

Intrinsic Need Satisfaction: A Motivational Basis of Performance and Well-Being in Two Work Settings¹

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Studies in 2 work organizations tested a self-determination theory based model in which employees' autonomous causality orientation and their perceptions of their managers' autonomy support independently predicted satisfaction of the employees' intrinsic needs for competence, autonomy, and relatedness, which in turn predicted their performance evaluations and psychological adjustment. Path analysis indicated that the self-determination theory model fit the data very well and that alternative models did not provide any advantage.

From the time McGregor (1960) applied Maslow's (1943) needs-hierarchy theory to the field of management, considerable research has explored the relation of human needs to job attitudes and work motivation. Some of the studies have utilized needs-hierarchy theories (Alderfer, 1972; Maslow, 1943), some have used other needs theories (e.g., McClelland, 1985; Murray, 1938), and some have been atheoretical in their points of departure.

One reason the concept of needs has been so appealing is that it has substantial heuristic utility for delineating dimensions of the environment that would be expected, *a priori*, to lead to positive versus negative work-related outcomes. Aspects of the environment likely to allow need satisfaction are predicted to yield positive outcomes, whereas those likely to thwart need satisfaction are predicted to yield negative outcomes.

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Needs as Desires

The term *needs* has been used most commonly to refer to a person's conscious wants, desires, or motives. Viewed in this way, needs are treated as individual-difference variables, with the strength of a person's needs (i.e., desires) being assessed and then used to predict work-related outcomes either directly, as was done by McClelland and Burnham (1976) in exploring managerial effectiveness, or in interaction with characteristics of the job or job environment, as was done by Hackman and Lawler (1971) in predicting job satisfaction, motivation, absenteeism, and supervisory ratings of work quality.

Hackman and Lawler (1971), who were attempting to clarify why enriched jobs had been found to enhance job attitudes for some employees but not for others (Blood & Hulin, 1967; Turner & Lawrence, 1965), proposed that workers differ in the strength of their desire for higher-order need satisfaction and that there should be a strong positive relation between enriched jobs and job attitudes for those with a strong desire for higher-order need satisfaction but not for those with a weak desire. In that and similar studies, need satisfaction was not measured but was assumed. In other words, it was assumed that the positive work outcomes resulting from enriched jobs was a function of higher-order need satisfaction.

Needs as Essential Nutriment

An alternative view defines needs in terms of the nutriment (whether physiological or psychological) that are essential for survival, growth, and integrity of the individual (Ryan, Sheldon, Kasser, & Deci, 1996). This view of needs assumes that needs are innate rather than learned, and it provides a basis for verifying empirically whether something is actually a need (e.g., Baumeister & Leary, 1995; Ryan, 1995). If its satisfaction is shown empirically to be associated with people's growth and health, it is a *need*; if its satisfaction is not associated with such outcomes, it is merely a *desire*. This is an important point because some of people's desires (which would be considered needs by the previous definition) have been found to be harmful or counterproductive (e.g., Kasser & Ryan, 1996). In our view, it is illogical and inappropriate to consider something a human need if it has harmful consequences for humans.

Self-determination theory (Deci & Ryan, 1985b; Ryan & Deci, 2000) has proposed that individuals have three innate, psychological needs. These are the need for *competence*, which concerns succeeding at optimally challenging tasks and being able to attain desired outcomes (e.g., Skinner, 1995; White, 1959); the need for *autonomy*, which concerns experiencing choice and feeling like the initiator of one's own actions (deCharms, 1968; Deci, 1975); and the need for *relatedness*, which concerns establishing a sense of mutual respect and reliance with others (Baumeister & Leary, 1995; Harlow, 1958).

This latter definition of needs leads not to the assessment of need strength, but instead to the assessment of need satisfaction. Everyone is assumed to have these innate needs (regardless of the strength of their reported desires for those outcomes), so the degree of a person's need satisfaction is hypothesized to predict positive work-related outcomes. When need satisfaction is assessed, determining which aspects of the work context allow need satisfaction becomes a matter for empirical exploration, rather than for assumption.

Use of this approach to defining needs and assessing need satisfaction could shed new light on the long-standing debate concerning the satisfaction–performance relation. Typically, satisfaction has been studied as job satisfaction, and the aggregated mixed results indicate a low positive correlation between satisfaction and performance in the workplace (Brayfield & Crockett, 1955; Schwab & Cummings, 1970; Vroom, 1964). Our approach maintains that when job satisfaction results from attainment of basic need satisfaction, it would be associated with effective performance, but when job satisfaction results from attainment of desired outcomes that do not satisfy the basic needs, it would tend not to be related to effective performance.

Self-Determination Theory

According to self-determination theory (Deci & Ryan, 1985b; Ryan & Deci, 2000), opportunities to satisfy the three intrinsic needs will facilitate self-motivation and effective functioning because they facilitate internalization of extant values and regulatory processes, and they facilitate adjustment because need satisfaction provides the necessary nutriments for human growth and development (Ryan, 1995). In contrast, thwarted satisfaction of the needs will undermine motivation and have maladaptive consequences (Baard, 1994; Ryan et al., 1996; Sheldon, Ryan, & Reis, 1996).

This general hypothesis is expected to apply across domains, and research in other domains has provided some support for the hypothesis. For example, research on relationships has found that satisfaction of the three intrinsic needs predicted security of attachment (La Guardia, Ryan, Couchman, & Deci, 2000), and work in church organizations has shown that satisfaction of these needs was related to attendance, contributions, volunteerism, and spiritual vitality (Baard & Aridas, 2001).

