The Critical Psychological States: An Underrepresented Component in Job Characteristics Model Research

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The mediating role of the critical psychological states (CPS) in the job characteristics model was examined in two studies. Using Baron and Kenny's (1986) approach for examining mediation hypotheses, results from Study 1: (1) supported the hypothesized linkages between the core job dimensions and the CPS, and between the CPS and attitudinal outcomes; (2) provided no support for the hypothesis that all three CPS must be experienced to maximize internal work motivation; (3) supported the present authors' hypothesis that the CPS would explain significant amounts of outcome variance beyond the core job dimensions; and (4) supported the present authors' hypothesis that the CPS are partial rather than complete mediator variables. Using causal modeling analysis and another sample, results from Study 2 provided the strongest support for a job characteristics model that allowed the core job dimensions to have direct and indirect effects on personal and work outcomes, further supporting the Study 1 finding that the CPS were partial mediator variables. The general discussion centered on the implications the present findings have for future job characteristics model research.

Hackman and Oldham's (1976) job characteristics model has stimulated over 200 published empirical studies and at least three comprehensive reviews (e.g., Fried & Ferris, 1987; Loher, Noe, Moeller & Fitzgerald, 1985; Roberts & Glick, 1981). In their review, Fried and Ferris (1987) found that only eight studies included the critical psychological states (CPS), and only three of those eight studies examined the CPS mediation hypothesis (Arnold & House, 1980; Hackman & Oldham, 1976; Wall, Clegg & Jackson, 1978).

That the CPS mediation hypothesis rarely has been examined is not a trivial issue. First, Hackman and Lawler (1971), and Hackman and Oldham (1975;
presented the CPS as the primary motivational component of the job characteristics model. Since few studies have included the CPS, one could question whether the motivational underpinnings of this theory have been adequately examined or represented in job characteristics model evaluations (Gardner & Cummings, 1988; Kanfer, 1991). Second, excluding the mediating role of the CPS could be overlooked if there was enough evidence supporting their exclusion. Excluding the CPS from tests of the theory, thus, would have represented the normal practice of modifying a theory as warranted by the accumulated evidence (Bacharach, 1989). For instance, sufficient empirical evidence has accumulated to support evaluating the relations among the job characteristics model's components without the growth need strength moderator (Graen, Scandura & Graen, 1986; Johns, Xie & Fang, 1992; Tiegs, Tetrick & Fried, 1992). By contrast, virtually no empirical evidence has accumulated supporting the practice of excluding the CPS from tests of the theory. In fact, Hogan and Martell suggested that the CPS have been excluded from past studies not because the empirical evidence supported this trend but because of the analytical difficulties associated with testing the mediation hypothesis (1987, p. 244). Thus, the practice of excluding the mediating role of the CPS appears to have occurred without theoretical or empirical justification.

The purpose of the present research was to examine the soundness of excluding the mediating role of the CPS from the job characteristics model. This was accomplished through two studies, both of which addressed the following underlying question: Do the CPS make a contribution to our understanding of individuals' reactions to their jobs, or are the CPS an unnecessary component of the job characteristics model whose exclusion would make the theory more parsimonious? In addressing the latter question, the present research was critical in nature. Specifically, in both studies the hypothesis that the CPS are important components of the job characteristics model was tested against the alternative hypothesis that they may not be necessary, and that their removal may result in a more parsimonious explanation of job design processes (Harris & Schaubroeck, 1990; James, Mulaik & Brett, 1982). The present research was also critical in that, assuming the CPS possess a mediating role, the nature of that role (i.e., whether the CPS are complete or partial mediators) was examined in a series of hypotheses that contrasted the theoretical statements of that role with the accumulated empirical evidence. It is important to note that the purpose of the present research was not to examine every nuance of the job characteristics model, but rather, only the role the CPS have in the model. In the following sections, we provide a basis for the present research question by briefly reviewing the role of the CPS in the job characteristics model and the findings from studies that included the CPS.

The Role of the CPS in the Job Characteristics Model

Hackman and colleagues (Hackman & Lawler; 1971; Hackman & Oldham, 1976; 1980) used the CPS to provide a theoretical link between perceived job characteristics and internal work motivation. As can be seen in Figure 1, internal
Figure 1. The Job Characteristics Model
work motivation is hypothesized to result from work that prompts three CPS, experienced meaningfulness, experienced responsibility, and knowledge of results. Experienced meaningfulness refers to the extent to which an individual believes his or her job is important vis-à-vis the individual's own value system. Experienced responsibility represents the degree of personal accountability an individual has for his or her work outcomes. And knowledge of results refers to the extent to which an individual knows how well he or she is performing on the job.

Hackman and colleagues hypothesize that the three CPS are prompted by work consisting of five core job dimensions. Skill variety (the breadth of skills used while performing work), task identity (the opportunity to complete an entire piece of work), and task significance (the impact the work has on others) are hypothesized to prompt experienced meaningfulness. Autonomy (the depth of discretion allowed while performing work) is hypothesized to prompt experienced responsibility. And feedback (the amount of information provided about work performance) is hypothesized to cause knowledge of results. In brief, greater amounts of these five core job dimensions are postulated to lead to stronger experiences of the three CPS which, in turn, lead to more positive responses to work as evidenced by changes in both attitudinal (e.g., increased internal work motivation, increased job satisfaction, decreased turnover intentions, etc.) and behavioral (increased performance, decreased turnover, etc.) outcomes.

Although never explicitly stated by Hackman and colleagues, Figure 1 indicates that the CPS are complete mediators of the core job dimensions-outcomes relations. That is, the effects of the core job dimensions on personal and work outcomes are shown to be fully transmitted by the CPS (Baron & Kenny, 1986; James, 1980; James & Brett, 1984). Also, as mentioned, Hackman and Oldham state that “the five core job dimensions are seen as prompting three psychological states, which, in turn, lead [italics added] to a number of beneficial personal and work outcomes” (1976, p. 255). Hackman and Oldham emphasize the impact the CPS have on personal and work outcomes by labeling them the job characteristics model's “causal core” (1976, p. 255). Finally, Hackman et al. hypothesize that all three CPS must be experienced to maximize internal work motivation.

