colleagues. In his Effort-Reward Imbalance model (Siegrist, 2001), a disturbed balance between psychological and/or physical effort ('investments') and rewards (such as money, esteem and career opportunities) is presumed to result in high levels of strain and, consequently, in health complaints. Consistent with these predictions, Siegrist and his colleagues have shown that exposure to effort-reward imbalance elicits high levels of strain and may lead to coronary heart disease and impaired physical, mental and social functioning (Siegrist, 2001).

However, progress in equity research has been hampered by several problems. Most importantly, many studies (with the notable exceptions of Perry, 1993; Sweeney, 1990; Van Dierendonck *et al.*, 1996; and Vecchio, 1984) have conveniently ignored the *shape* of the relationship between inequity and outcome variables. Whereas the studies mentioned above generally supported the prediction that negative outcomes occur when workers feel underbenefited, little attention has been given to the consequences of feeling *better off* than others: researchers often only examined the *linear* effects of inequity.

A further hindrance to progress is that many studies were conducted in specific occupational groups; because no nationally representative across-occupation samples were employed, it is difficult to appreciate the implications of previous research showing that the relation between inequity and work outcomes is U-shaped, rather than linear. Can previous results be generalized to the general working population, or are the findings reported in previous research unique for the sample under investigation? In addition, as statistical significance is not the same as practical relevance, are the curvilinear effects of inequity strong enough to have practical appeal as well?

Finally, researchers have been concerned with the measurement of inequity. One issue relates to the use of global single-item measures that assess one's perceived ratio of inputs and outcomes, and measures that assess inputs and outcomes separately. Two recent studies (Taris, Peeters, Le Blanc, Schaufeli, & Schreurs, 2001; Van Horn, Schaufeli, & Taris, 2001) have dealt with this issue, showing that participant scores on single-item measures are a function of the separate assessments of their inputs and outcomes. Van Horn *et al.* (2001, p. 211) conclude that both measures are 'valid in their convergent and construct validity' (i.e. in relation to each other and to other concepts). Another issue concerns the measurement of inequity in terms of the ratio between own investments and outcomes in comparison to the ratio of similar others. Several approaches to measuring inequity have excluded the comparison with similar others (Hatfield, Traupmann, Sprecher, & Hay, 1985; Pritchard, 1969; Siegrist, 2001), but as yet it is unknown whether this is justified.

This study addresses the issues of (1) the shape of the relationship between inequity and outcome variables; (2) the practical implications of possible curvilinear effects; and

(3) the measurement of inequity, in the context of a nationally representative field study among 1297 Finnish workers who were employed in various occupations. Two approaches to measuring inequity are compared; one includes the reference by Adams (1965) to similar others, whereas the other is based on own investments and outcomes only. We refer to Van Horn *et al.* (2001) and Taris *et al.* (2001) for discussions of using global single-item measures that assess one's perceived ratio of inputs and outcomes versus measures that assess inputs and outcomes separately.

1.1. *Measuring inequity*

According to equity theory, people pursue reciprocity in their relationships. What they invest in and gain from a particular relationship should be proportional to what the other party invests in and gains from this relationship. In Adams' (1965) seminal paper, this principle is expressed in terms of the ratios of the investments and outcomes of one party and those of the other party, respectively. If one outweighs the other, *lack of reciprocity* or *inequity* exists. Note that in this conceptualization 'lack of reciprocity' and 'inequity' are largely interchangeable terms (Chadwick-Jones, 1976; Schaufeli, Leiter, Maslach, & Jackson, 1996); both involve the comparison of the ratio of own investments and outcomes to that of another party. Pritchard (1969) criticized this 'interpersonal' way of measuring inequity because it neglects the role of internal standards as a means for comparison. This 'internal standard' refers to 'the amount of outcome Person perceives as being commensurate with his own inputs, *without regard to any comparison person*' (Pritchard, 1969, p. 205; Pritchard's italics). According to Pritchard, *intrapersonal* comparisons (that is, comparisons focusing on own inputs and outcomes only) play a crucial role in exchange processes, rather than *interpersonal* comparisons (involving comparison with the inputs and outcomes of others) as proposed in classical equity theory. A concept that is very similar to Pritchard's internal standard is Thibaut and Kelley's (1959) *comparison level* (CL). CL is 'a standard by which the person evaluates the rewards and costs of a given relationship in terms of what he feels he "deserves"' (p. 21). According to Thibaut and Kelly (1959), individual difference variables may be responsible for differences in the weight persons assign to these rewards and costs, leading to comparison levels that vary across persons. Similarly, in Siegrist's (2001) Effort-Reward Imbalance Theory workers evaluate their own efforts against the rewards they receive from their job, without any external reference.