In the present studies, we examine hypothesized relations in the work domain. Thus, we expect that intrinsic need satisfaction on the job will predict both performance ratings and psychological well-being of employees, in line with cross-cultural findings by Deci et al. (2001).

Autonomy Supportive Contexts

The theory further proposes that both social contexts and enduring individual differences influence people's intrinsic need satisfaction and thus their

motivation, performance, and adjustment. One social-contextual factor that has been researched extensively is autonomy support (Deci & Ryan, 1987), which in work organizations concerns the general interpersonal orientation used by one's manager or work-group supervisor (Deci, Connell, & Ryan, 1989). More concretely, *autonomy support* involves the supervisor understanding and acknowledging the subordinate's perspective, providing meaningful information in a nonmanipulative manner, offering opportunities for choice, and encouraging self-initiation (Deci, Eghrari, Patrick, & Leone, 1994).

Numerous studies have shown that autonomy-supportive contexts promote self-motivation (Deci, Schwartz, Sheinman, & Ryan, 1981; Grolnick & Ryan, 1989), satisfaction (Deci et al., 1989), and performance in various settings (Benware & Deci, 1984; Koestner, Ryan, Bernieri, & Holt, 1984). For example, Deci et al. (1989) found that when managers were more autonomy-supportive, their work-group members reported a higher level of trust in the corporation and more overall job satisfaction. Blais and Brière (1992) found similarly that when managers were perceived by their subordinates as more autonomy-supportive, the subordinates displayed greater job satisfaction, less absenteeism, and better physical and psychological well-being. Because we theorize that the positive outcomes in these two studies would have resulted from employees feeling greater satisfaction of their intrinsic needs, the present studies directly investigate the relation between employees' experience of their managers being autonomy-supportive and the employees' intrinsic need satisfaction.

It is worth noting that autonomy support refers not so much to a characteristic of the job itself as to an interpersonal climate created by the manager in relating to subordinates and carrying out managerial functions, such as goal setting, decision making, and work planning. Because autonomy support begins with the manager taking the employees' perspective in carrying out these functions, we expect that autonomy-supportive managers will facilitate satisfaction of all three intrinsic needs; for example, through worker empowerment (Champy, 1995), removing the obstacles of excessive work rules (Deming, 1986), promoting high involvement (Lawler, 1986), and providing the elements specified by the KEYS instrument to be necessary for creative engagement (Amabile, Conti, Coon, Lazenby, & Herron, 1996).

Autonomous Causality Orientation

An individual difference within self-determination theory that has received considerable empirical attention is the autonomous causality orientation (Deci & Ryan, 1985a). *Causality orientations* concern individual differences in the initiation and regulation of behavior and in the contextual elements toward which individuals orient when initiating and regulating their behavior. The *autonomy orientation* refers to people's tendency to be self-regulating and to

orient toward the interest value of the environment and the contextual supports for self-initiation. In past studies, the autonomy orientation has been associated positively with enhanced self-regulation, higher self-esteem and self-actualization, and greater integration in personality (Deci & Ryan, 1985a; Koestner, Bernieri, & Zuckerman, 1992; Williams & Deci, 1996).

In the present studies, we hypothesize that people high in autonomy orientation—because they are theorized to be more self-initiating, more likely to experience authorities as supportive, and more oriented toward aspects of the environment that support their self-regulation—will experience greater intrinsic need satisfaction on the job. Stated differently, they should feel more self-determining, more competent, and more related to their managers and coworkers because of their tendency toward active engagement with the social context.

The full need-satisfaction model, which was derived from self-determination theory and tested in this research, states that employees' autonomy orientation and their perceptions of their managers' autonomy support will predict satisfaction of their intrinsic needs for competence, autonomy, and relatedness, and in turn will predict work performance and adjustment. Several recent studies have tested aspects of this model. For example, Ilardi, Leone, Kasser, and Ryan (1993) found that factory workers who experienced greater overall satisfaction of their needs for autonomy, competence, and relatedness on the job displayed more positive work attitudes, higher self-esteem, and better well-being as indexed by the General Health Questionnaire (Goldberg & Hillier, 1979). In another study (Kasser, Davey, & Ryan, 1992), psychiatric patients in a supervised work setting who reported greater satisfaction of their needs for autonomy, competence, and relatedness on the job spent more time at work than did those who reported less need satisfaction. Studies in other domains (e.g., health care) also have shown that autonomous orientation and perceived autonomy support lead to maintained behavior change (Williams, Grow, Freedman, Ryan, & Deci, 1996).

The current studies extend earlier ones in three important ways. First, they are the first studies in any domain to predict need satisfaction from both the autonomous causality orientation and perception of autonomy support in the social context. Second, they are the first studies to predict performance evaluation from satisfaction of the basic psychological needs. And third, the primary study is the first to test the fit of this overall path model.

Pilot Study

Method

Participants

Participants for this study were 59 employees from the operations center of a major U.S. banking corporation. They completed a packet of four questionnaires at a group meeting. The packet asked respondents to report their most recent

annual overall performance ratings. Of the 59 participants, 35 provided their performance evaluations.