**Examinations of the Mediation Hypothesis**

Few studies have examined the hypothesized mediating role of the CPS in the model (cf. Arnold & House, 1980; Champoux, 1991; Fox & Feldman, 1988; Fried & Ferris, 1987; Hackman & Oldham, 1976; Hogan & Martell, 1987; Johns et al., 1992; Tiegs et al., 1992; Wall et al., 1978). Instead, studies that included the CPS typically examined the linkages between the core job dimensions and the CPS (e.g., Does skill variety correlate with experienced meaningfulness?), and between the CPS and attitudinal and behavioral outcomes (e.g., Do the CPS correlate with internal work motivation, performance, and turnover?). Although correlation studies cannot be viewed as tests of the mediation hypothesis (Fried & Ferris, 1987), they do provide some insight into the hypothesized linkages among the model's components.
Regarding the core job dimensions-CPS linkages, task identity has not always related well to experienced meaningfulness. Instead, task identity has: (1) operated just the opposite of what was originally hypothesized (Miner, 1980); (2) not related to any CPS (Fox & Feldman, 1988; Hackman & Oldham, 1976); or (3) related better to experienced responsibility or knowledge of results than to experienced meaningfulness (Arnold & House, 1980; Fried & Ferris, 1987; Johns et al., 1992). Autonomy has been shown to relate equally well to all three CPS (Arnold & House, 1980; Fried & Ferris, 1987). Feedback, in general, has related well to knowledge of results, although Fried and Ferris' (1987) meta-analysis showed feedback related equally well to all three CPS. Skill variety and task significance have related well to experienced meaningfulness.

Regarding the CPS-outcomes linkages, the CPS have related well to internal work motivation, growth satisfaction, and general satisfaction (Fried & Ferris, 1987; Hackman & Oldham, 1976; Johns et al., 1992). They have not, however, consistently related well to performance or absenteeism (cf. Berlinger, Glick & Rodgers, 1988; Fried & Ferris, 1987; Griffin, Welsh & Moorhead, 1981; Griffin, 1991; Hackman & Oldham, 1976). The Fried and Ferris (1987) meta-analysis found that experienced meaningfulness had stronger associations with attitudinal outcomes than did responsibility or knowledge of results, but a more recent study by Johns et al. (1992) showed that the three CPS related equally well to attitudinal outcomes.

A few studies have examined whether the CPS mediated the relations between the core job dimensions and outcomes and/or the requirement that all three CPS must be experienced. With regard to their role as mediators, Hackman and Oldham (1976) demonstrated that the CPS completely mediated the effects of fewer than half of the hypothesized linkages between the core job dimensions and personal and work outcomes. That is, after controlling for the CPS, many of the core job dimensions had significant associations with the outcome variables. Hackman and Oldham's findings, thus, suggested that the CPS were partial mediators of most of the core job dimensions-outcomes relations. Johns et al., (1992) showed that meaningfulness and responsibility did not completely mediate the relations between skill variety, autonomy, and a set of personal and work outcomes. With regard to the requirement of experiencing all three CPS, reviews and studies have not supported the hypothesis that all three CPS must be experienced to maximize improvements in personal and work outcomes (Arnold & House, 1980; Fried & Ferris, 1987; Hackman & Oldham, 1976; Johns et al., 1992).

To summarize, these findings appear to suggest that: (1) some of the core job dimensions may not relate as expected to their theoretically specified CPS; (2) the CPS may relate more strongly to attitudinal outcomes than to behavioral outcomes; (c) the CPS may be partial mediator variables; and (d) all three CPS may not be necessary to optimize improvements in personal and work outcomes. Recall, however, that the majority of the above studies did not examine the mediation hypothesis. Consequently, the collective findings derived from these studies must be viewed as only suggestive of a lack of support and not conclusive evidence against the hypothesized mediating role of the CPS. It seems
important, therefore, for additional research to focus on answering the question of whether the CPS should be included in the job characteristics model and, if so, in what form their role should be modeled.

The Present Research

Two studies were conducted to address the latter issue. Study 1 was primarily a test of the original mediation hypothesis using Baron and Kenny's (1986) mediation testing approach. The first question addressed in Study 1 was the main one underlying the stated purpose of the present research: Do the CPS mediate the relationship between the core job dimensions and personal and work outcomes, or are they an unnecessary component of the job characteristics model per the impression given by the bulk of studies excluding them from their tests? As noted earlier, we found no evidence to suggest that they should be excluded. Thus, we predicted that:

**Hypothesis 1:** The CPS will mediate the relations between the core job dimensions and outcomes.

Although never explicitly stated by Hackman and colleagues (Hackman & Lawler, 1971; Hackman & Oldham, 1976; 1980), an examination of both past and contemporary portrayals of the job characteristics model (i.e., Figure 1; Hogan & Martell, 1987) gives the impression that the CPS are complete mediators of the core job dimensions-outcomes relations. That is, the job characteristics model suggests that the core job dimensions' total effects on outcomes are transmitted through the CPS (James & Brett, 1984). As noted, however, there is empirical evidence indicating that the core job dimensions' total effects may not be fully transmitted through the CPS (e.g., Hackman & Oldham, 1976; Johns et al., 1992). First, one cannot ignore that fact that two meta-analyses show that core job dimensions have significant direct effects on outcomes (Fried & Ferris, 1987; Loher et al., 1985). Second, in tests including the CPS, there exists support for the core job dimensions' direct effects and indirect effects through the CPS on outcomes. This empirical evidence, therefore, suggests that the CPS may be partial rather than complete mediators. Study I was designed to test this aspect of the CPS' mediating role more explicitly than has previous research. Based on the evidence bearing on the question of complete or partial mediation, we predicted that:

**Hypothesis 2:** The CPS will be partial mediators in that the core job dimensions will have direct effects on outcomes, and indirect effects through the CPS.

