

Antecedents and Outcomes of Perceived Locus of Causality: An Application of Self-Determination Theory

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We extended self-determination theory by examining personality antecedents and self-regulatory consequences of *perceived locus of causality* (PLOC), which is the extent to which individuals perceive their actions as caused by internal or external reasons. We theorized that personality would influence PLOC and that individuals with internal PLOC would engage in more self-regulatory activities, which would in turn predict performance and enjoyment. We used structural equation modeling with data collected from 260 students at 4 time points to test our hypotheses. The model fit the data well. Although personality had direct effects on the self-regulatory activities of effort and meta-cognitive strategies, in addition to the indirect effects via PLOC, tests confirmed that including the indirect effects produced the best-fitting model.

Organizational scholars have had a longstanding interest in how individuals optimally motivate themselves to accomplish work tasks. The question of optimal motivation has also been of primary interest to Deci and Ryan's (1985b, 1991, 2000) self-determination theory (SDT), which has been fruitfully applied in a variety of domains, including counseling, education, health-care, and sports.

A key concept in SDT is perceived locus of causality (PLOC), which is a measure of felt autonomy for behavior (Ryan & Connell, 1989; Sheldon, 2002). PLOC measures the reasons for one's actions and ranges along a continuum from internally motivated to externally motivated behavior. SDT proposes that when individuals have a more internal PLOC (I-PLOC) for behavior, they will exert greater effort and experience greater satisfaction in performing the behavior than when they have a more external PLOC (E-PLOC; Deci & Ryan, 2000; Ryan & Deci, 2002). However, little research has examined possible mechanisms for such relationships, and little research has investigated achievement outcomes. For example, a recent meta-analysis

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of PLOC in the sports and exercise literature found that intention, rather than actual behavior or achievement, was the most commonly used dependent variable (Chatzisarantis, Hagger, Biddle, Smith, & Wang, 2003). Thus, a major purpose of the present study is to examine whether and how PLOC predicts performance and enjoyment. Consistent with prior research, we predict that PLOC will influence effort and, through effort, will influence performance and enjoyment. We extend prior research by theorizing that PLOC raises performance and enjoyment via the nature of the effort that individuals exert.

A second major purpose of this study is to examine dispositional determinants of PLOC. What traits or dispositions are associated with approaching a task with greater internalized versus externalized motivation? As noted by Judge, Bono, Erez, and Locke (2005), this issue has received surprisingly little research attention, probably because PLOC is typically conceived of as a task- or goal-specific variable that is situationally determined. Nonetheless, Judge et al. found that PLOC for goals (a construct labeled *goal self-concordance*) was correlated with core self-evaluation trait. We theorize that PLOC has a number of dispositional determinants not subsumed by core self-evaluations. Thus, in sum, we propose and then test a model that examines both the antecedents and the consequences of PLOC.

Literature Review and Hypotheses

Perceived locus of causality (PLOC) refers to the extent to which individuals perceive their own actions as a result of either external or internal reasons. Although researchers originally only differentiated between extrinsic and intrinsic motivation, more recent conceptualizations have described two forms of controlled motivation, external and introjected; and two forms of autonomous motivation, identified and intrinsic (Ryan & Deci, 2002; Sheldon, Turban, Brown, Barrick, & Judge, 2003).

The most controlled motivation is *external motivation*, which is acting solely to obtain a reward or to avoid punishment. *Introjected motivation* is an internally controlled form of motivation in which the person acts to avoid feeling guilty or anxious. The difference between external and introjected motivation is that with external motivation, the person feels controlled by external forces; whereas with introjected motivation, the person feels controlled by inner forces. *Identified motivation* is acting in a manner that is consistent with one's values and ideals. Finally, *intrinsic motivation* is engaging in a behavior because it is inherently interesting or pleasurable.