Measures

Autonomy orientation. The General Causality Orientations Scale (GCOS) is a 36-item questionnaire (Deci & Ryan, 1985a) that presents 12 different vignettes about problems or situations that arise in life (e.g., opportunity to take a new job, doing poorly on an examination). Three ways of responding to the occurrence are presented—one of which reflects being autonomously oriented—and participants indicate on a 7-point Likert-type scale the extent to which each response is characteristic of them. Responses on the 12 autonomy orientation items are summed to form the autonomy orientation subscale score. The subscales of this frequently used scale have good reliability and strong external validity (e.g., Deci & Ryan, 1985a; Koestner et al., 1992; Koestner & Zuckerman, 1994; Williams & Deci, 1996).

Perceived managerial autonomy support. The Problems at Work (PAW; Deci et al., 1989) questionnaire also uses a vignette format. Eight problem situations that are typical for managers are described, such as a difficulty in motivating a subordinate. Each vignette is followed by four responses that describe different ways a manager could handle the problem. These responses fall along a continuum ranging from highly autonomy-supportive to highly controlling.

The highly controlling responses involve prescribing a solution and demanding that it be followed, often with the promise of reward or the threat of punishment. The moderately controlling responses involve the manager telling the subordinate what he or she should do to solve the problem, implying that it is in his or her best interest to carry through on the solution. The moderately autonomy-supportive responses involve the manager encouraging the subordinate to figure out how to handle the problem by observing how others deal with such situations or occurrences. This approach allows the subordinate some freedom because it does not prescribe and demand, but it is not highly autonomy-supportive because it encourages complying with norms rather than developing creative solutions to problems. Finally, highly autonomy-supportive responses involve the manager listening to subordinates' viewpoints, acknowledging their feelings, and encouraging them to devise their own plans for handling the problem. When a manager is autonomy-supportive, he or she might provide relevant information or feedback if it seems useful, but would do it in a supportive, nonjudgmental way.

Participants respond to PAW (Deci et al., 1989) items on 7-point scales, indicating the extent to which each responses is characteristic of them. Responses of each type are summed across the eight vignettes, and then the four sums are combined algebraically, using weightings of -2, -1, 1, and 2 for *highly controlling*, *moderately controlling*, *moderately autonomy-supportive*, and *highly*

autonomy-supportive, respectively, to form an overall score. Higher scores indicate that the manager is more autonomy-supportive.

In research by Deci et al. (1989), managers in a major office-machine corporation completed the PAW questionnaire, describing themselves. Alpha coefficients were in excess of .70, indicating good internal consistency; and the test-retest reliability over a 4-month period was .80, indicating good temporal stability. Evidence of validity was provided by the managers' composite score being significantly correlated with their subordinates' level of trust in the organization, feeling nonpressured, and being satisfied with their jobs. Furthermore, in the longitudinal component of that project, changes in managers' level of autonomy support following an intervention predicted changes in their subordinates' trust in the organization and satisfaction with various aspects of their jobs.

The PAW (Deci et al., 1989) was designed for managers to complete describing themselves. However, in the current study, we adapted it so that subordinates would complete it providing their perceptions of their own managers. Alpha coefficients for the four subscales using this method were as follows: highly autonomous = .80; moderately autonomous = .74; moderately controlling = .71; and highly controlling = .66.

Intrinsic need satisfaction (INS scale). A 23-item questionnaire was used to assess the extent to which employees experience satisfaction of their three intrinsic needs—autonomy, competence, and relatedness—on their job. Participants responded to items such as “I enjoy the challenge my work provides” and “I get along with people at work” on 5-point scales. The three subscales emerged from a principal components factor analysis with varimax rotation, yielding seven items for autonomy, eight items for competence, and eight items for relatedness. Subscale scores can be used separately to test specific hypotheses or averaged to yield an overall, intrinsic needs satisfaction score.

Cronbach's alpha for the total scale was reported to be .90 (Leone, 1995); and in the present data set, overall alpha was .87. Leone found intrinsic need satisfaction to be correlated positively with work engagement, overall job satisfaction, and psychological adjustment, thus confirming its validity.

Anxiety/depression. The General Health Questionnaire (GHQ; Goldberg & Hillier, 1979) is a 28-item questionnaire that assesses the extent to which participants experience the presence of four types of psychiatric or adjustment symptoms: depression, anxiety, somatic symptoms, and social dysfunction. Respondents report on 4-point scales how frequently they have experienced these difficulties over the past few weeks.

In the present study, only the 14 items related to anxiety and depression were used, and a total score was formed by adding the responses to the 14 items. Numerous studies have shown the scale to be both reliable and valid (e.g., Goldberg, Cooper, Eastwood, Kedward, & Shepherd, 1970). In the present data set, alpha was .91 for the total score.

Table 1

Means and Sample Sizes for Variables in the Pilot Study

Variable	<i>M</i>	<i>SD</i>	<i>N</i>
Autonomous causality orientation	70.13	6.67	59
Managerial autonomy support	15.47	21.38	56
Intrinsic need satisfaction	44.67	7.23	59
Need satisfaction, autonomy	15.17	2.60	59
Need satisfaction, competence	15.44	3.45	59
Need satisfaction, relatedness	14.61	3.56	59
Performance evaluation	2.14	0.65	35
Anxiety–depression	28.66	8.71	59

Work performance. The corporation has a standard performance evaluation process in which employees are rated by their supervisor on a 4-point scale ranging from *excellent* to *below standard*. There are no forced distributions, so a manager can rate subordinates in accord with his or her actual appraisal of subordinates' performance.