Unlike the above, Hackman and Oldham do state explicitly that all three CPS must be experienced to maximize the explanation of internal work motivation (1976, p. 256). However, like the above, there is empirical evidence suggesting that this aspect of the mediation hypothesis may not hold. Specifically, the Hackman and Oldham (1976) and Arnold and House (1980)
studies show that all three CPS are not necessary to maximize the explanation of outcome variance. Thus, we predicted that:

**Hypothesis 3:** All three CPS will not be necessary to maximize the explanation of outcome variance; however, the CPS will account for significant amounts of outcome variance beyond the core job dimensions.

Study 2 represented a validation of the Study 1 findings. It was based on a different sample and different methodology. In this vein, Study 2 permitted the determination of whether conclusions regarding the CPS' mediating role converged when examined with different samples and methods. To the degree that convergence occurs, confidence is gained in the validity of the conceptual premises underlying the theory in question (Brewer & Hunter, 1989). Using structural equation methodology, Study 2 examined the fit of three different job characteristics models, each of which included a different role for the CPS in the model: (1) the job characteristics model shown in Figure 1, which modeled the CPS a complete mediators; (2) a job characteristics model that included the CPS' direct effects and indirect effects through the CPS on outcome variables, thus testing the partial mediating role of the CPS; and (3) a job characteristics model that excluded the mediating role of the CPS altogether, thus modeling the majority of job characteristics model research. These three models were compared to themselves and "best" and "worst" fitting reference points (discussed below). For the reasons explained under the description of Study 1 above, it was postulated that the model most representative of the data would be the one in which the CPS possess a mediating role, and a role of partial rather than complete mediation.

**Hypothesis 4:** The job characteristics model that includes the CPS as partial mediators will provide the best explanation of the motivational processes underlying the job characteristics model.

**STUDY I**

**Method**

**Sample**

Data for Study 1 were collected from 188 geographically dispersed subjects working for different offices of one organization located in the Southeast. Subjects performed a variety of jobs, including management (15% of the sample), professional counseling (72% of the sample), and secretarial and administrative support (13% of the sample). The average age of the subjects was 44 years, 55% of whom were males. Fifty-five percent of the subjects had at least eleven years of experience with the organization. All subjects held high school diplomas, and among them 85% had bachelors degrees and 66% had master's degrees.
Measures

The data were collected through surveys, distributed to and completed by the subjects at their work sites. The surveys were given to the subjects in a packet, which also contained a letter of endorsement from the organization's chief executive officer and a return envelope addressed to the researchers. Participation was voluntary, and the subjects were guaranteed their responses would remain confidential. Of the surveys distributed (N=230) and returned, 188 were fully completed and usable, yielding a response rate of 82%.

Core job dimensions. The revised Job Diagnostic Survey (JDS) was used to measure five core job dimensions (Idaszak & Drasgow, 1987). The scales and their internal consistency coefficients were: skill variety (\(\alpha = .76\)), task identity (\(\alpha = .76\)), task significance (\(\alpha = .77\)), autonomy (\(\alpha = .79\)), and feedback from the job (\(\alpha = .74\)).

Critical psychological states. Scales from the original JDS were used to measure the CPS (Hackman & Oldham, 1980). The scales and their alpha coefficients were: meaningfulness (\(\alpha = .81\)), responsibility (\(\alpha = .83\)), and knowledge of results (\(\alpha = .80\)).

Outcomes. Scales from the original JDS were used to measure general satisfaction, internal work motivation, and growth satisfaction. The scales and their alpha coefficients were: general satisfaction (\(\alpha = .85\)), internal work motivation (\(\alpha = .90\)), and growth satisfaction (\(\alpha = .81\)).

Analysis

Baron and Kenny's (1986) approach for testing mediation hypotheses was used to test Hypotheses 1 and 2. Their approach required estimating three regression equations, which we have labeled Steps 1, 2 and 3, for each hypothesized mediated relationship. Step 1 required regressing the mediator on the independent variable. Step 2 required regressing the dependent variable of the independent variable. And Step 3 required regressing the dependent variable on the independent variable and the mediator.

According to Baron and Kenny, support for mediation is provided if the following conditions hold: (1) the first regression shows that the independent variable affects the mediator; (2) the second regression shows that the independent variable affects the dependent variable; and (3) the third regression shows that the mediator affects the dependent variable and the effect of the independent variable on the dependent variable is lower in magnitude in the third equation than in the second equation (1986, p. 1177). To provide support for complete mediation, the independent variable must not affect the dependent variable when the mediator is controlled.

Hypothesis 1 states that the CPS will possess a mediating role in the job characteristics model. Thus, support for Hypothesis 1 would be provided if: (1) each core job dimension affects its hypothesized CPS (e.g., skill variety affects experienced meaningfulness) (Step 1); (2) each core job dimension affects each outcome variable (e.g., skill variety affects internal work motivation) (Step 2); and (3) each CPS affects each outcome variable (e.g., experienced meaningfulness affects general satisfaction).
meaningfulness affects internal work motivation) (Step 3). Further, the effect of each core job dimension on each outcome variable must be lower in magnitude when each theory-specified CPS is controlled (e.g., the effect of skill variety on internal work motivation must be lower in magnitude when experienced meaningfulness is controlled) (Step 2 vs. Step 3).

Hypothesis 2 states that the CPS will be partial rather than complete mediators. To provide support for this hypothesis, the results of Step 3 must show that each core job dimension affects each outcome variable when each theory-specified CPS is controlled (e.g., skill variety must affect internal work motivation when experienced meaningfulness is controlled).

