

Relationship Between Conscientiousness and Learning in Employee Training: Mediating Influences of Self-Deception and Self-Efficacy

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A field study of 97 employees tested a model of the mediating influences of self-deception and task-specific self-efficacy in the relationship between conscientiousness and learning. The setting was an introductory Windows 3.1 software training course. Findings indicated that, as hypothesized, self-deception and self-efficacy mediated the relationship between conscientiousness and learning. Specifically, conscientiousness was positively related to self-deception, which was negatively related to learning, and conscientiousness was positively related to self-efficacy, which was positively related to learning. In addition, 4 alternative models were estimated. The results of the tests of the 4 alternative models were not supported by the data, further substantiating the validity of the hypothesized model.

A recent trend in organizational research has been dispositional explanations for the attitudes individuals display at work and their subsequent influences on employee behavior. Despite renewed debates over the relative influences of dispositional versus situational variables on work attitudes, roles, and behaviors (Adler & Weiss, 1988), evidence has amassed supporting the dispositional approach (George, 1992; House, Shane, & Herold, 1996).

Training research has focused on the role of training design characteristics and training context. Examining the determinants of training effectiveness is timely, and these studies have shed light on various antecedents of training outcomes. Given the increasing emphasis on dispositional explanations of work behaviors noted above, it seems

equally timely to investigate the relationship between personality and training outcomes. In fact, researchers have called for further research on the role of individual differences in training effectiveness (Ford, Smith, Seago, & Quiñones, 1993; Goldstein, 1991; Noe, 1986).

In this study, we argue that Conscientiousness, one factor in the Big Five model of personality (Norman, 1963), may be a salient determinant of learning. Individuals who are conscientious are dependable, hardworking, achievement oriented, and persevering (Digman, 1990). Intuitively, it would seem that conscientious individuals are more likely to meet their employers' expectations than less conscientious individuals. Highly conscientious individuals may be more likely to take the initiative to seek out training opportunities and to attend to doing well by working hard. This expectation is consistent with recent meta-analytic evidence, showing that conscientiousness is a valid predictor of training proficiency ($\rho = 0.23$; Barrick & Mount, 1991). Because the construct of training proficiency is not fully understood, does this finding indicate that conscientious employees should learn more as a result of training?

Our goal is to contribute to the knowledge of the relationship between conscientiousness and one likely aspect of training proficiency—learning—by proposing and testing a model of the possible mediating processes. The setting for this study was an introductory software training course for employees. Figure 1 depicts the model under investigation. We propose that the relationship between conscientiousness and learning is mediated by two psychological constructs, self-deception and self-efficacy. Self-deception refers to the tendency to have honestly held but positively biased views of oneself (Paulhus, 1986). Self-efficacy refers to the judgments an individual makes

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about his or her capabilities to mobilize the motivation, cognitive resources, and courses of action needed to orchestrate future performance on a specific task (Gist & Mitchell, 1992). Given the training context, we focused on software self-efficacy beliefs. We describe below the theoretical rationale and operation of this model.

Kanfer (1991) observed that distal theories of motivation explain mediating influences on action through proximal motivational states. Moreover, she stated that a "fundamental problem in the investigation of dispositional influences on work behavior stems from the current lack of a unified theoretical perspective for understanding how and which personality constructs influence the motivational system" (p. 155). Barrick, Mount, and Strauss (1993) proposed and found support for a process model that casts conscientiousness as a distal personality construct that relates to proximal motivational variables, which, in turn, relate to job performance. Following Kanfer (1991) and Barrick et al. (1993), we argue that conscientiousness is a distal motivational construct that relates to self-deception and specific self-efficacy, which represent two more proximal antecedents of learning in employee training contexts.

Mediating Influences of Self-Deception and Self-Efficacy

The hypothesized model shows links from conscientiousness to self-deception and self-efficacy. Support for

the directional nature of these links can be derived from an understanding of the constructs. Conscientiousness has been clearly established as a personality trait, and there is considerable evidence for its stability and heritability. Costa and McCrae (1994) reported that measures of conscientiousness correlate highly ($r = .61$) over an average of a 14-year period. There is also evidence that conscientiousness has a genetic basis (Plomin & McClearn, 1990).

Although there is some evidence for the stability of self-deception and task-specific self-efficacy measures, measures of these constructs do not have nearly the same temporal stability as conscientiousness. In fact, although research indicates that conscientiousness is relatively immune to environmental influences (Bergeman, Chipuer, Plomin, & Pedersen, 1993), other research suggests that both self-deception and task-specific self-efficacy beliefs are, to some degree, contextually dependent (Gist & Mitchell, 1992; Lautenschlager & Flaherty, 1990).