Participants in the present study were asked to report their most recent performance evaluation. The timing of these evaluations varied for different participants, but could have been up to several months prior to the data collection. Because the questionnaires were anonymous, we expected that the reports would be veridical.

Results

Table 1 presents the means, standard deviations, and sample sizes for each of the variables in the study. Table 2 presents the intercorrelations among these variables. The number of participants included in each correlation varied in accordance with the number who provided both sets of relevant data.

The first issue that was investigated concerns the relationship of intrinsic need satisfaction to the outcome variables of work performance and psychological well-being. As predicted, work performance, as assessed by evaluation ratings, was correlated with the summary score for intrinsic need satisfaction ($r = .34, p < .05$). People who experienced greater need satisfaction on the job were rated by their managers as performing better.

Table 2 indicates further that the specific need satisfaction most strongly related to performance evaluation ratings was relatedness ($r = .34, p < .05$). However, because of the very small sample of performance ratings, a simultaneous regression analysis in which performance ratings were regressed onto each of the three separate need satisfactions failed to yield any significant relations.

Table 2

Correlations Among the Main Variables of the Pilot Study

	1	2	3	4	5	6	7
1. Autonomous causality orientation	—						
2. Manager autonomy support	.12 (55)	—					
3. Intrinsic need satisfaction	.33** (59)	.42*** (56)	—				
4. Need satisfaction autonomy	.30* (59)	.32* (56)	.81*** (59)	—			
5. Need satisfaction competence	.23† (59)	.24† (56)	.85*** (59)	.57*** (59)	—		
6. Need satisfaction relatedness	.29* (59)	.47*** (56)	.85*** (59)	.54*** (59)	.54** (59)	—	
7. Performance evaluation	.19 (34)	.07 (30)	.34* (35)	.27 (35)	.19 (35)	.34* (35)	—
8. Anxiety-depression	-.20 (57)	-.09 (55)	-.26† (59)	-.26† (59)	-.33* (59)	-.07 (59)	-.08 (34)

Note. The number of cases used in each correlation is in parentheses.

† $p < .08$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Depression/anxiety, as an inverse indicator of well-being, was marginally negatively correlated with intrinsic need satisfaction ($r = -.26, p < .06$), suggesting that there may be a relation between intrinsic need satisfaction and psychological adjustment. Table 2 also indicates that the specific need satisfaction most strongly (and negatively) related to anxiety/depression was competence ($r = -.33, p < .05$) and that satisfaction of the need for autonomy was marginally negatively related to anxiety/depression ($r = -.26, p < .06$). A simultaneous regression in which anxiety/depression was regressed onto each of the three separate need satisfactions reveals that satisfaction of the need for competence did account for significant variance in adjustment ($\beta = -.34, p < .05$).

The next issue that was investigated concerns whether intrinsic need satisfaction can be predicted by perceptions of managers' autonomy support and by employees' autonomy orientation. Correlational results reveal that composite intrinsic need satisfaction was related both to employees' perceptions of their managers' autonomy support from the PAW (Deci et al., 1989; $r = .42, p < .001$) and to employees' own autonomy orientation from the GCOS (Deci & Ryan, 1985a; $r = .33, p < .01$). Because it was hypothesized that both managerial autonomy support and employees' autonomy orientation would influence the experience of need satisfaction independently, the summary need satisfaction score was regressed simultaneously onto those two variables. Results show that significant, independent variance in overall intrinsic need satisfaction was explained by both perceived autonomy support ($\beta = .34, p < .01$) and autonomous causality orientation ($\beta = .28, p < .00$).

When the three need satisfactions are considered separately, Table 2 shows that satisfaction of the need for autonomy was significantly correlated with both perceived autonomy support ($r = .32, p < .05$) and autonomous causality orientation ($r = .30, p < .05$). A simultaneous regression of satisfaction of the autonomy need onto perceived autonomy support and autonomous causality orientation shows that perceived autonomy support was significant ($\beta = .26, p < .05$) and that autonomy orientation was marginally significant ($\beta = .25, p < .07$).

Satisfaction of the need for competence was marginally correlated both with perceived autonomy support ($r = .23, p < .08$) and with autonomous causality orientation ($r = .24, p < .08$). In a simultaneous regression analysis, neither variable explained a significant amount of independent variance in satisfaction of the need for competence.

Satisfaction of the need for relatedness was significantly correlated with both-perceived autonomy support ($r = .47, p < .001$) and the autonomous causality orientation ($r = .29, p < .05$). Simultaneous regression indicates that perceived autonomy support accounted for a significant amount of variance in satisfaction of the relatedness need ($\beta = .41, p < .01$) and that autonomous causality orientation was marginally related ($\beta = .23, p < .07$).

Discussion

This pilot study provides weak though encouraging support for the model. Both perceptions of managers' autonomy support and subordinates' autonomous causality orientations did relate to composite intrinsic need satisfaction. The fact that subordinates' individual differences in the general autonomy orientation and subordinates' perceptions of their managers' autonomy support contributed independent variance is particularly important because it suggests that subordinates' experience of their managers' autonomy support was not just a reflection of individual differences in their own tendency to be autonomous. Further, the results indicate that intrinsic need satisfaction related to work performance and marginally to adjustment.