Although these four motivations are conceptualized as falling along a continuum of internalization, considering intrinsic as the most internalized

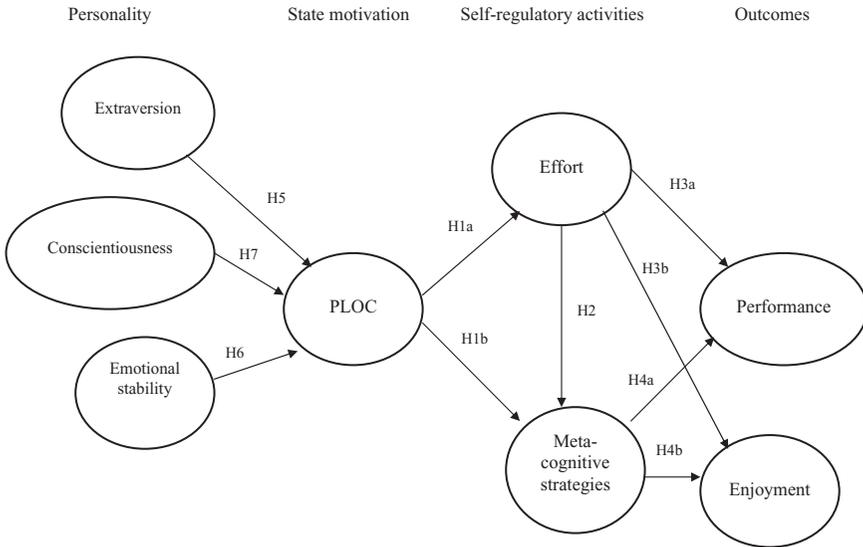


Figure 1. Theorized model. PLOC = perceived locus of causality.

motivation, the central distinction in SDT is between controlled (i.e., external and introjected) and autonomous (i.e., identified and intrinsic) motivations (Ryan & Connell, 1989). Broadly speaking, SDT emphasizes that there are positive outcomes of autonomous motivations for behavior (i.e., internal PLOC) and negative outcomes of controlled motivations for behavior (i.e., external PLOC). Consequently, PLOC has been conceptualized as a unitary construct capturing the degree to which autonomous motivations are present and controlled motivations are absent (Ryan & Connell, 1989). We adopt this perspective as well, and refer to the construct as *internalized PLOC* or I-PLOC to emphasize that our proposed model focuses on the positive benefits of internalized or autonomous motivations.²

Figure 1 presents the theoretical model delineating the consequences and antecedents of I-PLOC. The general theoretical model proposes that distal stable personality characteristics influence situation-specific motivation (I-PLOC), which predicts self-regulatory activities, which in turn predict

²Perceived locus of causality is different from locus of control, although, as noted by scholars (Koestner & Zuckerman, 1994), some people confuse the two concepts. *Locus of control* refers to a person's beliefs about the extent to which *outcomes* result from forces within (internal) or outside (external) of the person (Rotter, 1966; Spector, 1982). In contrast, *perceived locus of causality* refers to a person's beliefs about the extent to which one's *actions* are determined by external forces (controlled) or by the self (autonomous). Thus, locus of control refers to the determinants of outcomes, whereas locus of causality refers to the determinants of behaviors.

outcomes. As argued by Vallerand (1997), motivation can be examined at three levels: the global level, which includes personality; the contextual level, which consists of life domains (e.g., leisure, work); and the situational level, which focuses on a specific situation.

We conceptualize I-PLOC as a situation-specific variable (Ryan & Connell, 1989) that is influenced by more global variables (i.e., personality) and that influences specific self-regulatory activities. We investigated the model by collecting data at four points in time from college students who were enrolled in a class, and examined the final outcomes of class performance and enjoyment (Lee, Sheldon, & Turban, 2003). More specifically, on the consequences side, we theorize that I-PLOC predicts effort and meta-cognitive strategies, which in turn are expected to predict outcomes. On the antecedent side, we extend SDT by investigating the effects of extraversion, conscientiousness, and emotional stability on I-PLOC.

Effects of I-PLOC on Effort and Meta-Cognitive Strategies

Ryan and Connell (1989) developed an approach to measuring PLOC that has been used widely (for overviews, see Deci & Ryan, 2000; Ryan & Deci, 2002; Sheldon, 2002). This approach asks individuals to rate their reasons for engaging in activities, in terms of the four motivations described previously. An internalization score (I-PLOC) is created by combining ratings for the autonomous and controlled reasons (reverse-scored) such that higher scores indicate greater felt autonomy for the behavior. We adapted Ryan and Connell's (1989) approach by assessing I-PLOC as reasons for taking a university course. As such, PLOC is a situation-specific motivational variable that assesses the extent to which individuals have internalized reasons for behavior.

Evidence indicates that individuals exert greater effort and persistence for behaviors engaged in for internalized versus externalized reasons. For example, Sheldon and his colleagues (Sheldon, 2002; Sheldon & Elliot, 1998, 1999; Sheldon & Houser-Marko, 2001; Sheldon & Kasser, 1998) reported that individuals' I-PLOC for personal goals (i.e., self-concordance) was related to longitudinal goal effort and to eventual goal attainment. Replicating prior findings, we expect a positive relationship between internalized task motivation and subsequent effort.