Thus, although there are many different ways to measure investments in and outcomes gained from particular relationships, it seems that a broad distinction can be made between conceptualizations that include external (or *interpersonal*) comparison vs. conceptualizations that focus on own inputs and outcomes only (*intrapersonal* comparison). Unfortunately, previous research has largely failed to address the question of which of these two approaches is best. For example, previous research has shown that an imbalance between own inputs and outcomes (intrapersonal comparison) results in stress (Van Dierendonck *et al.*, 1996). Does interpersonal comparison (i.e. comparison with the input/outcome ratio of others) significantly add to this stress, or is interpersonal comparison just an inefficient way of measuring a concept that is adequately covered by the much simpler concept of intrapersonal comparison? It would seem that only studies in which both approaches are explicitly compared can provide valid evidence regarding this issue, but to our knowledge the only study to include both intra- and interpersonal equity measures is that by Van Dierendonck *et al.* (1996). They found that both measures yielded curvilinear effects on the outcome variables in their study. However, as they did not examine the effects of one equity measure on their outcome variables after controlling for the effects of the other, little can be said about the best way of measuring inequity.

1.2. *Curvilinear effects of equity on work outcomes*

A further issue that concerns us here is whether inequity has curvilinear effects on the outcome variables, rather than linear effects only. According to Adams (1965), receiving too much as well as receiving too little should result in negative work outcomes. When the ratio between own investments and outcomes equals the ratio of others the optimum level for the outcome variables will be obtained. In intrapersonal approaches the optimum level will be reached when one's perceived investments equal one's perceived outcomes.

This does not imply that the magnitude of the effects of over- and underpayment (either relative to others, or to one's 'internal standard') on the outcome variables are similar. According to Adams (1965), the threshold for negative outcomes resulting from investing too much in relation to one's rewards is higher than that for receiving too little. In support with his reasoning, Perry (1993) found that the negative effects of *under*-payment on job satisfaction were considerably stronger than those of *over*payment (but see Van Dierendonck *et al.*, 1996, who found the strongest effects for overbenefited participants).

Previous research has yielded mixed evidence for the proposition that the relation between inequity and work outcomes is U-shaped, rather than linear. The linear effects of inequity are usually at least as strong as the curvilinear effects (Perry, 1993; Sweeney, 1990; Van Dierendonck *et al.*, 1996; Vecchio, 1984). Indeed, a review of the literature suggests that the occurrence of curvilinear effects is a fickle phenomenon. One possible reason for the lack of stability of estimates of curvilinear relationships across samples is co-linearity. Curvilinear effects of an explanatory variable A on a dependent variable B are usually tested by examining the square of A on B, after controlling for the main effect of A. The correlation between A and A-square is usually very high, thus reducing the power of tests of regression weights (Bobko, 1990). As the current study was conducted among a large sample of Finnish workers, lack of statistical power should not be the reason for possible failure to detect curvilinear effects.

1.3. *Hypotheses*

Based on the notions discussed above, we expected that inequity at work would result in negative work outcomes. That is, both positive inequity (being overpaid) and negative inequity (being underpaid) would result in negative work outcomes. The strongest effects, however, should occur when people feel that they are being underpaid (Adams, 1965; Perry, 1993). The linear component of the relationship between inequity and work outcomes has been thoroughly documented (Geurts *et al.*, 1998; Iverson & Roy, 1994; Shapiro *et al.*, 1995; Van Dierendonck *et al.*, 1994; Van Yperen., 1998). We therefore formulate the following hypothesis.

(1) *Hypothesis 1.* There will be a strong linear relationship between inequity and the outcome variables, such that underpaid participants in particular have a high likelihood of experiencing negative work outcomes, compared to other participants.

Further, given the theoretical notions outlined above, the optimum values for the outcome variables should be obtained when people feel that they are treated equitably. In interpersonal approaches this would occur when the ratio between own investments and outcomes equals the ratio of others. In intrapersonal approaches the optimum level would be reached when one's perceived investments equal one's perceived outcomes. Thus, apart from the

linear effect hypothesized in Hypothesis 1, we also expected a curvilinear effect, which is hypothesized below.

(2) *Hypothesis 2.* A curvilinear effect will occur such that optimal values for the outcome variables would be obtained when people felt that they were treated equitably.

Given the lack of relevant evidence as regards the best measurement of inequity, we set out to further examine the degree to which two equity measures (one including comparison with comparable others, the other focusing on own investments/outcomes) yield similar results. Interpersonal measures were most true to Adams' (1963, 1965) conceptualization of equity.

(3) *Hypothesis 3.* Interpersonal measures will be better measures of inequity than intrapersonal measures. This should become manifest in relatively strong effects of the interpersonal equity measure on the dependent variables, compared to the effects of the intrapersonal equity measure.

Confirmation of Hypothesis 3 would indicate that the intrapersonal equity measure was a too-simple substitute for the interpersonal equity measure. Conversely, rejection of Hypothesis 3 would mean that comparison with others added little to the measurement of inequity, suggesting that the underlying psychological process was simpler than one might assume.