Although these preliminary results are encouraging, the study is greatly limited by the small overall sample size and especially by the small number who provided performance evaluation data. Thus, it is important to replicate the study with a larger sample and more complete performance data so the encouraging relations from the pilot study may be confirmed and extended. A larger sample would also allow the fit of the overall path model to be tested using Structural Equation Modeling.

The results of this first study also suggest that two of the measures may not have been optimal. The fact that adjustment was only marginally related to need satisfaction in this sample when other studies have yielded strong significant relations between intrinsic need satisfaction and various indicators of adjustment suggests that the adjustment measure may not be the most appropriate for this setting. Although the dimension of anxiety seems to be quite relevant for the workplace, depression may not be as relevant. Consequently, in the second study, we substituted the somatization subscale for the depression subscale reasoning that lack of need satisfaction might be more likely to show up as somatization than depression in a demanding, high-paced corporate setting. Further, although the PAW (Deci et al., 1989) measure did relate to intrinsic need satisfaction, it was designed to measure managers' self-perceptions rather than subordinates' perceptions of them. Thus, we included the PAW in the second study for consistency, but the primary measure was recently designed specifically to assess subordinates' perceptions of autonomy support.

Primary Study

Method

Participants

We invited 698 associates (first-line employees) from a major investment banking firm to participate in this study. They were asked to attend departmental

meetings to complete a professionally designed and printed packet of questionnaires and to report the most recent, annual overall performance rating they had received. Of the 698 employees, 71 had been on the job for too short a time to have performance evaluations. We received complete data from 528 of the 627 relevant employees, for a response rate of about 84%. Of those responding, 38% were female, which closely reflects the overall percentage of women employed in the firm.

Measures

The GCOS (Deci & Ryan, 1985a) was again used to assess the individual-difference variable of workers' autonomy orientation. The PAW (Deci et al., 1989) questionnaire was used in this study as a supplemental measure of perceptions of managers' autonomy support. The INS scale was again used to assess satisfaction of the needs for competence, autonomy, and relatedness; and two subscales from the GHQ (Goldberg & Hillier, 1979) were again used to index adjustment, although in this study anxiety and somatization were used instead of anxiety and depression.

We changed from 5-point to 7-point scales on the INS and the GHQ for consistency so that responses on all items in the study would be on 7-point scales. In addition, we used the following measures.

Work Climate Questionnaire (WCQ). This 15-item scale assesses participants' perceptions of the degree of autonomy supportiveness of their managers. It includes items such as "My manager provides me with choices and options about my work." Responses are made on a 7-point scales ranging from 1 (*not at all true*) to 7 (*very true*).

The WCQ was adapted from two comparable questionnaires: one used to assess patients' perceptions of the degree of autonomy support from their health care providers (Williams et al., 1996; Cronbach's $\alpha = .92$), and the other to assess students' perceptions of the degree of autonomy support from their college or medical-school instructors (Williams & Deci, 1996; $\alpha = .96$). The only differences among the scales are the target person (manager, doctor, and instructor).

Vitality (Ryan & Frederick, 1997). A seven-item questionnaire assessed feelings of physical and mental vitality, aliveness, and vigor. Cronbach's alpha for the scale was .84 in a sample of 151 undergraduates, and construct validity was demonstrated in several studies. For example, the trait of psychological vitality correlated positively with global self-esteem ($r = .52, p < .01$) and negatively with total scores on the Rand Psychopathology Index ($r = -.60, p < .01$).

Adjustment. The indicator of adjustment consisted of the combination of anxiety and somatization (each reverse scored) and of vitality after each had been converted to z scores. In this study, the correlation between anxiety and somatization was .73 ($p < .001$). When anxiety and somatization were combined,

Table 3

Means and Sample Sizes for Variables in the Primary Study

Variable	<i>M</i>	<i>SD</i>	<i>N</i>
Autonomous causality orientation	65.82	8.04	558
Managerial autonomy support (PAW)	22.64	21.08	542
Managerial autonomy support (WCQ)	60.48	20.57	568
Intrinsic need satisfaction	109.21	18.37	564
Need satisfaction, autonomy	29.99	7.08	564
Need satisfaction, competence	39.09	8.14	564
Need satisfaction, relatedness	40.13	7.63	564
Performance evaluation	2.37	0.56	574
Adjustment	60.93	19.97	564

Note. PAW = Problems at Work questionnaire (Deci et al., 1989); WCQ = Work Climate Questionnaire.

the correlation between the composite of those two negative indicators of well-being and vitality (the positive indicator) was $-.43$ ($p < .001$). This suggests that use of the composite indicator was reasonable.

Performance. The corporation uses a 3-point evaluation scale, ranging from 1 (*poor performance*) to 3 (*superior performance*). Participants were asked to report their most recent performance evaluation ratings, which they might have received up to several months prior to the data collection.

As can be seen in Table 3, about the same number of people reported their performance evaluations as provided each of the other types of data, thus overcoming one problem in the pilot study. Still, there is the question of whether the reports were veridical. Although we were not able to obtain the actual ratings for the participants from the company records, we were provided the percentages of people within the largest work group included in our study ($n = 322$) who received each of the three performance level ratings. Those percentages were virtually identical to the percentages of people in our sample who reported each of the three levels. Specifically, 33% of our participants reported receiving the highest rating while the records indicate that 34% of the employees received that rating; 63% of our participants reported receiving the middle rating, while the records indicate that 61% of the employees received that rating; and 4% of our participants reported receiving the lowest rating, while the records indicate that 5% of the employees received that rating. Thus, the reports were fully commensurate with what would be expected, and therefore are likely to be veridical.