Conscientiousness \rightarrow Self-Deception \rightarrow Learning

We expected that highly conscientiousness individuals would be predisposed to engage in self-deception. Research shows that individuals with tendencies to engage in self-deception ignore minor criticisms, discount failures, and avoid negative thoughts (Sackeim & Gur, 1979). Specifically, training-program participants may express self-deceptive tendencies by holding positively biased

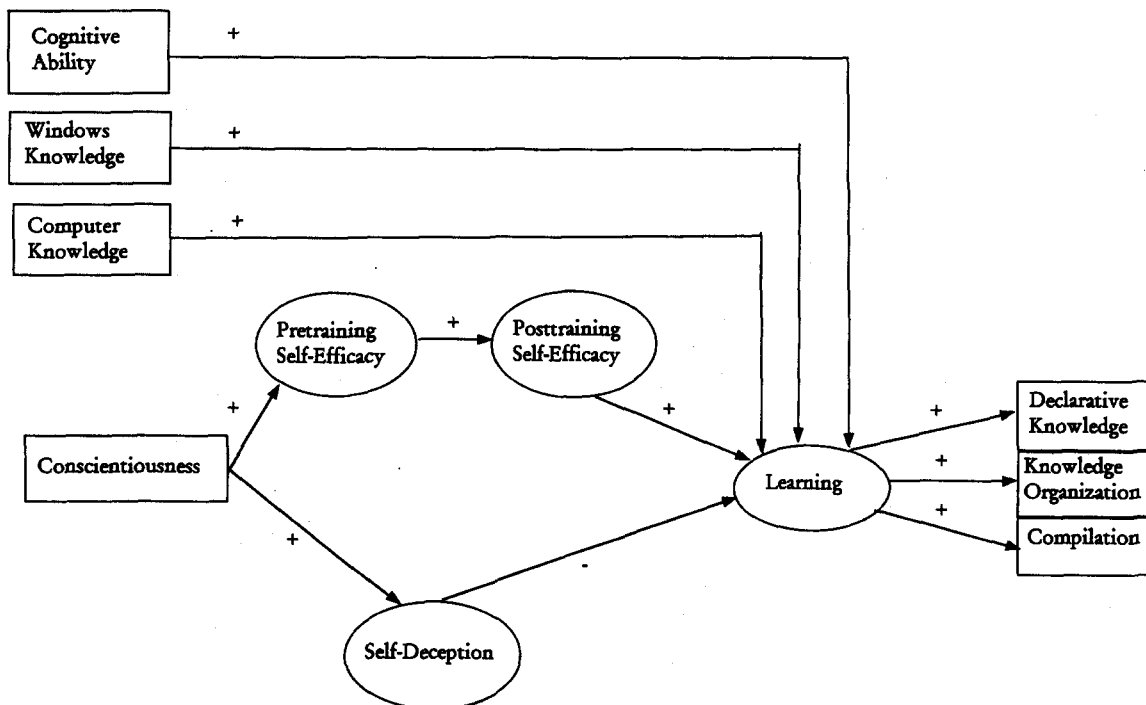


Figure 1. Hypothesized model for the mediating effects of self-deception and self-efficacy on the relationship between conscientiousness and learning.

perceptions of their accomplishments (Paulhus & Reid, 1991). Self-deceivers also perceive themselves as achievement oriented (Barrick & Mount, 1996). In fact, self-deception has been found to be positively related to achievement, particularly in competitive situations where positive thinking is critical to success (Starek & Keating, 1991).

It seems likely that conscientious individuals use self-deceptive thought processes to try to achieve success in work situations. Conscientious individuals are probably more likely to engage in self-deception in training settings by distorting their attainments toward the positive. In fact, recent empirical evidence supports the relationship between conscientiousness and self-deception. Barrick and Mount (1996) found significant positive correlations between conscientiousness and self-deception in two independent samples ($r = .24$ and $r = .29$).

We also expected that self-deception would lead to diminished learning. Self-deception is used to avoid aversive self-confrontation and attributions of failure (Sackeim & Gur, 1979). Individuals with self-deceptive proclivities deny negative attributions that threaten their self-image (Roth, Snyder, & Pace, 1986). Self-deceivers are likely to make external attributions to protect their self-image. Making external attributions represents an avoidant cognitive strategy that draws attention away from training tasks and leads to diminished learning (Martocchio & Dulebohn, 1994). Thus, self-deception should be negatively related to learning.