2. Method

2.1. *Sample*

The data were collected in a cross-sectional study among a nationally representative sample of Finnish people who were between 24 and 65 years of age at the start of the study. The data were collected by Statistics Finland (SF, the Finnish national census), which has access to the names and addresses of the Finnish population. One of their tasks is to collaborate with researchers (e.g. by providing sampling services), provided that the intended study meets the criteria formulated by SF's ethical committee. SF mailed the questionnaire prepared by the authors to the persons in the sample. The questionnaire was to be returned to SF, where the database was formed. After 1 week, everyone in the sample received a reminder; when 51% of the target group had responded, those who had as yet not reacted received another reminder, together with a new copy of the questionnaire. Two months after the first contact was made a satisfactory 66% response rate had been obtained ($N = 3300$).

Comparison of population characteristics (gender, age, occupational sector, employment status) with that of the sample revealed only minor differences (e.g. 51.3% of the Finnish population is female, versus 53.3% of the sample). From this data set we selected the participants who had been employed during the 12 months preceding the survey ($N = 1566$). After listwise deletion of missing values, the final sample included 1297 workers ($M_{age} = 41.5$ years, SD $= 9.4$ years; 50.7% of the sample was female; and the average amount of work experience was 20.9 years, SD $= 9.9$ years).

2.2. *Measures*

2.2.1. *Burnout*: Burnout was assessed using the Finnish version of Schaufeli *et al.*'s (1996) Maslach Burnout Inventory-General Survey (MBI-GS). Contrary to the 'standard' MBI-HSS (Human Services Survey), the MBI-GS was designed to assess burnout in the general population, including occupations in which contact with other people does not constitute

a major part of the tasks. The MBI-GS consists of 16 items divided across three subscales, *emotional exhaustion*, *cynicism*, and (lack of) *professional efficacy*, respectively.

(1) *Emotional exhaustion* refers to feelings of being emotionally overextended and depleted of one's emotional resources. This 5-item scale is similar to the emotional exhaustion scale included in Maslach and Jackson's (1986) MBI. However, contrary to the MBI-HSS, the exhaustion items of the MBI-GS are generic; they refer to fatigue, but without referring to people as the source of those feelings. Typical items are 'I feel emotionally drained from my job' and 'working all day is really a strain for me' (0 = 'never', 6 = 'everyday'). The reliability of this scale (Cronbach's α) was .89.

(2) *Professional efficacy* is similar to the personal accomplishment scale in the MBI-HSS. This 6-item scale refers to worker feelings of competence and successful achievement in their work. Typical items are 'I have accomplished many worthwhile things in this job' (reversed) and 'In my opinion, I do a good job' (reversed) ($\alpha = .83$). A high score on this scale signifies low feelings of competence and achievement.

(3) *Cynicism* reflects indifference or a distant attitude towards work; unlike the MBI-HSS, the items of the MBI-GS refer to work itself and not to personal relationships at work. This scale consists of five items, e.g. 'I doubt the significance of my work' and 'I have become less enthusiastic about my job', $\alpha = .81$.

2.2.2. *Health complaints*: Participant health was measured by the 12-item version of the General Health Questionnaire (Goldberg, 1972). This questionnaire taps the degree to which the participants suffer from minor psychiatric morbidity, such as feeling unable to make decisions and loss of self-confidence (1 = 'less often than usual', 4 = 'more often than usual', $\alpha = .91$).

2.2.3. *Sickness absence*: A single item measured whether the participants had been absent with stress–related complaints during the 12 months preceding the survey. The item was 'Have you been absent from your work during the past 12 months as a result of overstrain or fatigue?' (1 = 'no', 2 = 'yes').

2.2.4. *Equity*: The workers' *investments* in their work were measured with a single item, namely 'How much do you feel you invest in your work in terms of skills and energy?' (1 = 'very little', 5 = 'very much'). Worker *outcomes* were measured by three items, 'How much do you feel you get in return from your work in terms of income, job benefits, etc.?', 'How much do you feel you get in return from your work in terms of recognition and prestige?', and 'How much do you feel you get in return from your work in terms of personal satisfaction?' (1 = 'very little', 5 = 'very much'). These three items were subjected to an exploratory factor analysis, showing that the first factor accounted for 61.2% of the variance of the items and that all three items showed satisfactory loadings on this factor (all loadings $> .72$). The reliability of this 3-item scale was .68. Further, the participants were asked to indicate what they felt were the investments of and outcomes for their work mates. Consequently, the items mentioned above were slightly amended, e.g. 'How much do you feel you get in return from your work in terms of recognition and prestige' became 'How much do you feel your work mates get in return from their work in terms of recognition and prestige'. The reliability of this scale was .71.

   The current study included two equity measures. The first included an explicit compar–ison with an external referent and corresponded with Adams' (1963, 1965) conceptualization of inequity as involving a comparison of one's own investment/outcome ratio to that of

similar others. It was computed as (own investments/own outcomes−perceived investments other/perceived outcomes other). In the remainder of the paper this measure will be referred to as the *interpersonal equity measure*. Positive scores indicate that the ratio between investments and outcomes is better for others than for oneself (24.4%, $N=301$); negative scores signify that oneself is better off than one's co-workers (50.8%, $N=639$). A zero score indicates that the balance between investments and outcomes is equal for self and others (24.7%, $N=309$).