Results

Means, standard deviations, and sample sizes are presented in Table 3. The means for males and females on each variable were compared. Males were higher on performance evaluations (2.42 vs. 2.31), $t(526) = 2.39, p < .02$; and adjustment (0.12 vs. -0.62), $t(526) = 3.04, p < .01$; and they perceived the work climate to be more autonomy-supportive (as measured by the WCQ; 62.43 vs. 58.07), $t(526) = 2.75, p < .01$. Further, males reported marginally higher satisfaction of the need for relatedness than did females (40.51 vs. 39.40), $t(526) = 1.82, p < .07$. No other significant gender differences emerged. Thus, gender was entered into regressions involving one of the variables for which there was a gender difference.

The intercorrelations among the variables appear in Table 4. One can see from the table that the two important work outcomes were related to need satisfaction. As predicted, work performance correlated significantly with overall intrinsic need satisfaction ($r = .24, p < .001$) and with satisfaction of each of the three separate needs. When performance was regressed onto intrinsic need satisfaction and gender, both were significant (need satisfaction, $\beta = .25, p < .0001$; gender, $\beta = .10, p < .02$). When performance was simultaneously regressed onto the three separate need satisfactions and gender, satisfaction of relatedness was significantly related to performance ($\beta = .12, p < .01$), as was gender ($\beta = .10, p < .05$), and satisfaction of competence was marginal ($\beta = .09, p < .08$).

Adjustment also correlated significantly with intrinsic need satisfaction, as predicted ($r = .46, p < .001$), and with satisfaction of the three separate needs. When adjustment was regressed onto intrinsic need satisfaction and gender, both were significant (need satisfaction, $\beta = .46, p < .0001$; gender, $\beta = .15, p < .001$). Then, when adjustment was simultaneously regressed onto the three need satisfactions and gender, satisfaction of each of the three needs accounted for significant independent variance (competence, $\beta = .20, p < .0001$; autonomy, $\beta = .27, p < .0001$; relatedness, $\beta = .10, p < .05$). Gender was also a significant predictor of adjustment ($\beta = .15, p < .001$).

Intrinsic need satisfaction was related both to individual differences in workers' autonomy orientation and to workers' perceptions of their managers' autonomy support, but it was not related to gender. Autonomy orientation correlated significantly with intrinsic need satisfaction ($r = .21, p < .001$), and also with satisfaction of each of the three separate needs. Both measures of perceived autonomy support also correlated significantly with intrinsic need satisfaction (WCQ, $r = .58, p < .001$; PAW [Deci et al., 1989], $r = .24, p < .001$).

Both measures of perceived autonomy support also correlated significantly with satisfaction of each of the three separate needs. The fact that PAW (Deci et al., 1989) related to intrinsic need satisfaction replicated the finding of the pilot study. However, the current analyses indicate that the WCQ measure related

Table 4

Correlations Among the Main Variables of the Primary Study

	1	2	3	4	5	6	7	8
1. Autonomous causality orientation	—							
2. Manager autonomy support (PAW)	.31***	—						
3. Manager autonomy support (WCQ)	.12**	.16***	—					
4. Intrinsic need satisfaction	.21***	.24***	.58***	—				
5. Need satisfaction autonomy	.12**	.18***	.61***	.82***	—			
6. Need satisfaction competence	.16***	.26***	.44***	.83***	.56***	—		
7. Need satisfaction relatedness	.21***	.15***	.38***	.76***	.44***	.40***	—	
8. Performance evaluation	.10*	.15***	.15***	.24***	.20***	.17***	.20***	—
9. Adjustment	.05	.17***	.28***	.46***	.43***	.38***	.31***	.09*

Note. PAW = Problems at Work questionnaire (Deci et al., 1989); WCQ = Work Climate Questionnaire.

* $p < .05$. ** $p < .01$. *** $p < .001$.

considerably more strongly to the need-satisfaction variables. Accordingly, because of the differential strength of the relations and because the WCQ was specifically designed to assess workers' perceptions of managers' autonomy support, the WCQ, rather than the PAW, was used in all further analyses.

Because both autonomy orientation and perceived autonomy support were expected to predict intrinsic need satisfaction, the summary need satisfaction score was regressed simultaneously onto those two variables. Results show that significant, independent variance in overall intrinsic need satisfaction was explained by both perceived autonomy support ($\beta = .58, p < .001$) and autonomous causality orientation ($\beta = .14, p < .001$).

Simultaneous regressions were then performed with each of the separate need satisfactions being regressed onto the two predictor variables. When satisfaction of the competence need was regressed onto perceived autonomy support and autonomous causality orientation, both were significant predictors (perceived autonomy support, $\beta = .43, p < .001$; autonomy orientation, $\beta = .11, p < .01$). A simultaneous regression of satisfaction of the autonomy need onto perceived autonomy support and autonomous causality orientation shows that perceived autonomy support predicted significant variance ($\beta = .59, p < .001$). Finally, a simultaneous regression of satisfaction of the relatedness need onto perceived autonomy support, autonomous causality orientation, and gender shows that perceived autonomy support was significant ($\beta = .35, p < .001$), autonomy orientation was significant ($\beta = .18, p < .001$), and gender was marginal ($\beta = .08, p < .07$).