Conscientiousness → Self-Efficacy → Learning

In training settings, it seems reasonable to expect that highly conscientious individuals will approach training with greater task-specific self-efficacy than less conscientious individuals. That is, we expected that pretraining self-efficacy would be higher for trainees who rated high in conscientiousness and less for trainees who rated low in conscientiousness. The hallmarks of conscientiousness are generalized. This means that highly conscientious individuals are, on average, more dependable, hardworking, achievement oriented, and persevering in most domains of their lives than less conscientious individuals. Consistent with Kanfer (1991), we maintain that task-specific self-efficacy represents the mechanism through which the generalized tendencies of conscientiousness manifest themselves in high levels of learning.

Task-specific self-efficacy represents an individual's intentions to allocate mental or physical effort to achieve a targeted level of performance (Kanfer, 1987). Individuals whose self-efficacy beliefs are high set challenging goals or exert greater effort to master challenges than individuals whose self-efficacy beliefs are low (Locke & Latham, 1990). We expected that individuals would revise their

self-efficacy as training progressed. Research has shown that, initially, individuals will form self-efficacy beliefs about a novel task (as in the case of an introductory software-usage course) relying on an analysis of task requirements (i.e., what it will take to do well), personal factors (e.g., skill level), and situational factors (e.g., distractions; Gist & Mitchell, 1992). As individuals begin gaining experience with the task, they are likely to revise their self-efficacy beliefs on the basis of an attributional analysis (Gist & Mitchell, 1992). Past research has shown that attributing performance to factors within personal control leads to higher self-efficacy than attributing performance to factors outside personal control (Martocchio & Dulebohn, 1994).

Research shows that heightened efficacy beliefs result in the initiation and persistence of task-related coping efforts that increase the chance of successful outcomes (Bandura, 1991). Recently, Mitchell and his colleagues (Mitchell, Hopper, Daniels, George-Falvy, & James, 1994) found support for a hypothesis that a capacity measure such as task-specific self-efficacy is a better predictor of learning initially than are motivational self-regulatory measures (e.g., goals). Focusing on goals distracts individuals from focusing attention on stimulus response, which is critical during the initial stages of knowledge acquisition (Kanfer & Ackerman, 1989).

Individuals whose self-efficacy is low tend to dwell on their personal deficiencies (Bandura, 1991). They become more self-diagnostic than task diagnostic (Kanfer, 1987), which leads to diminished learning. Prior research demonstrated that self-efficacy has had positive influences on the acquisition of declarative knowledge and compilation in software training contexts (e.g., Gist, Schwoerer, & Rosen, 1989). Thus, conscientiousness should be positively related to self-efficacy, and self-efficacy should be similarly related to learning.

Reconciliation With Previous Research

In the conscientiousness–self-deception–learning relationship in Figure 1, we implicitly predict a negative relationship between conscientiousness and learning. Given that researchers have found that conscientiousness is positively related to job performance and training proficiency (Barrick & Mount, 1991) and effective learning is also positively related to job performance (e.g., Cascio, 1991), it is reasonable to ask whether our hypothesis conflicts with those literatures. There are reasons why our hypothesized relationship does not necessarily conflict with previous research in these areas.

First, the conscientiousness–self-deception–learning relationship is only one of two depicted in the model. The conscientiousness–self-efficacy–learning relationship predicts a positive relationship between conscien-

tiousness and learning. Thus, if the two relationships are equivalent in magnitude, the expected correlation between conscientiousness and learning is zero. Indeed, it is possible that one of the two mediating linkages is stronger than the other; this asymmetry could cause the correlation to be either positive or negative. Second, although Barrick and Mount (1991) did find a positive correlation between conscientiousness and training proficiency, training proficiency is a broader construct than learning. If one considers training as a sequential process that begins with learning and ends with direct application of the learned material to the job (Kirkpatrick, 1976), it seems plausible that conscientious employees may be better at some steps of this sequence than would others. For example, although conscientious employees may be better at transferring learned material to the job, it is also possible that their concentration of performance (vs. mastery) goals diverts attentional resources away from initial learning. Thus, conscientious employees may learn less during the initial stages of training but perform better at the application or transfer stage. Though this reasoning is somewhat speculative, it does provide a plausible reconciliation between our hypothesized model and Barrick and Mount's (1991) findings. In short, given the two pathways by which conscientiousness may influence learning, we make no directional predictions regarding the simple relationship between conscientiousness and learning.