The second equity measure in this study did not include this external comparison. Otherwise it was equal to the interpersonal measure. This *intrapersonal equity measure* was thus computed as the ratio of own investments to own outcomes. Scores higher than 1.00 signify that the participants' investments exceeded their outcomes (84.6% of the participants, $N=1079$); scores lower than 1.00 indicate that the outcomes exceed the investments (5.9% of the participants, $N=77$); and scores equal to 1.00 indicate a perfect balance between investments and outcomes (9.4% of the participants, $N=123$).

Although the correlation between the inter- and intrapersonal equity measure was substantial ($r=.65$, $p<.001$), a 42.3% shared variance allows for the possibility that these measures will behave differently. Thus, they were retained as separate variables.

2.2.5. *Background variables*: Finally, the study included measures of participant age, gender, level of education (three categories, 1=primary school, 2=secondary school, and 3= college/university education) and the number of years of employment. Table 1 presents descriptive information for all variables used in this study.

2.3. *Statistical analysis*

To examine the linear and curvilinear effects of equity on the outcome variables, two multivariate analyses of variance were conducted with the five health variables as dependent variables and the two equity measures as the independent variables. The participants in the study were assigned to one of three groups, depending on whether they felt overbenefited, equally treated or underbenefited. This was done for each of the two equity measures; thus two sets of analyses (one for each equity measure) are presented below. The linear and curvilinear effects of inequity on the dependent variables were tested by specifying polynomial contrasts for the independent variables. The first contrast tested the linear effect of equity on the outcome variables by comparing the scores of underbenefited group to those of the overbenefited group. The second contrast examined the non-linear effect of equity on the outcome variables by testing whether the mean scores of the equally treated group differed significantly from the pooled mean scores of the other two groups. To ease interpretation of the effects, the outcome variables were standardized with zero mean and unit variance.

3. Results

3.1. *Intrapersonal equity measure*

A multivariate analysis of variance with the five outcome variables as dependent variables and intrapersonal equity (underbenefited vs. equally treated vs. overbenefited) as the independent variable revealed a significant main effect of the latter, $F(10, 2586)=8.0$, $p<.001$. Then separate ANCOVAs were conducted on each of the five outcome variables, with Intrapersonal equity as the independent variable and age, gender, level of education and number of years of employment as covariates, and planned comparisons on the outcome

Table 1. Means, standard deviations and correlations for the variables used in this study ($N = 1297$).

	Emotional exhaustion	Cynicism	Lack of efficacy	Sickness absence	Health complaints	Gender	Age	Work experience	Level of education	Intrapersonal equity†	Interpersonal equity‡
Emotional exhaustion	1.00										
Cynicism	.55	1.00									
Lack of efficacy	.13	.32	1.00								
Sickness absence (high = absent)	.23	.15	.05	1.00							
Health complaints	.61	.56	.29	.21	1.00						
Gender (high = female)	.07	−.01	.02	.04	.07	1.00					
Age	.01	.09	.06	.00	.08	.00	1.00				
Work experience	.02	.11	.04	.00	.08	−.07	.91	1.00			
Level of education	−.01	−.10	.04	−.01	−.02	.09	−.35	−.49	1.00		
Intrapersonal equity measure†	.38	.36	.17	.09	.36	.04	.00	.03	−.10	1.00	
Interpersonal equity measure‡	.22	.19	.11	.07	.22	−.02	.00	.04	−.10	.64	1.00
M	2.20	1.80	1.13	.05	2.06	.51	41.54	20.93	2.09	1.45	.17
SD	1.43	1.41	1.10	.50	.48	.50	9.39	9.93	.81	.52	.51

Correlations of .06 and over are significant at $p < .05$.

†High = investments exceed outcomes.

‡High = others better off than oneself.

variables. Table 2, Panel A, presents the means and standard deviations of the three groups for all outcome variables.

We found linear effects of equity for three of the five outcome variables; for lack of efficacy and sickness absence no significant linear effects were found. Consistent with Hypothesis 1, overbenefited participants reported lower levels of emotional exhaustion, cynicism and health complaints than underbenefited participants. Further, non-linear effects of equity were found for emotional exhaustion, cynicism, health complaints and sickness absence. Hypothesis 2 stated that the lowest values for the outcome variables would be obtained for the equally treated group. Inspection of the respective means shows this pattern of effects was obtained in four out of five cases. However, in only one case was the difference between the overbenefited group and the equally treated group statistically significant. The fact that the non-linear test was significant in the other three cases was because the overbenefited and the equally treated groups obtained significantly lower scores on the outcome variables than the underbenefited group. Hypothesis 2 was only confirmed for sickness absence, with the lowest score for the equally treated group.