Hypothesis 3 states that all three CPS will not be necessary to maximize the explanation of outcome variance; however, the CPS will account for significant amounts of outcome variance beyond the core job dimensions. Arnold and House's (1980) regression technique was used to test this hypothesis. They tested the requirement that all three CPS are necessary by comparing the amount of outcome variance explained by a regression equation including the main effects of the CPS and the CPS' three two-way interaction terms to the amount of variance explained by a regression equation including the latter terms plus the CPS' three-way interaction term. To support this requirement, they suggested that the regression equation that included the main effects of the CPS, the CPS' three two-way interactions, and the CPS' three-way interaction term: (1) should explain the greatest amount of variance in an outcome variable; and (2) should have a significant partial regression coefficient representing the CPS' three-way product term.

The second part of Hypothesis 3 states that the CPS will explain significant amounts of outcome variance beyond the core job dimensions. To test this part of Hypothesis 3, we compared the amount of outcome variance explained by a regression equation that included the main effects of the core job dimensions to the amount of outcome variance explained by a regression equation that included the main effects of the core job dimensions and the CPS, the CPS' three two-way interactions, and the CPS' three-way interaction. If the CPS contribute to the job characteristics model's explanatory power beyond the core job dimensions, the second regression equation that includes the CPS would be expected to explain significantly greater proportions of outcome variance than the regression equation that included only the main effects of the core job dimensions.

Results and Discussion

The means, standard deviations, and correlations among all Study 1 variables are presented in Table 1. Hypothesis 1 states that the CPS will possess a mediating role between the core job dimensions and outcome variables. The test for Hypothesis 1 required the estimation of three regression equations. In the first regression equation, each CPS was regressed on its hypothesized core job dimension. To satisfy this part of the test (Step 1), each core job dimension must affect its hypothesized CPS in the first regression equation. The regression results for Step 1 are shown in Table 2. As seen in Table 2, all the regression
Table 1. Means, Standard Deviations, and Intercorrelations Among Study 1 Variables

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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</thead>
<tbody>
<tr>
<td>1. General Satisfaction</td>
<td>4.89</td>
<td>1.35</td>
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<tr>
<td>2. Growth Satisfaction</td>
<td>4.77</td>
<td>1.24</td>
<td>60</td>
<td></td>
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<td></td>
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<tr>
<td>3. Internal Motivation</td>
<td>5.83</td>
<td>.79</td>
<td>40</td>
<td>47</td>
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<td></td>
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<tr>
<td>4. Meaningfulness</td>
<td>5.49</td>
<td>1.32</td>
<td>53</td>
<td>57</td>
<td>57</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>5. Responsibility</td>
<td>6.10</td>
<td>1.06</td>
<td>26</td>
<td>35</td>
<td>61</td>
<td>47</td>
<td></td>
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<td>6. Knowledge of Results</td>
<td>5.19</td>
<td>1.29</td>
<td>41</td>
<td>57</td>
<td>18</td>
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<td>7. Skill Variety</td>
<td>5.40</td>
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<td>28</td>
<td>51</td>
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<td>39</td>
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<td>8. Task Identity</td>
<td>5.38</td>
<td>1.30</td>
<td>30</td>
<td>32</td>
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<td>9. Task Significance</td>
<td>5.59</td>
<td>1.18</td>
<td>36</td>
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<td>46</td>
<td>49</td>
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<td>49</td>
<td>29</td>
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<td>10. Autonomy</td>
<td>5.22</td>
<td>1.17</td>
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<td>11. Job Feedback</td>
<td>4.77</td>
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<td>46</td>
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<td>37</td>
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Note: N = 188. Decimals omitted from correlation matrix. Correlations equal to r = .15 are significant at p < .05.
coefficients representing the core job dimensions' main effects on their hypothesized CPS were statistically significant. These results, therefore, satisfied Step 1 of the test for mediation.

In the second regression equation, each outcome variable was regressed on each core job dimension (Step 2). The Step 2 test required that each core job dimension affect each outcome variable in the second regression equation. The results for the Step 2 test are shown in Table 3. Findings showed that the regression coefficients representing the five core job dimensions' main effects on general satisfaction, growth satisfaction, and internal work motivation were all significant. These findings, thus, satisfied the Step 2 test for mediation.

In the third regression equation, each outcome variable was regressed on each core job dimension and hypothesized mediating CPS (Step 3). The Step 3 test required that the CPS affect each outcome variable in the third regression equation, and that the effects of each core job dimension be lower in magnitude in the third versus the second regression equation. Table 4 depicts the results for the Step 3 test. As seen in Table 4, all but one of the regression coefficients representing the CPS' main effects on general satisfaction, growth satisfaction, and internal work motivation were significant. The one exception was the nonsignificant regression coefficient representing the effects of knowledge of results effect on internal work motivation.
The second part of the Step 3 test required that the partial regression coefficients representing the core job dimensions' main effects on the outcome variables be lower in magnitude in the regression equations that controlled the hypothesized CPS (shown in Table 4) than the regression coefficients obtained from the regression equations that excluded the CPS (Step 2 regression results shown in Table 3). A comparison of the partial regression and regression coefficients (Table 4 vs. Table 3) revealed that the effects of the core job dimensions on general satisfaction, growth satisfaction, and internal work motivation were all lower in magnitude when the hypothesized CPS were controlled. These findings satisfied the second part of the Step 3 test for mediation. Combined, the results of the three regression equations satisfied all three steps in the test for mediation. Except in the case of knowledge of results, these findings provided support for Hypothesis 1.