We extend prior research by theorizing that I-PLOC influences the nature of individuals' effort. In general, *meta-cognitive strategies* refer to cognitions that are focused on how to accomplish a task. That is, meta-cognitive strategies involve thinking about and controlling the cognitive and behavioral processes that are involved in task performance (Clause, Delbridge, Schmitt,

Chan, & Jennings, 2001; Elliot, McGregor, & Gable, 1999; Schmidt & Ford, 2003; Warr & Allan, 1998).

We examine three meta-cognitive strategies theorized to be influenced by motivational variables, and in turn to influence performance outcomes: deep processing, organization, and mental focus (Clause et al., 2001; Elliot et al., 1999; Lee et al., 2003). *Deep processing* refers to the extent to which an individual attempts to integrate new material with prior knowledge and information (Elliot et al., 1999). *Organization* refers to the extent to which a person has developed a structured and organized strategy for task accomplishment (Elliot et al., 1999). Finally, *mental focus* refers to the extent to which the person is able to concentrate and become absorbed by the task (Lee et al., 2003).

Meta-cognitive strategies require mental effort (Kanfer & Ackerman, 1989; Zimmerman, 2000), and evidence suggests that higher levels of motivation are related to greater use of meta-cognitive strategies (Clause et al., 2001; Elliot et al., 1999; Ford, Smith, Weissbein, Gully, & Salas, 1998; Schmidt & Ford, 2003), although little research has examined whether PLOC is related to such strategies. We theorize that individuals are more likely to engage in meta-cognitive strategies when they have internal rather than external reasons for engaging in a behavior. Stated differently, we expect that people will use more of their faculties when they are internally versus externally motivated.

Consistent with our logic, a recent field experiment that manipulated intrinsic or extrinsic goal content found that students with intrinsic goals reported deeper processing of material than did students with more extrinsic goals (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). We extend such results by measuring, not manipulating, felt autonomy (i.e., I-PLOC) and by assessing multiple meta-cognitive strategies.

Hypothesis 1a. Internal perceived locus of causality (I-PLOC) for the course will be positively related to greater effort.

Hypothesis 1b. Internal perceived locus of causality for the course will be positively related to use of meta-cognitive strategies.

As noted by scholars, self-regulatory activities require effort (Kanfer & Ackerman, 1989; Zimmerman, 2000). More specifically, it takes considerable effort for individuals to integrate new material with older material, to develop a strategy for task accomplishment, and to maintain concentration on the task. Thus, although not directly related to the consequences of I-PLOC, we expect that meta-cognitive strategies will also be influenced by effort, in addition to I-PLOC.

Hypothesis 2. Effort will be positively related to meta-cognitive strategies.

Effects of Effort and Meta-Cognitive Strategies on Outcomes

We expect that both effort and meta-cognitive strategies will predict enjoyment and performance. Focusing on effort, SDT proposes that being actively engaged in an activity (i.e., exerting greater effort) results in greater enjoyment, particularly when the activity is pursued for autonomous reasons. Similarly, we theorize that individuals who report greater effort will have higher performance. In addition, we theorize that individuals who develop active learning strategies and who are more organized and focused have greater cognitive resources available for performance. Evidence from various studies indicates that meta-cognitive strategies are related to performance (Clause et al., 2001; Ford et al., 1998; Minnaert & Janssen, 1999; Schmidt & Ford, 2003; Thiede, 1999; Warr & Allan, 1998). In addition, based on the proposition that engagement in a task is enjoyable, we theorize that meta-cognitive strategies will be positively related to enjoyment.

Hypothesis 3a. Effort will be positively related to performance.

Hypothesis 3b. Effort will be positively related to enjoyment.

Hypothesis 4a. Meta-cognitive strategies will be positively related to performance.

Hypothesis 4b. Meta-cognitive strategies will be positively related to enjoyment.

Personality Antecedents to I-PLOC

In general, SDT scholars primarily have examined contextual factors that influence PLOC, with considerable research indicating that individuals typically have more internalized reasons for engaging in behavior (higher I-PLOC) when the context supports feeling autonomous, competent, and connected with others (Deci & Ryan, 2000; Ryan & Deci, 2000, 2002). However, because of the emphasis on examining contextual factors, little research has examined whether individual differences are related to I-PLOC, although scholars have called for such research (Judge et al., 2005; Sheldon et al., 2003; Vallerand, 2000).