3.2. *Interpersonal equity measure*
The above analyses were repeated for the interpersonal equity measure (Table 2, Panel B). The findings were virtually identical to those obtained for the intrapersonal equity measure. That is, linear effects of equity were found for emotional exhaustion, cynicism and health complaints, such that the underbenefited group reported higher scores on these outcomes than the overbenefited group (Hypothesis 1 partly confirmed). The non-linear effect of equity was significant in four out of five comparisons; in all four cases the mean scores for the overbenefited group were not significantly different from those obtained for the group that felt equally treated (Hypothesis 2 rejected).

3.3. *Relative contribution of the equity variables*
Hypothesis 3 concerned the 'best' measurement of inequity. As the interpersonal approach is more true to Adams' (1963, 1965) conceptualization of inequity, we would expect the interpersonal measure to be a better measure of inequity than the intrapersonal measure (as should become evident from stronger effects on outcome variables). However, comparison of the effects of the two equity measures reveals that these are remarkably similar. The F-values for the linear and non-linear effects of the two equity measures are about equally strong, while the proportions of variance explained in the outcome variables (adjusted R^2s, obtained after controlling for age, gender, level of education and number of years of employment) were about the same. Thus, both measures have very similar effects on the outcome variables, meaning that it would seem impossible to prefer either of these to the other. However, note that the interpersonal equity measure is conceptually more complex than the intrapersonal measure, in that it includes a comparison of one's own input/outcome ratio with that of others. Our results, however, suggest that inclusion of the information about the perceived investments/rewards of others does *not* result in a better measure of equity.

To explore this issue more fully, five sets of stepwise hierarchical regression analyses were performed (one for each dependent variable). In the first block the background variables age, gender, level of education and number of years of employment were entered. In the second block two variables representing the linear and curvilinear effects of the intrapersonal equity measure were added. The variable representing the curvilinear effects

Table 2.   Means and standard deviations of underbenefited, equitably treated and overbenefited groups as a function of outcome variable and inequity measure.

		Panel A: Intrapersonal equity measure						Panel B: Interpersonal equity measure					
		Over-benefited (N=77)	Equally treated (N=123)	Under-benefited (N=1079)	F(linear)¶	F(non-linear)¶	Adjusted R^2	Over-benefited (N=301)	Equally treated (N=309)	Under-benefited (N=639)	F(linear)¶	F(non-linear)¶	Adjusted R^2
Emotional exhaustion	M	−.54†	−.53†	.10‡	29.6★★★	8.0★★	.05	−.16†	−.19†	.16‡	22.8★★★	7.0★★	.03
	SD	.72	.78	1.01				.96	.93	1.02			
Cynicism	M	−.22†	−.38†	.06‡	5.8★	8.3★★	.03	−.09†	−.20†	.14‡	10.0★★	10.7★★	.03
	SD	.95	.82	1.01				1.01	.86	1.05			
Lack of efficacy	M	.07	−.00	−.01		.1	.00	.07	−.04	−.01	2.0	1.3	.01
	SD	.97	1.12	.99				.96	1.05	.99			
Health complaints	M	−.36†	−.46†	.08‡	13.9★★★	8.4★★	.04	−.13†	−.18†	.15‡	18.2★★★	8.2★★	.04
	SD	1.01	.70	1.01				.97	.89	1.04			
Sickness absence	M	.00†	−.23‡	.03†	.04	4.8★	.01	−.05†‡	−.13†	.06‡	3.1	4.5★	.01
	SD	1.01	.60	1.01				.87	.67	1.12			
Multivariate		F(10, 2586)=8.0★★★						Multivariate F(10, 2486)=5.2★★★					

★$p<.05$, ★★$p<.01$, ★★★$p<.001$.
†, ‡Means with different superscripts differ significantly at $p<.05$ (Scheffé range test).
¶This comparison has (1, 1287) df (F-values controlled for gender, age, experience and level of education).

of this measure was obtained after standardizing and then squaring the intrapersonal equity measure. Finally, in the third step the effects of two variables representing the linear and curvilinear effects of the investments/outcome (I/O) ratio for the comparison other were added. Thus, in step 3 it becomes clear what the comparison with others adds to the explanation of the outcome variables, relative to one's own I/O ratio.

Inclusion of the perceived investments/outcomes for the comparison others hardly improved on the intrapersonal equity measure for all five analyses. After controlling for the background variables, the linear and curvilinear effects of the block of intrapersonal equity measures accounted for on average 1.8 to 17.2% of the variance in the dependent variables (average additional amount of explained variance $= 10.5\%$, median value $= 13.9\%$): in all cases the extra amount of variance explained by the intrapersonal equity measures was significant, $p < .05$. In contrast, the I/O ratio for the comparison others explained on average an additional .3% of the variance in the dependent variables (range .0–.4%, median value .1%) after controlling for the background variables and the intrapersonal equity measures. In none of the cases was the extra amount of variance explained by the interpersonal equity measures statistically significant at the $p < .05$ level. When the order of entering the interpersonal and the I/O ratio for the comparison other was reversed (i.e. the linear and curvilinear components of the intrapersonal measure were entered first), the I/O ratio for the comparison other explained on average 2.8% of the variance in the dependent variables. Even then, the intrapersonal equity measure explained on average an additional 7.9% of the variance in the dependent variables.