All relations that were hypothesized as part of the path model did emerge as significant, indicating that it would be appropriate to test whether self-determination theory's need-satisfaction models of performance and adjustment at work would fit the data. We examined the path model, and the results are shown in Figure 1. All of the hypothesized paths in the model were significant (all $ps < .01$). The overall fit of the model to the data was excellent, as indicated by these goodness-of-fit statistics: $\chi^2(6, N = 528) = 10.18, p = .12$; normed fit index (NFI) = .97; comparative fit index (CFI) = .99; and root mean square error of approximation (RMSEA) = .04.

Because the performance evaluations were done before the need satisfaction data were obtained, it is possible that performance evaluations influenced need satisfaction rather than the other way around, as hypothesized. Thus, we tested a second model identical to the one in Figure 1, except that the arrow went from performance to need satisfaction rather than from need satisfaction to performance. The fit of this model was significantly worse than the fit of the model in Figure 1, χ^2 difference = 14.3, $p < .05$, suggesting that the direction of influence was from need satisfaction to performance, as we hypothesized.

Of course, with the cross-sectional data, we cannot conclude directional influence, but the fits of the models are consistent with the hypothesized relations. Finally, we tested a model in which causality was assumed to be bidirectional

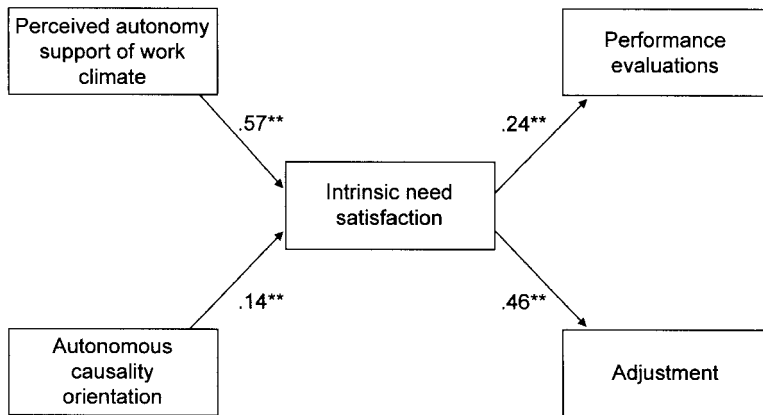


Figure 1. Parameter estimates for path analysis of the intrinsic need satisfaction model of work performance and adjustment.

between need satisfaction and performance. The fit of this model did not differ from that of the model in Figure 1. However, the standardized regression weight of the path from performance to need satisfaction was nonsignificant ($-.04$). Thus, the hypothesized model appears to be a more reasonable one.

Finally, we noted in the Method section that the three indicators of adjustment were quite highly correlated. However, because vitality is a positive indicator of adjustment, whereas anxiety and somatization are negative indicators, we tested an additional model that was similar to the model in Figure 1 except that there were two adjustment outcomes; namely, vitality and the composite of anxiety and somatization. The fit indexes for this model were worse than those for the model in Figure 1, although the fit of the two models did not differ significantly. Further, the standardized estimates for the paths from need satisfaction to vitality and anxiety–somatization were nearly identical (0.42 to vitality and -0.38 to anxiety–somatization). Thus, there appears to be no advantage to this model, so it seems reasonable to conclude that the hypothesized model is the best fitting model.

General Discussion

Results of these studies provide additional support for the relevance of self-determination theory to motivation in the workplace. The proposed model suggests that performance on the job and psychological adjustment are influenced by satisfaction of people's intrinsic needs for competence, autonomy, and relatedness on the job, and that these opportunities for intrinsic need satisfaction are influenced by managers being perceived as autonomy-supportive and by subordinates' autonomous causality orientation.

Results of the two studies were quite similar, although because of the small sample size in the pilot study, many of the relations that were significant in the primary study were not in the pilot study. Correlation and regression analyses indicate that managers being perceived as more autonomy-supportive and subordinates having a stronger autonomous causality orientation were related to subordinates' experience of greater intrinsic need satisfaction. There was also indication that intrinsic need satisfaction was related to work outcomes, in that intrinsic need satisfaction significantly predicted both work performance and adjustment.

The primary study allowed an overall test of self-determination theory's need-satisfaction model of performance and adjustment at work. The study provides excellent support for the model. Each hypothesized path was significant, and the overall model fit the data very well.

Additional analyses with the three individual need satisfactions show that each was involved in various motivational processes, although again the relations were weaker in the pilot study. In the primary study, perceived autonomy support was significantly related to experienced satisfaction of each of the three needs, and the autonomous causality orientation was significantly related to satisfaction of two of the three needs. Further, satisfaction of all three needs significantly predicted independent variance in adjustment, and satisfaction of the need for relatedness significantly predicted performance evaluations.

There was a very interesting and internally consistent pattern of gender differences in the primary study. Women tended to perceive their managers as less autonomy-supportive, to feel marginally less satisfaction of their relatedness need, to receive lower performance evaluations, and to display less well-being. There are various ways of explaining this pattern of results. One possibility is that managers were actually less autonomy-supportive of women than of men, which could have led the women to feel less related, and in turn to perform less well and to be less well-adjusted. This set of effects also could have been supplemented by women being given somewhat poorer evaluations, even if they actually performed as well as men did. An alternative possibility—in line with the literature suggesting that women tend to be more concerned with relatedness than do men (e.g., Maccoby & Jacklin, 1974) and that women tend to perceive ambiguous messages as less autonomy-supportive than do men (Deci, Cascio, & Krusell, 1975; Kast & Connor, 1988)—is that women could have perceived less autonomy support and felt less relatedness than did men, even if there had been the same amount.