Control Variables

In addition to investigating the dispositional influences on learning, we took into account several additional influences. The first is general cognitive ability, which indicates the level at which an individual learns, understands instructions, and solves problems (Wonderlic & Associates, 1992). Ackerman (1988) argued that general cognitive ability is an important determinant of declarative knowledge. Research has demonstrated that successful acquisition of declarative knowledge depends on (a) an individual's ability to understand instructions, (b) general familiarity with task goals, and (c) formulating strategies for task accomplishment (Ackerman, 1992). Further, given the study context, we controlled for an individual's general knowledge about the use of computers and his or her prior knowledge about the software program Windows 3.1.

Method

Participants and Training Context

Ninety-seven clerical and administrative employees of a public university participated. Average age was 38.54 years ($SD = 11.42$). Female participants constituted the majority (83%). Most participants had completed some college coursework or

earned a bachelor's degree (68%). About 36% of participants indicated that they never used the software. However, 83% of the sample reported their skill level with the software ranged from nonexistent to low. The remainder (17%) rated their skill level with the software as average. None rated skill level as high or very high.

The university where we conducted the study offers a range of short training courses (e.g., supervisory skills) for a nominal fee to employees who seek to enhance their work-related skills. The general policy is that although supervisors and department heads may encourage their employees to enroll in particular courses, employees' employment status remains unaffected on the basis of the extent to which they successfully apply their skills acquired during training in the work setting.

The training consisted of an 8-hr course on the basics of using the software program Windows 3.1. One of the researchers delivered the training in two 4-hr sessions, separated by 1 work day. The training activities included lecture, hands-on practice, and self-paced exercises, with the computer, that reflected the principles conveyed in lecture. Trainees were provided with an ID number to link their pre- and posttraining responses. The IDs were not connected with their identities; this fact was communicated to the trainees in advance.

Procedure

The instructor began the first session with a general introduction. Next, the trainees completed the pretraining questionnaire variables (general cognitive ability, tests of general computer knowledge and knowledge about Windows 3.1, measures of conscientiousness, pretraining self-efficacy, and self-deception). Then, the instructor delivered lecture, and students practiced on the computer following the instructor's directions. The second session contained a lecture and practice with the software, building on the principles conveyed during the first session. Finally, trainees completed a measure of self-efficacy followed by measures of learning.

Measures

General cognitive ability. We assessed general cognitive ability with the revised form of the Wonderlic Personnel Test (Wonderlic), Form 1 (Wonderlic & Associates, 1992). The Wonderlic is a 12-min test with 50 items arranged in order of increasing difficulty. The score is the total number of correct answers. Possible scores range from 0 to 50. The Kuder-Richardson (KR-20) coefficient (see Cascio, 1991), which measures internal consistency for tests whose items are dichotomously scored, was .94.

General computer knowledge. We used a five-item, multiple-choice test to assess trainees' general knowledge about using computers prior to the start of training. A sample item was "When you want to 'warm boot' your computer, press the following key(s)." The score was the total number of correct answers. Thus, possible scores ranged from 0 to 5. The KR-20 coefficient was .79.

Windows 3.1-specific knowledge. We used a five-item, multiple-choice test to sample trainees' knowledge about Windows 3.1 prior to the start of training. For example, "Using the mouse,

you can select a menu by. . . ." The score was the total number of correct answers. Possible scores ranged from 0 to 5. The KR-20 coefficient was .64.

Conscientiousness. We measured conscientiousness using the 12-item scale of the NEO Personality Inventory (Costa & McCrae, 1985). These items were designed to assess the hallmarks of conscientiousness noted earlier. A sample item was "I have a clear set of goals and work toward them in an orderly fashion." Participants responded on 5-point scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Coefficient alpha was .90.

Self-deception. Self-deception was measured with the 20-item scale of Paulhus's Balanced Inventory of Desirable Responding (BIDR, Version 6; Paulhus, 1991), which assesses the tendency to give one self-reports that are positively biased (e.g., "I never regret my decisions"). Participants responded on 7-point scales ranging from 1 (*not true*) to 7 (*very true*). Coefficient alpha was 0.77.

Self-efficacy. We measured self-efficacy on the basis of a 6-item scale used in previous research (Martocchio & Dulebohn, 1994). A sample item was "Using Windows 3.1 is probably something I will be good at." Participants responded on 7-point scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Coefficient alphas were .88 for the pretraining and .94 for the posttraining administrations.