All in all, these findings suggest that Hypothesis 3 must be rejected. It was *not* the case that the interpersonal equity measure effected the outcome variables more strongly than the intrapersonal measure. Both measures performed about equally well, but the regression analyses revealed that inclusion of the perceived I/O ratio for the comparison other hardly improved the prediction of the dependent variables.

4. Discussion

This study sought to examine the effects of a perceived imbalance between investments and outcomes on various indicators of worker health (emotional exhaustion, cynicism, lack of professional efficacy, sickness absence and health complaints). Two related issues were addressed. The first pertained to the shape of the relationship between perceived equity at work and various health-related work outcomes. We expected both linear and curvilinear effects of inequity, such that both being underbenefited and being overbenefited would result in more negative health outcomes than feeling equitably treated. The second issue concerned the measurement of equity. A rough distinction was made between approaches in which people were expected to compare their own investments-to-outcomes ratio to that of similar others (i.e. interpersonal equity measures) and approaches in which this external comparison was excluded (intrapersonal equity measures).

4.1. *Measurement of equity*

Our analyses revealed that both equity measures yielded similar patterns of effects in relation to the outcome variables in this study. The linear and curvilinear effects of both measures on the outcome variables were about equally strong. Thus, in this sense it is impossible to prefer one type of measure to the other. However, the intrapersonal measure is conceptually much simpler than the interpersonal measure, in that the latter includes an explicit comparison to the investment/reward ratio of comparable others. The fact that the effects

of both measures were about equally strong suggests that the additional information about the perceived investment/outcome ratio of others makes the measurement of inequity unnecessarily complex.

This impression was confirmed by the results of several stepwise regression analyses. These revealed that adding the information about the investment/reward ratio of comparable others explained little extra variance in the dependent variables after controlling the intrapersonal measure. Conversely, the intrapersonal measure explained a substantial amount of variance, even after controlling for the perceived investment/reward ratio of others. Thus, these results suggest that there is no reason to prefer the intrapersonal measure to the interpersonal equity measure, especially since the latter is conceptually and mathematically more complex than the first.

4.2. *Shape of the relationship between equity and health outcomes*

Our study provided moderately strong evidence for the presence of both linear (Hypothesis 1) and quadratic (U-shaped, Hypothesis 2) effects of inequity on the health outcomes in our study. Participants who felt that their work investments exceeded their outcomes (or who felt that their own investments-to-outcomes ratio compared unfavourably to that of similar others) were more likely to report high levels of emotional exhaustion, cynicism, and health complaints than others. Note that the present study provides no evidence for the assumption that overbenefiting participants report more health complaints than participants who felt equally treated. Although there was a tendency for the latter group to report lower levels of health complaints than the first group, this difference was nearly always not large (or consistent) enough to reach statistical significance at the 5% level. In a sense this result confirms our expectation that the threshold for negative outcomes resulting from investing too much in relation to one's outcomes is much higher than that for receiving too little (Adams, 1965; Perry, 1993).

4.3. *Study limitations*

We wish to briefly outline some limitations and issues for future research. One limitation derives from the fact that the data were collected using a cross-sectional design, implying that it is impossible to test the causal order of the relationships under study. In this context it is important to note that the causal order of these variables has been examined in previous longitudinal research, showing that inequity predicts future burnout (Taris *et al.*, 2001) and sickness absence (Geurts, Buunk, & Schaufeli, 1994). This does not imply, however, that the strength of the relationships among the variables in this study is unbiased; it is still possible that variables *mutually* influence each other (e.g. burnt-out workers may report elevated levels of inequity to rationalize their illness).

Further, note that the equity measures employed in this study were based on one particular way of measuring inequity. As only one item was used for measuring worker investments, the reliability of this item could not be estimated. Further, the choice for particular job rewards may have been idiosyncratic. Thus, other approaches to measuring inequity (cf. Vecchio, 1984) could yield different results. This means that it may be difficult to generalize from the current set of results to other equity measures. Note, however, that other research suggests that various conceptualizations of inequity (e.g. single-item measures and multi-item measures) tend to be highly correlated (Taris *et al.*, 2001; Van Horn *et al.*, 2001). Follow-up research may show whether the current pattern of results replicates for other measures.

A similar limitation derives from the fact that the health-related outcomes examined in this study were drawn from a much more varied set of possible outcomes. The outcomes studied here can mostly be considered as directed toward the study participants themselves, rather than directed 'outward' (i.e. toward colleagues, superiors, clients, or the organization they work for) as is the case for outcomes such as turnover (Geurts *et al.*, 1998), employee theft (Shapiro *et al.*, 1995), intentionally diminishing performance (Greenberg, 1989), and so forth. This limits the degree to which the current results can be generalized to other types of outcome variables (especially non-health outcomes).