Hypothesis 2 states that the CPS will be partial rather than complete mediators of the core job dimensions-outcomes relations. The test for this hypothesis related to the partial regression coefficients representing the core job dimensions' effects on the outcome variables when the theory specified CPS were controlled (Table 4 regression results). Specifically, if the partial regression coefficients representing the core job dimensions' effects on the outcomes are significant when the CPS are controlled, support for partial mediation is provided. By contrast, if the partial regression coefficients are not significant when the CPS are controlled, support for complete mediators is provided. As shown in Table 4, thirteen of the fifteen partial regression coefficients were significant after the theory-specified CPS were controlled. Two exceptions were the partial regression coefficients representing the direct effects of skill variety and feedback on general job satisfaction. Aside from these two exceptions, the
Table 5. Outcome Variance Explained by Job Dimensions and Critical Psychological States

<table>
<thead>
<tr>
<th>Predictor</th>
<th>General Satisfaction $R^2$</th>
<th>Growth Satisfaction $R^2$</th>
<th>Internal Motivation $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Five core job dimensions</td>
<td>.31</td>
<td>.56</td>
<td>.29</td>
</tr>
<tr>
<td>M, R, K, M X R, M X K, R X K, M X R X K*</td>
<td>.43</td>
<td>.63</td>
<td>.51</td>
</tr>
</tbody>
</table>

Note: $N = 188$. All $R^2$'s ($p < .01$). M = experienced meaningfulness; R = experienced responsibility; K = knowledge of results.

* Variables entered into regression equation after the five core job dimensions.

findings supported the hypothesis that the CPS are partial rather than complete mediator variables.

Hypothesis 4 states that all three CPS will not be necessary to maximize the explanation of outcome variance, and that the CPS will account for significant amounts of outcome variance beyond the core job dimensions. If the three CPS are necessary to maximize the explanation of outcome variance, there should be a significant $R^2$ increment when the CPS' three-way product term is included in the regression equation containing the main effects of the core job dimensions and the three CPS, and the CPS' three two-way product terms. Table 5 summarizes the regression results for this test. As seen in Table 5, the findings showed that the three-way product term did not increase the amount of variance explained in general satisfaction, growth satisfaction, or internal work motivation beyond the amount of variance explained by the regression equation that included the main effects of the core job dimensions, the CPS, and the CPS' two-way interaction terms. Further, the partial regression coefficients representing the CPS' three-way interaction terms in these regressions were all nonsignificant (results available from the authors).

The regression results shown in Table 5 also indicated that the CPS explained significant amounts of variance in general satisfaction, growth satisfaction, and internal work motivation beyond the core job dimensions. As expected, the five core job dimensions alone accounted for significant amounts of variance in these outcome variables. However, the proportion of variance accounted for in all three outcome variables increased significantly when the three CPS were added to the regression equations. Specifically, adding the three CPS to the regression equations increased the proportion of explained outcome variance in general job satisfaction by 13% ($F_{3,179} = 14.4$, $p < .01$), growth satisfaction by 12% ($F_{3,179} = 22.5$, $p < .01$), and internal work motivation by 22% ($F_{3,179} = 22.5$, $p < .01$). These findings, thus, provided support for Hypothesis 3.

To summarize, the findings from the Baron and Kenny (1986) approach provided support for Hypotheses 1 and 2. In accordance with the job
characteristics model, the findings indicated that the core job dimensions related well to their specified CPS and that the CPS related well to general job satisfaction, growth satisfaction, and internal work motivation. Further, experienced meaningfulness completely mediated the skill variety-general job satisfaction relationship, and knowledge of results completely mediated the feedback-general satisfaction linkage. By contrast, the findings indicated that meaningfulness, responsibility, and knowledge of results were partial mediators of the remaining hypothesized relations between the core job dimensions and general job satisfaction, growth satisfaction, and internal work motivation. In addition, the feedback-internal work motivation relationship was not mediated by knowledge of results. Finally, the findings provided support for Hypothesis 3. All three CPS were not necessary to maximize the explanation of outcome variance, and the CPS accounted for significant amounts of outcome variance beyond the core job dimensions. Study 2 was designed to further examine the Study 1 finding that the CPS were partial mediators of the core job dimensions-outcomes relations.

STUDY 2

Methods

Sample and Data Collection

The Study 2 sample consisted of 90 policy processing and customer service employees of a major Southeastern insurance company. The subjects represented 100% of the employees in this functional area. The subjects performed three categories of jobs, namely management and supervision (N = 8), policy processing and issuing (N = 70), and customer service (N = 12). Median age and years of education were 28.5 and 12 years, respectively. Seventy-three percent of the sample was female. Sixty-four percent of the subjects had been in their current jobs two years or less, and 51% had been with the organization five years or less.

Measures

The Study 2 data were collected through surveys. Subjects completed the surveys in large group sessions away from the work area and were guaranteed anonymity of their responses through minimum identification requirements.

Core job dimensions. Scales from the revised Job Diagnostic Survey (JDS) were used to measure five core job dimensions (Idaszak & Drasgow, 1987). The measures and their internal consistency reliabilities were: (1) skill variety (α = .76); (2) task identity (α = .76); (3) task significance (α = .77); (4) autonomy (α = .90); and (5) feedback from the job (α = .69).

Critical psychological states. For the CPS, the original JDS items were used (Hackman & Oldham, 1980). The scales and their internal consistency coefficients were: (1) meaningfulness (α = .81), responsibility (α = .83), and knowledge of results (α = .80).
**Outcome variables.** Two outcome measures from the original JDS (Hackman & Oldham, 1980) were completed by respondents: (1) general job satisfaction ($\alpha = .85$); and (2) internal work motivation ($\alpha = .90$). In addition, job search intentions were assessed by having employees respond with 1=(0 to 20%), 2=(21 to 40%), 3=(41 to 60%), 4=(61 to 80%), or 5=(81 to 100%) to the question: “What is the probability that you will be involved in a search for a job outside the company during the next 12 months?”

**Model Development and Analysis**

Based on Anderson and Gerbing’s (1988) “two-step” approach (discussed briefly below) for evaluating competing theoretical structural models, five nested “job characteristics models” were estimated using LISREL VII (Jöreskog & Sörbom, 1989). Differences among the nested models are summarized in Table 6. Model I represented the least restricted or saturated structural model. For the saturated model, all possible paths among this “job characteristics model’s” components were estimated. The paths from skill variety, for example, to all three CPS were estimated, as were the paths from skill variety to all of the outcome variables. The paths from the remaining core job dimensions to the CPS and outcomes were all freed in a similar manner. This model was estimated to provide goodness of fit indices (discussed below) for the best possible fitting structural model.