We assessed learning on the basis of a composite of three learning constructs (declarative knowledge, knowledge organization, and compilation) associated with the initial phase of skill acquisition (Kraiger, Ford, & Salas, 1993). Although these learning constructs are conceptually distinct learning constructs, measures of them are likely to be sequentially interrelated (Kraiger et al., 1993). For example, trainees' success in changing screen colors using Windows 3.1 software (compilation) depended on knowing how to open group windows and manipulate information in dialog boxes (knowledge organization), which, in turn, depended on their knowledge of fundamental concepts including group window icons, program icons, and clicking and double clicking (declarative knowledge). Thus, empirically, it seemed likely that these individual learning measures would be sufficiently interrelated, warranting the use of a single composite index.

Learning. We used 26 multiple-choice questions to assess declarative knowledge and four items to measure knowledge organization. Each item contained five choices from which one was correct. The KR-20 coefficients were .94 and .88 for declarative knowledge and knowledge organization, respectively. We assessed compilation through hands-on exercises with Windows 3.1. The exercises were designed to have trainees apply trained behavior to novel situations (Kraiger et al., 1993). Objective score keys were developed in advance to rate whether trainees were successful on a number of learning points that matched the materials taught in the lectures. A composite point score was assigned to each item on the basis of the item's level of difficulty and the number of keystrokes required to complete the item. Mistakes completing parts or all of each item were deducted from the item's point value. As a check on the reliability of the scoring process, we scored a random sample of compilation output independently. Interrater agreement was .97. Possible scores on the composite ranged from 0 to 216. Coefficient

alpha, which is appropriate because the sum of the component parts represents a continuous score, was .76.

Analyses

We used structural equation modeling using maximum likelihood estimation (LISREL 8; Jöreskog & Sörbom, 1993) to test the hypothesized model. LISREL provides several indicators for assessing fit including chi-square (χ^2) with degrees of freedom (*dfs*), goodness-of-fit index (GFI), incremental fit index (IFI), comparative fit index (CFI), and root-mean-square residual (RMSR). Some authors have expressed concerns over using LISREL models with sample sizes less than 200 (Boomsma, 1987). It appears that small sample sizes, when accompanied by departures from multivariate normality, lead to underestimates of fit statistics (overestimates of χ^2 , underestimates of standardized fit statistics; West, Finch, & Curran, 1995). In such situations, a model that fits the data well can fit the data better only if a larger sample size is used. Thus, this concern does not seem to be relevant when a model that is based on a small sample size fits the data well. Bentler and Chou (1987) noted that the minimum sample size depends on model complexity. They recommended a ratio of sample size to estimated parameter ratio of 5:1 or higher to achieve reliable estimates. Since this ratio was 12.1:1 in our study, it appears our sample size, although smaller than ideal, is sufficient.

Results

Table 1 shows the correlations and descriptive statistics for the study variables. The hypothesized structural model displayed in Figure 2 fits the data well, $\chi^2 (31, N = 97) = 51.44, ns$; GFI = .92; IFI = .92; CFI = .92; RMSR = .09). Figure 2 shows the path coefficients for this analysis. All paths were statistically significant (either at $p < .01$ or $p < .05$ levels) and in the predicted directions. In estimating the structural model, these factor loadings again were freely estimated and thus can be expected to vary to some degree from those reported above.

Alternative Model Testing

Although fit statistics of the hypothesized model are important in judging the adequacy of the model, they do not always permit confident conclusions to be drawn about its suitability. Because one model fits the data does not necessarily mean it is the correct model. Other models may fit the data equally well (MacCallum, Wegener, Uchino, & Fabrigar, 1993). Although there are a nearly infinite number of alternative models, Hayduk (1987) encouraged testing of alternative models that are theoretically or conceptually compelling. In many cases, that entails adding links. If adding a link results in a significant decrease in χ^2 , this indicates that adding the link significantly improves the fit of the model and therefore should be included. We tested two alternative models that entailed adding links.