A related limitation is that the data employed here were obtained through self-reports. This implies that the associations among the variables may be inflated due to common method variance and response bias (Conway, 2002). Thus, it would seem desirable to replicate the current results using 'objective' measures of worker health (such as cortisol and testosterone levels, blood pressure and the like).

Finally, note that the current research was designed as a field study, examining general perceptions of inequity in relatively unfocused exchange relationships at work, rather than the very specific relationships usually studied in laboratory designs. On the one hand, this lack of precision may have resulted in increased error variances for the equity measures, thus leading to conservative estimates of the effects of inequity on the outcomes. On the other hand, the fact that general perceptions were used makes it hard to pin down the precise nature of the effects of inequity on the outcome variables; for example, investments were measured with a single item, thus raising the question of *which* type of investments was responsible for the effects reported in this study. This issue remains to be resolved in future research.

4.4. *Theoretical and practical implications*

The results of this study—albeit with limitations—provide interesting insights into the role of perceived inequity at work. Some evidence was found for the assumption that inequity has curvilinear effects on various health-related outcome variables, apart from the linear effects found in previous studies. The nature of these curvilinear effects was such, however, that especially workers who felt disadvantaged (50 to 85% of the sample under study, depending on the measure chosen) reported elevated levels of emotional exhaustion, cynicism and health complaints. Workers who felt that their rewards exceeded their investments reported very similar levels of complaints to those who felt that there was a balance between their investments and rewards. Thus, the relationship between inequity and well-being was *J-shaped* rather than *U-shaped*, as was expected on the basis of previous work: it was not the case that optimal values for worker health were found for the equally treated group, relative to the underbenefited and overbenefited groups. The practical implication of this finding is simple: that is, contrary to what previous research (Van Dierendonck *et al.*, 1996) and theory suggested, it is not the case that workers who receive too many rewards are an important risk group for health complaints; it would appear from our study that people are quite able to deal with the stress resulting from being over-rewarded—if they experience any stress at all.

Potentially, the finding that the intrapersonal equity measure performed at least as well as the more complex interpersonal equity measure is of more importance. Our results revealed that the incorporation of the comparison with similar others did not improve the prediction of the outcome variables. One explanation for this finding might be that this particular way of measuring interpersonal equity triggers workers to compare themselves with others who perform the same tasks in the same department of the same organization.

If so, the outcomes may have been about the same for self and others (in terms of pay, relation with the supervisor, etc.). This would mean that especially own (and others') investments are important in determining the degree to which equity exists. This reasoning meshes well with recent findings that investments are considerably less important in determining the degree to which workers experience inequity than perceived outcomes (Taris *et al.*, 2001; Van Horn *et al.*, 2001).

This also suggests that in work settings intrapersonal approaches to measuring equity will be more appropriate than interpersonal approaches. Workers might well compare themselves to other workers, but as the difference between own and others' outcomes will be rather limited; external comparison will add little to measures that include own investments and outcomes only. If this is correct, the interpersonal approach to measuring equity would be nothing but a more complicated variation on the intrapersonal approach, and should therefore be discouraged—at least in the work context.

This reasoning also suggests that there may be contexts in which interpersonal measures will perform *better* than intrapersonal measures. Some contexts may easily elicit comparison with others (if so, interpersonal measures might be superior to intrapersonal measures); other contexts may elicit no such comparison (and then intrapersonal measures may perform better). It would seem important to test such a distinction in future research. Before doing so, however, a framework should be developed that specifies *when* interpersonal or intrapersonal approaches apply. Previous research and theory has not made such a distinction, suggesting that until now researchers have assumed that the psychological process accounting for the relationship between inequity and outcome variables does not vary across contexts. Perhaps the key to this issue lies in the visibility of own and others' investments and rewards. A necessary condition for interpersonal comparison to apply seems that one has access to information about the investments and rewards of others. In the absence of such information, intra-personal comparison will apply. The work context would seem to be a likely candidate for inviting interpersonal comparisons, as both one's own and one's co-workers' investments (time, effort, output) and rewards (promotions, salary increases, favours from the boss) will often be quite discernible (even if they do not differ across workers). The fact that the interpersonal approach performed relatively poorly in this context suggests either that this reasoning is faulty, or that interpersonal comparison is in general a less important and less pervasive phenomenon than intrapersonal comparison. The current study cannot resolve this issue; perhaps future laboratory studies will shed light on the question of under which circumstances intrapersonal versus interpersonal comparison applies.

References

ADAMS, J. S. (1963). Toward an understanding of inequity. *Journal of Abnormal and Social Psychology*, *67*, 422–436.

ADAMS, J. S. (1965). Inequity in social exchange. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 2, pp. 267–299). New York: Academic Press.

BOBKO, P. (1990). Multivariate correlational analysis. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of Industrial and Organizational Psychology* (Vol. 1, pp. 637–686). Palo Alto, CA: Consulting Psychologists Press.