Model II represented the next least restricted model in the sequence. This model estimated the core job dimensions’ direct and indirect effects on personal and work outcomes. Direct effects were estimated by freeing the paths from the core job dimensions directly to the personal and work outcomes. The indirect effects were estimated by freeing the paths from the core job dimensions to their specified CPS and freeing the paths from the CPS to the outcomes. Model II was based on Hackman and Oldham’s (1976) finding and the Study I finding that the CPS may be partial rather than complete mediator variables.

Model III represented the original job characteristics model and the next model in the sequence (see Figure 1). For Model III, only the core job dimensions’ indirect effects on personal and work outcomes were estimated. The paths from the core job dimensions to their specified CPS were freed, as were the paths from the CPS to the outcome variables.

Model IV excluded the mediating role of the CPS from the job characteristics model. Only the core job dimensions and the outcome variables were

<table>
<thead>
<tr>
<th>Model</th>
<th>Structural Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Paths among all job characteristics model components.</td>
</tr>
<tr>
<td>II</td>
<td>Paths from: (a) CJD to outcomes; (b) CJD to CPS; (c) CPS to outcomes.</td>
</tr>
<tr>
<td>III</td>
<td>Paths from: (a) CJD to CPS; (b) CPS to outcomes.</td>
</tr>
<tr>
<td>IV</td>
<td>Paths from CJD to outcomes.</td>
</tr>
<tr>
<td>V</td>
<td>Structural null model.</td>
</tr>
</tbody>
</table>

Note: CJD = core job dimensions; CPS = critical psychological states.
included in this model. Paths from the core job dimensions to the outcome variables were estimated. Model IV was based on job characteristics model research that has excluded the mediating role of the CPS and estimated only the core job dimensions’ direct effects on personal and work outcomes.

Lastly, Model V represented the structural null or most restricted model in the sequence. For Model V, all paths among the job characteristics model’s components were fixed to zero.

Covariance matrices and information about each scale’s reliability and variance were used as input for the LISREL program (Podsakoff, Williams & Todor, 1986; Renn, 1989). Two-stage least squares and maximum-likelihood procedures yielded initial and final parameter estimates, respectively. The latent-to-manifest parameter for each variable was fixed to the square root of the reliability (internal consistency coefficients) for each measure, and the value one minus the reliability times a variable’s variance was used to represent residuals. This technique provided the means to incorporate measurement error into the analysis prior to estimating the structural models.

Models Comparison

**Sequential Chi-Square Difference Tests (SCDTs).** SCDTs were used to compare statistically the fit of the five nested structural models. Specifically, the five models were compared via a decision-tree framework similar to a framework provided by Anderson and Gerbing (1988, p. 420). In general, the framework required a sequential a priori comparison of the chi-square values and associated degrees of freedom of two models—one more restricted than the other. The models were compared in an priori sequence to determine if restricting a set of parameters to equal zero statistically reduced a model’s power to account for covariance among the model’s constructs (Anderson & Gerbing, 1988; Bentler & Bonett, 1980; James et al., 1982; Williams & Hazer, 1986). The null hypothesis for each paired models comparison was no significant difference between the chi-square values of the least and more restricted models. A rejected null hypothesis, as indicated by the SCDT, provides statistical support for the least restricted of the two models. Anderson and Gerbing indicated, however, that statistically significant differences between models may be found during these comparisons even when there are trivial differences between the amounts of construct covariance explained by each model. Thus, they suggested comparing the models on a practical as well as statistical basis. To this end, we used the parsimonious fit index to judge the practical significance of each model (James et al., 1982). These as well as other fit indexes used to judge the fit of the five models are described below.

**LISREL’s Goodness of Fit Indexes.** The overall fit of each model to the data was assessed with LISREL’s chi-square statistic, Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), and Root Mean Square Residual (rmsr). In general, a nonsignificant chi-square, large GFI and AGFI, and small rmsr values are associated with better fitting models.
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**Incremental Fit Index** (IFI). The IFI was used to judge the relative fit of competing models to the data in relation to the structural null model (Bollen, 1989). The IFI has the same advantage of accurately reflecting model fit as the normed fit index (Bentler & Bonett, 1980) and has the additional advantages of performing better with small samples and having a smaller sampling variance (Bentler, 1990). The range of IFI values is generally between 0-1, with larger values reflecting better fitting models.

**Parsimonious Fit Index** (PFI). The PFI was used to compare the practical significance and efficiency of the five models (James et al., 1982). The PFI represents a model's ability to explain construct covariance given the number of freely estimated parameters. Even when there is statistical support for a least restricted model (i.e., a model with more freely estimated parameters), the more restricted model may be judged superior from a practical standpoint based upon a superior PFI value. A superior relative PFI indicates that a model is more parsimonious or efficient than a competing model in explaining an acceptable amount of construct covariance (Anderson & Gerbing, 1988, p. 421).

**Significance of Parameter Estimates.** The significance of the parameter estimates for each model was determined by a statistic approximating the t-distribution. Estimates with t-values of 2.0 or greater are significant at or beyond the $p < .05$ level.

**Results and Discussion**

Descriptive statistics for the manifest variables are shown in Table 7. The goodness of fit indexes for Models I-V are presented in Table 8. As seen in Table 8, of the theoretical models examined (Models II-IV), the two models that included the CPS provided better fits to the data than did the model that excluded the CPS (Model IV). In brief, Models II and III had the smallest chi-square and rmsr values, and the largest GFIs, AGFIs, IFIs, and PFIs. Both models also had the largest ratio of the number of significant obtained to hypothesized path coefficients.