Table 1
Zero-Order Correlations and Descriptive Statistics for the Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11
Posttraining											
1. Compilation	—										
2. Knowledge organization	.45	—									
3. Declarative knowledge	.59	.47	—								
4. Learning composite	.84	.75	.86	—							
5. Self-efficacy	.41	.26	.18	.34	—						
Pretraining											
6. Self-efficacy	.41	.15	.05	.18	.63	—					
7. Self-deception	-.17	-.29	-.14	-.21	.20	.17	—				
8. Conscientiousness	-.04	-.25	-.26	-.27	.25	.34	.49	—			
9. Windows knowledge	.26	.39	.41	.46	.31	.17	-.07	.03	—		
10. General computer knowledge	.27	.33	.31	.36	.15	.15	-.06	-.04	.25	—	
11. General cognitive ability	.34	.30	.43	.47	.00	.06	-.17	-.24	.10	.27	—
M	123.98	1.96	13.33	134.84	34.38	34.96	83.52	36.06	1.40	2.46	17.22
SD	63.33	1.29	4.44	70.09	4.91	4.84	11.85	5.96	1.15	1.38	5.64

Note. $N = 97$. $.19 \leq r \leq .24$, $p < .05$; $r \geq .25$, $p < .01$.

First, it is possible that the two mediating variables self-efficacy and self-deception do not fully account for the relationship between conscientiousness and learning. Thus, we estimated an alternative model that included a direct link between conscientiousness and learning. As is shown for the first alternative model in Table 2, adding a direct link from conscientiousness to learning did not improve any of the fit statistics over the hypothesized model. Because the hypothesized model is more parsimo-

nious, we preferred it over the alternative model. This suggests that self-efficacy and self-deception do account for the relationship between conscientiousness and learning. Second, it is possible that pretraining self-efficacy influences learning beyond its effect mediated through posttraining self-efficacy. Thus, another alternative model entailed estimating a direct link between pretraining self-efficacy and learning. However, as is shown in Table 2, adding this direct link did not improve the fit of the hy-

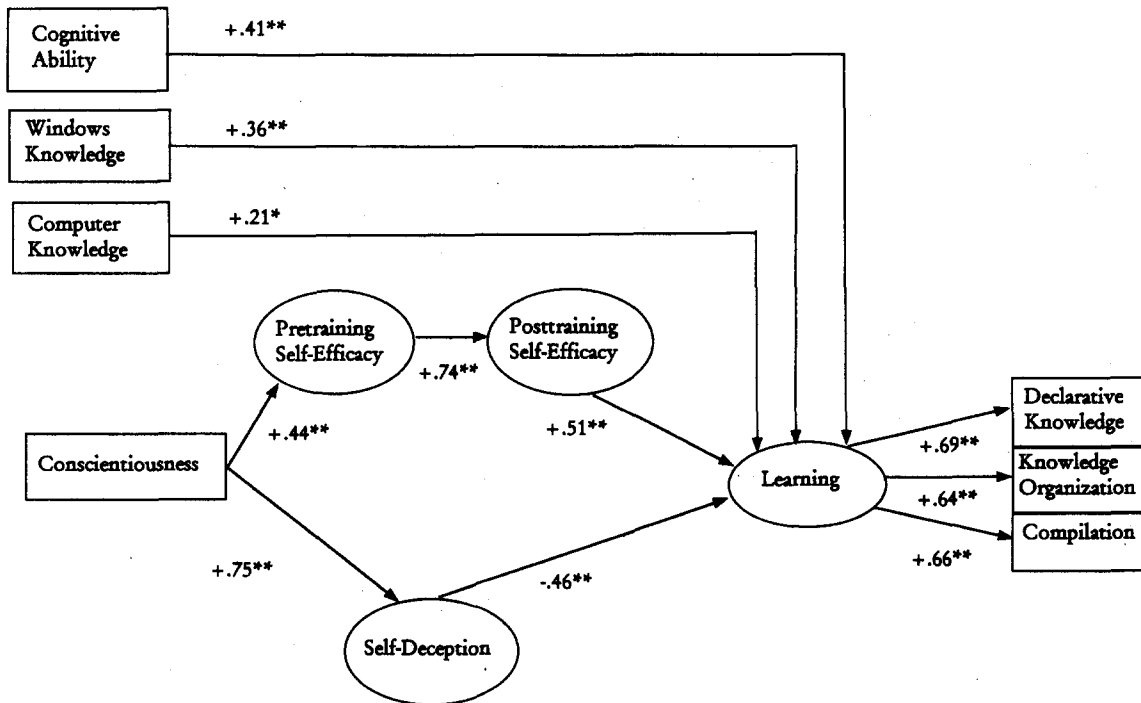


Figure 2. Results for the model. * $p < .05$. ** $p < .01$.