In this organization, women made up one third of the employees, but there was a disproportionately lower percentage of women in managerial roles. In fact, although 38% of our sample was female, only 18% of the managers about whom participants were reporting their perceptions were women. This, of course, adds complexity because it is possible that male and female managers were

differentially autonomy-supportive. Additional research will be required to determine what factors account for the pattern of gender differences we obtained.

The current studies add to previous investigations of self-determination in the workplace both by relating intrinsic need satisfaction to performance and by considering the individual need satisfactions as well as total intrinsic need satisfaction. The fact that both total need satisfaction and satisfaction of the need for relatedness predicted performance suggests that it is indeed useful to continue using the concept of need satisfaction in research on organizational performance, but that it is important to be specific about the needs being addressed and to focus on need satisfaction, rather than just need strength. The study was also the first to examine autonomous causality orientation and perceived autonomy support together as predictors of need satisfaction. The finding that the two variables—an individual-difference variable and a social-context variable—account for independent variance in need satisfaction is an important new finding.

Further, the fact that intrinsic need satisfaction related to performance is useful in sorting out the inconsistent relations that have been found between satisfaction and performance at work. It may be the case that intrinsic need satisfaction is related to work performance, but that job satisfaction is not related to performance if job satisfaction does not derive from satisfaction of the basic psychological needs for autonomy, competence, and relatedness.

Limitations to the present research are worth noting. First, participants reported their own performance ratings. Although this is clearly a limitation, comparison of the percentages of our participants who reported each performance level to the actual percentages of employees at each level within the largest work group of our sample indicates that the reports were likely to have been veridical. Second, the performance evaluations were done prior to the data collection of need satisfaction, raising the possibility that performance evaluations influenced need satisfaction rather than the other way around. Although the model in which performance influenced need satisfaction fit the data significantly less well than the model in which need satisfaction influenced performance, a longitudinal study in which need satisfaction data were collected prior to performance evaluations would be useful.

Third, our measure of the degree to which managers were autonomy-supportive was provided by the subordinates, so a study that assesses managerial autonomy support independently (as was done by Deci et al., 1989) and then relates it to intrinsic need satisfaction would be an important addition to the present research. The fact that we removed variance attributable to employees' own autonomy orientation, which is an individual-difference variable likely to affect employees' perceptions of their managers' autonomy support, suggests that the effect of perceived managerial autonomy support could not be explained as a function of employees' individual differences. Nonetheless, the fact that women reported less autonomy support than did men highlights the importance

of having an independent measure of managerial autonomy support in order to disentangle the factors that contributed to the pattern of gender differences that we found.

The present studies provide evidence that the concept of intrinsic needs, defined as the nutrients necessary for human survival and growth, is useful for studying performance and adjustment in the workplace. Intrinsic need satisfaction, when assessed rather than assumed, was found to relate to performance and adjustment across the entire sample, whereas it had been found to relate to these work outcomes only for subsamples in previous studies where it had been assumed (e.g., Hackman & Lawler, 1971).

The focus on need satisfaction provides a framework for empirical exploration of the contextual factors that allow intrinsic need satisfaction and thus facilitate performance and adjustment. However, the precise concepts of satisfaction of the intrinsic needs for competence, autonomy, and relatedness also allow a priori predictions of the conditions that are likely to promote satisfaction, performance, and adjustment. Thus, when managers keep in mind the needs of their subordinates, the managers ought to be able to provide the conditions that will allow need satisfaction and lead to positive work outcomes (Baard, 2002).

Work in church organizations also has supported the view that leaders' attentiveness to the need satisfaction of members is essential for promoting active engagement in the organization's mission. In fact, Baard and Aridas (2001) introduced the idea of an ACRE approach to leadership, suggesting that the most effective leaders will be ones who provide *autonomy, competence, and relatedness supporting environments*.

In the present studies, we explored the self-determination theory concept of autonomy support, which is an interpersonal style that can be used by managers in performing any of the managerial functions. At the core of the concept is the idea of understanding subordinates' perspectives and then providing choice, reflecting feelings, providing rationales for requested behaviors, and encouraging self-regulation. By taking a subordinate's perspective, managers are more able to understand the specific elements that are needed in a particular situation to facilitate the desired work outcomes of effective performance and employee well-being. Clearly, the use of performance evaluations as the behavioral outcome makes the results important for the success of work organizations. Furthermore, the use of anxiety and somatization as (negative) indicators of adjustment makes the results similarly relevant for the organization's bottom line. Although not assessed in our study, it seems clear that absenteeism would be directly related to these indicators, and the indicators are also likely to be related to health care costs that are becoming increasingly burdensome for work organizations.

Like previous studies exploring self-determination theory in work organizations (Deci et al., 1989) and exploring related theoretical perspectives (e.g., Amabile et al., 1996), the present studies indicate that the work environment is

extremely important for effective performance. These studies show, in particular, that the concept of intrinsic need satisfaction can provide a useful way for organizing and interpreting a variety of studies that relate contextual supports to performance and adjustment at work.

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