The models were subjected to an a priori series of SCDTs: (1) Model III (job characteristics model with CPS) versus Model I (fully saturated model), $\chi^2_{diff(21)} = 294.6, p < .01$; (2) Model IV (CPS excluded) versus Model III, $\chi^2_{diff(1)} = 77.1, p < .01$; (3) Model III versus Model II (core job dimensions direct and indirect effects through CPS), $\chi^2_{diff(15)} = 274.0, p < .01$; and (4) Model II versus Model I, $\chi^2_{diff(6)} = 20.5, p < .01$. As expected, the SCDTs indicated that Model I (fully saturated model) provided a statistically better fit to the data than did the other models. More important, however, were the results for the theoretical models (Models II-IV). The results indicated that, next to the fully saturated model (Model I), Model II provided the best fit to the data. Further, Model II's PFI value indicated that it was the most parsimonious of all models, including Model I. Thus, from a statistical and practical standpoint, the model comparisons provided the greatest support for Model II.

Comparing Model II directly to Model III (original job characteristics model) provided additional support for Model II. Specifically, Model II's
Table 7. Means, Standard Deviations, and Intercorrelations for Study 2 Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search intentions</td>
<td>1.8</td>
<td>1.2</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>General satisfaction</td>
<td>4.7</td>
<td>1.1</td>
<td>-24</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Internal motivation</td>
<td>5.4</td>
<td>0.9</td>
<td>-02</td>
<td>47</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Meaningfulness</td>
<td>4.8</td>
<td>1.1</td>
<td>-24</td>
<td>45</td>
<td>16</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Responsibility</td>
<td>5.0</td>
<td>1.0</td>
<td>-01</td>
<td>36</td>
<td>22</td>
<td>51</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Knowledge of results</td>
<td>4.8</td>
<td>1.1</td>
<td>-25</td>
<td>22</td>
<td>16</td>
<td>16</td>
<td>33</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Skill variety</td>
<td>3.9</td>
<td>1.6</td>
<td>-01</td>
<td>25</td>
<td>07</td>
<td>55</td>
<td>36</td>
<td>11</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Task identity</td>
<td>3.7</td>
<td>1.6</td>
<td>-10</td>
<td>06</td>
<td>03</td>
<td>32</td>
<td>40</td>
<td>14</td>
<td>12</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<tr>
<td>Task significance</td>
<td>5.3</td>
<td>1.4</td>
<td>-14</td>
<td>17</td>
<td>07</td>
<td>49</td>
<td>26</td>
<td>07</td>
<td>61</td>
<td>04</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Autonomy</td>
<td>4.4</td>
<td>1.7</td>
<td>-10</td>
<td>38</td>
<td>17</td>
<td>45</td>
<td>42</td>
<td>19</td>
<td>54</td>
<td>35</td>
<td>43</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Job feedback</td>
<td>4.3</td>
<td>1.3</td>
<td>08</td>
<td>27</td>
<td>14</td>
<td>27</td>
<td>27</td>
<td>52</td>
<td>26</td>
<td>21</td>
<td>29</td>
<td>32</td>
<td>—</td>
</tr>
</tbody>
</table>

Note: N = 90. Decimals omitted from correlation matrix.
Correlations greater than .21 are significant at p < .05 (one-tailed).
goodness of fit indexes were superior to those of Model III. And according to Model II's PFI value, its superior fit over Model III was not due to relaxing parameters (James et al., 1982). The SCDTs (discussed above) also showed that Model II provided a statistically better fit to the data than does Model III. Model II also had a higher ratio of the number of significant obtained to hypothesized path coefficients than does Model III. Table 9 shows the LISREL estimates of the path coefficients for Model II.

In summary, the goodness of fit indexes associated with Models I-V indicated that the two job characteristics models that included a mediating role for the CPS provided better fits to the data than did the model that excluded the CPS' mediating role. Of the two models including a mediating role for the
Note: \( N = 90 \). All paths shown are significant at or beyond \( p < .05 \). Solid paths represent significant paths from original job characteristics model. Dotted paths represent significant paths representing the core job dimensions' direct effects on personal and work outcomes.

**Figure 2.** Best-Fitting Job Characteristics Model

CPS, the model comparisons and the ratios of the number of significant obtained to hypothesized path coefficients provided their greatest support for the job characteristics model that represented the CPS as partial rather than complete mediator variables. Thus, the Study 2 results validated the Study 1 finding that the CPS were partial rather than complete mediators of the core job dimensions-outcomes relations. Figure 2 depicts the job characteristics model (Model II) that received the greatest support in Study 2.
STUDY 1 AND STUDY 2

General Discussion

The primary question driving this research was: Do the CPS make a significant contribution to the job characteristics model's ability to explain basic work processes, or are the CPS an unnecessary component of the job characteristics model whose exclusion would make the theory more parsimonious? With regard to this underlying question, the findings from both studies indicated that the CPS contributed significantly to the job characteristics model's explanatory power, and thus, should not be excluded from the theory. Although they supported the inclusion of the CPS, the findings did not support the CPS' inclusion as was originally hypothesized and depicted in the job characteristics model. The findings did not support the requirement that all three CPS need to be experienced to maximize the explanation of work outcomes—a finding that was consistent with our hypothesis and with the findings of past research (Arnold & House, 1980; Hackman & Oldham, 1976). In addition, the findings did not support the CPS' role as complete mediators of the core job dimensions-outcomes relations (as depicted in the job characteristics model). Findings from both studies demonstrated that the core job dimensions had direct and indirect effects (through the CPS) on the outcome variables. This finding is subject to at least two interpretations, both of which have implications for future job characteristics model research.