Table 2
Fit Statistics for Hypothesized and Alternative Models

Model	χ^2	df	RMSR	GFI	CFI	IFI
Hypothesized	51.44	33	.09	.92	.92	.92
Alternative						
1. Adding direct link from conscientiousness to learning	51.44	32	.09	.92	.91	.92
2. Adding direct link from pretraining self-efficacy to learning	51.37	32	.09	.92	.91	.92
3. Adding links: cognitive ability → computer knowledge → Windows knowledge → pretraining self-efficacy	61.98*	35	.08	.90	.88	.88
4. Direct-effect-only model (adding link from conscientiousness to learning but dropping links from posttraining self-efficacy and self-deception to learning)	68.89*	34	.13	.90	.84	.85

Note. RMSR = root-mean-square residual; GFI = goodness-of-fit index; CFI = comparative fit index; IFI = incremental fit index.
* $p < .01$.

hypothesized model. Thus, as with the first alternative model, we preferred the more parsimonious hypothesized model.

We tested two other alternative models, and the results are presented in Table 2. First, rather than cognitive ability, computer knowledge, and Windows 3.1 knowledge having direct influences on learning, it is possible that their influence is mediated through pretraining self-efficacy. Thus, cognitive ability may influence computer knowledge, and computer knowledge influences Windows knowledge, which in turn influences pretraining self-efficacy. The links in this model were statistically significant. However, the fit of this model was significantly worse than the hypothesized model, $\Delta\chi^2(2, N = 97) = 10.54, p < .01$. Thus, our direct links between cognitive ability, computer knowledge, Windows knowledge, and learning seem appropriate. Second, we tested a model that included a direct link from conscientiousness to learning but excluded links from posttraining self-efficacy and self-deception to learning. This model is reasonable if conscientiousness displays a direct influence on learning when there is an absence of mediated influences. However, the fit of this model was significantly worse than the hypothesized model, $\Delta\chi^2(1, N = 97) = 17.45, p < .01$. Thus, it appears that a direct link from conscientiousness to learning cannot adequately replace the hypothesized mediated links.

Path Analysis

Although the earlier general discussion of LISREL with small sample sizes justifies the use of LISREL in this study, because of prevalent concerns about LISREL with small samples, we also tested the hypothesized model using Hunter and Hamilton's (1990) ordinary least-squares path-analysis program. Because path analysis relies on fewer restrictions than maximum likelihood estimate, it is often a recommended alternative to LISREL when the sample size is small. Results from this method indicated that every significant variable in the LISREL model remained significant in the path model, although

the path coefficients were slightly smaller in magnitude (e.g., the path coefficient from self-deception to learning was $-.30, p < .01$, and the coefficient from posttraining self-efficacy to learning was $.41, p < .01$). Furthermore, as with the LISREL model, the path model fit the data well, $\chi^2(14, N = 97) = 12.45, ns; R^2 = .66$.

Discussion

This study extends the evidence regarding the relationship between conscientiousness and training outcomes (Barrick & Mount, 1991) by examining some of the processes that influence one aspect of training outcomes, learning. We posited that self-deception and self-efficacy mediate the relationship between conscientiousness and learning, and our results support the operation of self-deception and self-efficacy as mediators. This means that highly conscientious individuals tend to engage in self-deception compared with individuals low on conscientiousness. Self-deception, in turn, was negatively related to learning. Those who engaged in self-deception learned less than individuals who tended not to engage in self-deception activities. In addition, highly conscientious individuals tend to have higher self-efficacy than individuals low on conscientiousness. Self-efficacy, in turn, was positively related to learning. These findings provide further support for the role of conscientiousness as a distal motivational construct.

The pre- and posttraining self-efficacy ratings are high relative to the scale maximum of 42 and the participants' low level of self-rated skills with Windows 3.1. Individuals rely on various sources of information to form self-efficacy, including past experience (Gist & Mitchell, 1992). Presumably, self-efficacy levels are higher for individuals with successful past experiences than individuals with fewer successful related past experiences. Participants in this study generally had relatively little experience using Windows 3.1; however, it is possible that they had successful experiences using other software programs, relying on their past experiences as indicators of their poten-

tial success with Windows. Although we are unable to test this conjecture, it seems reasonable given the role computers and applications software such as Windows plays in clerical and administrative employees' jobs.