CHADWICK-JONES, J. K. (1976). *Social Exchange Theory: Its Structure and Influence in Social Psychology*. London: Academic Press.

CONWAY, J. M. (2002). Method variance and method bias in industrial and organizational psychology. In S. E. Rogelberg (Ed.), *Handbook of Research Methods in Industrial and Organizational Psychology* (pp. 344–365). Malden, MA: Blackwell.

FESTINGER, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117–140.

GEURTS, S., SCHAUFELI, W., & DE JONGE, J. (1998). Burnout and intention to leave among mental health-care professionals: A social psychological approach. *Journal of Social and Clinical Psychology*, 17, 341–362.

GEURTS, S. A., BUUNK, B. P., & SCHAUFELI, W. B. (1994). Social comparisons and absenteeism: A structural modeling approach. *Journal of Applied Social Psychology*, 24, 1871–1890.

GOLDBERG, D. (1972). *The Detection of Psychiatric Illness by Questionnaire*. London: Oxford University Press.

GREENBERG, J. (1989). Equity and workplace status: A field experiment. *Journal of Applied Psychology*, 73, 606–613.

GREENBERG, J. (1990). Employee theft as a reaction to underpayment inequity: The hidden cost of pay cuts. *Journal of Applied Psychology*, 75, 561–568.

HATFIELD, E., TRAUPMANN, J., SPRECHER, S., & HAY, J. (1985). Equity and intimate relations: Recent research. In W. Ickes (Ed.), *Compatible and Incompatible Relationships* (pp. 309–321). Oxford: Pergamon Press.

IVERSON, R. D. & ROY, P. (1994). A causal model of behavioral commitment: Evidence from a study of Australian blue-collar employees. *Journal of Management*, 20, 15–41.

MASLACH, C. & JACKSON, S. E. (1986). *MBI: The Maslach Burnout Inventory: Manual Research Edition*. Palo Alto, CA: Consulting Psychologists Press.

PERRY, L. S. (1993). Effects of inequity on job satisfaction and self-evaluation in a national sample of African-American workers. *Journal of Social Psychology*, 133, 565–573.

PRITCHARD, R. D. (1969). Equity theory: A review and critique. *Organizational Behavior and Human Performance*, 4, 176–211.

SCHAUFELI, W. B., LEITER, M. P., MASLACH, C., & JACKSON, S. E. (1996). Maslach Burnout Inventory-General Survey (MBI-GS). In C. Maslach, S. E. Jackson, & M. P. Leiter (Eds.), *MBI Manual* (3rd ed.). Palo Alto, CA: Consulting Psychologists Press.

SCHAUFELI, W. B., VAN DIERENDONCK, D., & VAN GORP, K. (1996). Burnout and reciprocity: Towards a dual-level social exchange model. *Work & Stress*, 10, 224–237.

SHAPIRO, S. L., TREVINO, L. K., & VICTOR, B. (1995). Correlates of employee theft: A multi-dimensional justice perspective. *International Journal of Conflict Management*, 6, 404–414.

SIEGRIST, J. (2001). A theory of occupational stress. In J. Dunham (Ed.), *Stress in the Workplace: Past, Present and Future* (pp. 52–66). London: Whurr Publishers.

SWEENEY, P. D. (1990). Distributive justice and pay satisfaction: A field test of an equity prediction. *Journal of Business and Psychology*, 4, 329–341.

TARIS, T. W., PEETERS, M. C. W., LE BLANC, P. M., SCHAUFELI, W. B., & SCHREURS, P. J. G. (2001). From inequity to burnout: The role of job stress. *Journal of Occupational Health Psychology*, 6, 303–323.

THIBAUT, J. W. & KELLEY, H. H. (1959). *The Social Psychology of Groups*. New York: Wiley.

VAN DIERENDONCK, D., SCHAUFELI, W. B., & BUUNK, B. P. (1996). Inequality among human service professionals: Measurement and relation to burnout. *Basic and Applied Social Psychology*, 18, 429–451.

VAN DIERENDONCK, D., SCHAUFELI, W. B., & SIXMA, H. J. (1994). Burnout among general practitioners: A perspective from equity theory. *Journal of Social and Clinical Psychology*, 13, 86–100.

VAN HORN, J. E., SCHAUFELI, W. B., & TARIS, T. W. (2001). Lack of reciprocity among teachers: Validation of reciprocity indices and their relation to stress and well-being. *Work & Stress*, 15, 191–213.

VAN YPEREN, N. W. (1998). Informational support, equity and burnout: The moderating effect of self-efficacy. *Journal of Occupational and Organizational Psychology*, 71, 29–33.

VAN YPEREN, N. W., HAGEDOORN, M., & GEURTS, S. A. E. (1996). Intent to leave and absenteeism as reactions to perceived inequity: The role of psychological and social constraints. *Journal of Occupational and Organizational Psychology*, 69, 367–372.

VECCHIO, R. P. (1984). Models of psychological inequity. *Organizational Behavior and Human Performance*, 34, 266–282.