First, the core job dimensions' direct effects on personal and work outcomes could represent an individual's immediate affective response to a job stemming from the momentary activation of certain cognitions (Feldman & Lynch, 1987). Namely, researchers note (e.g., Vandenberg & Seo, 1992) that certain stimuli in the work environment (in this case job dimensions) cause both an immediate affective response to that stimuli, and the stimulation of cognitive processes that reflect a more piecemeal careful assessment of the implications the stimuli have for the individual (see also, Lord, 1991). This more careful assessment is not immediate but in the long run causes an individual to alter his or her immediate reactions to the stimuli. Within this perspective, the core job dimensions direct effects may represent an individual's immediate affective reaction to a job. By contrast, the core job dimensions' indirect effects through the CPS may represent an individual's more thought out and long term assessment of the job. Testing this interpretation of the core job dimensions direct and indirect effects goes beyond the limits of the present cross-sectional data. However, this interpretation could be tested by collecting multiple waves of measures in a longitudinal study. With such longitudinal data, researchers could test this interpretation by analyzing the core job dimensions' lagged effects (through the CPS) apart from their immediate effects on personal and work outcomes.

Second, that meaningfulness, responsibility, and knowledge of results did not explain the core job dimensions' total effects on the present outcomes leaves room for other "psychological states" to mediate these relations. Gardner and
Cummings (1988), for example, hypothesize that activation theory may explain why core job dimensions influence personal and work outcomes (see also Hackman & Oldham, 1976; Scott, 1966). Drawing from activation theory, Gardner and Cummings postulate that enriched or "high impact" jobs (as reflected in higher levels of the core job dimensions) may stimulate higher activation levels (potential "CPS"), which, in turn, lead to positive affect and behavioral efficiency (better personal and work outcomes). By contrast, monotonous or "low impact" jobs may depress activation levels, which, in turn, lead to negative affect and lower performance. Fox and Feldman (1988) provide some support for activation level as a potential mediating CPS. They found that arousal (operationalized as attention state) mediated the relationship between skill variety, task identity, and autonomy and general job satisfaction, effort, and performance.

Fried and Ferris' meta analysis led them to also suggest that other psychological states unspecified by the job characteristics model may mediate the relationship between the core job dimensions and performance (1987, p. 312). They found that, of the five core job dimensions, task identity and job feedback had the strongest associations with performance. However, they also found that experienced meaningfulness and knowledge of results—the hypothesized mediators of these two job dimensions, were not related to performance. Since a hypothesized mediator of the relationship between an independent and a dependent variable must affect the dependent variable (Step 3 of the Baron and Kenny approach described above), Fried and Ferris' findings appear to indicate that experienced meaningfulness and knowledge of results do not mediate, respectively, the relations between task identity and job feedback and performance.

Thomas and Velthouse (1990) identified "CPS" (they labeled "task assessments") unspecified by the job characteristics model that may mediate the relations between these core job dimensions and performance. They theorized that perceived impact (Abramson, Seligman & Teasdale, 1978), competence (Bandura, 1977), and choice (deCharms, 1968) mediate the relationship between interventions (e.g., job design or redesign) and behavior (e.g., motivation and performance). Of these three potential CPS, it seems plausible that perceived impact could mediate the relationship between task identity and performance, and that competence may mediate the relationship between job feedback and performance. Perceived impact represents "the degree to which behavior is seen as 'making a difference' in terms of accomplishing the purpose of the task" (Thomas & Velthouse; 1990: p. 672). Task identity may prompt perceived impact because it represents the degree to which a job requires the completion of an entire piece of work. Specifically, successful completion of an entire task without assistance from others would be expected to result in the belief that one's work behaviors made the sole and significant difference (i.e., had high impact on) in the quality and quantity of work output. In turn, high perceived impact would be expected to lead to increased motivation and improved work performance (Abramson et al., 1978). Competence—a concept similar to Bandura's (1977) concept of self-efficacy,
represents "the degree to which a person can perform task activities skillfully when he or she tries" (Thomas & Velthouse, 1990, p. 672). Both the development of competence and the knowledge of one's competence may derive from job feedback. Job feedback provides direct and clear information about work effectiveness (Hackman & Oldham, 1980). Thus, positive feedback stemming from high work effectiveness should lead to the belief that one can perform a task effectively or competently. The belief that one is competent at a task, in turn, has been linked to greater effort and persistence during task performance (Bandura, 1977). Examining the potential mediating effects of perceived impact and competence between task identity and job feedback and performance may lead to a clearer understanding of why these two job dimensions relate more strongly to performance than do skill variety, task significance, and autonomy, job dimensions that may not prompt these "CPS." In sum, despite which of these two interpretations future research demonstrates to be the more accurate, it is clear from the present findings that more research is needed on the motivational underpinnings of the job characteristics model to provide a better understanding of how and why job dimensions affect personal and work outcomes.

Although based on two diverse samples and methodologies, the present findings are not without limitations. Some may view the exclusion of the growth need strength moderator as a limitation. As noted earlier, however, studies indicate that the relations among the job characteristics model's components can be adequately tested without the growth need strength moderator (Graen et al., 1986; Johns et al., 1992; Teigs et al., 1992). Further, the Fried and Ferris (1987) meta-analysis demonstrates that growth need strength's moderating effects have been largely artifactual, except in the case of the core job dimensions-performance relationship. Nonetheless, the present findings would be strengthened if they were replicated by future research that included the growth need strength moderator. The present findings were derived from cross-sectional research designs and paper-and-pencil measures. Common method variance, thus, may have inflated the present results. Glick, Jenkins & Gupta (1986), however, show that core job dimensions have significant associations with outcomes after common method variance is controlled. The Fried and Ferris (1987) meta-analysis suggests that common method variance is not as much of a threat to job characteristics model research as previously believed. Further, to test for the potential effects of common method variance in Study 2, we ran a Hogan and Martell (1987) test (see also, Vandenberg & Scarpello, 1990). This test revealed that a single-factor model—representing common method variance, produced a poorer fit to the data than did the fully-saturated model (Model I) and the target model (Model II as shown in Figure 2) (results available from the authors upon request). Therefore, common method variance does not appear to be a likely alternative explanation for the present findings supporting the partial mediating role of CPS.

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