The mean self-efficacy scores remained fairly steady between the pre- and posttraining assessments, suggesting that self-efficacy was not affected by the training. However, a closer look at each participant's scores revealed that 67% of the trainees (i.e., 65 out of 97) experienced changes in self-efficacy. Specifically, some trainees rated self-efficacy relatively low at the beginning of training but higher later. Others rated self-efficacy relatively high at the beginning but lower later. Still, others did not exhibit changes in self-efficacy (i.e., 32 of 97). On balance, the mean level remained fairly steady, but there was considerable within-person variability. These findings are not peculiar. Changes in self-efficacy are due, in part, to the variability and locus of determinants that differ between individuals (Gist & Mitchell, 1992). For example, some people have high confidence in their abilities to perform well at the outset; however, interpretations of their training experiences may or may not lead to revisions in self-efficacy. Likewise, those starting out with low self-efficacy may have had positive experiences, leading to an increase over the course of training.

The significant negative zero-order correlation between conscientiousness and learning differs from Barrick et al.'s (1993) finding that conscientiousness and job performance following training are positively related and from Barrick and Mount's (1991) finding that conscientiousness and training proficiency are positively related. Earlier, we discussed possible asymmetry between the mediating effects as an explanation for the negative zero-order correlation between conscientiousness and learning, which we obtained in this study. Another way to reconcile the apparently contradictory results is to argue that conscientious employees may initially learn less but may be much better, perhaps because of their self-discipline and organization, at applying what they do learn. Our results support this conjecture: There were significant negative correlations between conscientiousness and both declarative knowledge and knowledge organization but a nonsignificant correlation between conscientiousness and compilation, which represents the first stage of applying learning to the job. Future research is needed to replicate these results and to test the speculation that conscientious trainees quickly remedy initial learning deficits.

Although these results contribute to our understanding of how conscientiousness influences learning, this study is not without limitations. Our sample may represent only a limited range of the more conscientious. The training was voluntary. The more conscientious employee probably elected training, and the less conscientious probably chose not to take training. We might expect stronger ef-

fects without this possible range restriction. Nevertheless, we found support for the overall fit of the model and the particular paths. Also, we should note that there are other dispositions that may be relevant to training, such as extraversion and openness, both of which Barrick and Mount (1991) found to be related to training proficiency. Future research should consider testing process models involving these dispositions as well.

A further possible limitation centers on whether the scores on the measure of cognitive ability, pretraining knowledge tests, and learning approximate participants' true scores or guessing. We are confident that the mean test scores represent participants' knowledge and ability levels rather than their guessing for three reasons. First, the directions for these tests explicitly instructed participants to leave blank questions for which they were unsure of the answers. Second, participants' identities were anonymous, which should reduce their concerns about others' evaluations of their knowledge. Third, we correlated impression management (measured with the BIDR Version 6) with the ability, pretraining knowledge, learning, and self-efficacy measures. The correlations were near zero and not statistically significant. If impression management were significantly and positively related to these measures, then it would be reasonable to infer that some participants may have guessed in hopes of improving their scores.

In conclusion, the results of this study extend our knowledge of the training process, which has focused extensively on situational antecedents of learning, by demonstrating that dispositional factors also contribute to learning. Our results are notable because they are well grounded in aspects of the literatures on dispositions and motivation. Greater confidence in the mediating influences of self-deception and self-efficacy resulted from the tests of four plausible equivalent models, none of which provided a better fit to the data than the original model. We encourage researchers to further study the role of dispositions in training.

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Sternberg Appointed Editor of *Contemporary Psychology* (*APA Review of Books*), 1999–2004

The Publications and Communications (P&C) Board of the American Psychological Association announces the appointment of Robert J. Sternberg, Yale University, as editor of *Contemporary Psychology (APA Review of Books)* for a 6-year term beginning in 1999.

Contemporary Psychology has been in existence for 42 years and, for most of the time, has been operating under the same coverage model. The model is a good one, as the current issues edited by John H. Harvey reflect, and the journal has long met the needs of individuals and libraries. The pace of change has increased during the past few years, however, and the P&C Board recently decided that it was time for a new model, one that would reflect the 21st century reader's needs for information about books.

Sternberg, at the request of the P&C Board, will be embarking on a program to make the journal even more timely and interesting during his editor-elect year in 1998. Some of the changes envisioned include fewer but longer and more thoughtful reviews of books, reviews only of "new" books (with a few noteworthy exceptions), comparative textbook reviews at strategic times of the year, and changes in publication frequency and pricing. Sternberg welcomes suggestions for improving the journal and serving reader needs.

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Please note that all reviews are written by invitation. Publishers should note that books should **not** be sent to Sternberg. *Publishers should continue to send two copies of books to be considered for review plus any notices of publication to*

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As the editorial term of John H. Harvey comes to a close, the P&C Board wishes to express its appreciation for his hard work and dedication as well as that of his staff at the University of Iowa.