Consistent with the idea that personality influences motivation, a recent meta-analysis found that conscientiousness and emotional stability were associated with motivational measures based in goal setting, expectancy, and self-efficacy theories (Judge & Ilies, 2002). Extending such results, we theorize

that certain personality characteristics will lead to greater internalized motivation. More specifically, we theorize that conscientiousness, emotional stability, and extraversion are more likely to lead to an approach orientation to tasks, which includes sensitivity to positive stimuli and the pursuit of positive outcomes (Elliot & Thrash, 2001, 2002). Such respondents are more likely to internalize task requirements as reflected in a higher internalized PLOC. More broadly, our model is consistent with hierarchical models in which personality variables influence situationally specific motivational states (Barrick, Stewart, & Piotrowski, 2002; Kanfer & Heggestad, 1997).

Considerable evidence indicates that personality—particularly conscientiousness and emotional stability—influences performance (Barrick, Mount, & Judge, 2001). Unfortunately, however, there are few theoretical frameworks to date explaining how personality influences performance, although evidence suggests that personality may influence self-regulatory activities, which in turn influence performance (Barrick et al., 2002; Hogan & Holland, 2003). We theorize that personality is related to I-PLOC, which in turn predicts self-regulatory activities that influence performance. We propose a fully mediated model (see Figure 1) such that personality predicts self-regulatory activities and outcomes only through I-PLOC. Nonetheless, we acknowledge that personality may have direct effects on self-regulatory activities and on performance and enjoyment. Consequently, we investigate possible direct effects, in addition to the hypothesized indirect effects.

Extraversion

Extraversion, which is a dimension of the five-factor model, refers to the degree to which an individual tends to be warm, outgoing, energetic, positive, and assertive. Results from meta-analyses indicate that extraversion was consistently related to measures of performance motivation (Judge & Ilies, 2002). Elliot and Thrash (2002) argued that because extraverts tend to have a heightened sensitivity to positive and desirable stimuli, they are more likely to have an approach motivation to tasks, in comparison to introverts. We theorize that an approach orientation is more likely to lead to the internalization of task requirements because it will lead individuals to focus attention on what is valuable and interesting in the task, and thus help individuals to align task requirements with their underlying values. Thus, we propose the following:

Hypothesis 5. Extraversion will be positively related to internal perceived locus of causality.

Emotional Stability

Emotional stability is another dimension from the five-factor model and is sometimes defined from its negative pole of neuroticism. People who are more emotionally stable are less anxious, more even-tempered, and more relaxed. Individuals with greater emotional stability tend to set more challenging goals, have stronger self-efficacy beliefs, and have stronger beliefs that working on an activity will result in a specific outcome (i.e., expectancy; Judge & Ilies, 2002). In contrast, neurotic individuals tend to be hypervigilant concerning negative or undesirable stimuli, and to adopt performance-avoidance, rather than mastery goals (Elliot & Thrash, 2002).

We theorize that individuals higher in neuroticism will see class-related tasks and requirements as negative stimuli to be avoided and thus are unlikely to have high internalized motivation to perform them. In contrast, individuals with greater emotional stability are less likely to attempt to avoid class-related tasks and more likely to attempt to align such tasks with their underlying values. Consistent with our logic, Judge et al. (2005) found that individuals with high core self-evaluations (of which emotional stability is a component) had more self-concordant goals. Thus, we propose the following:

Hypothesis 6. Emotional stability will be positively related to internal perceived locus of causality.

Conscientiousness

Conscientiousness is another dimension of the five-factor model and measures the extent to which individuals tend to be dependable, achievement-motivated, and self-disciplined. Judge and Ilies (2002) found that conscientiousness was related to performance motivation measured as goal-setting difficulty, self-efficacy, and expectancy of success. Furthermore, evidence indicates that conscientiousness is related to autonomous goal setting and to goal commitment (Barrick, Mount, & Strauss, 1993).

We theorize that conscientious individuals who tend to strive for accomplishment (Barrick et al., 2002) are more likely to internalize class requirements than are less conscientious individuals because they are more likely to accept and take ownership of externally dictated tasks that are required for success. Stated differently, we expect that highly conscientious individuals, who are concerned about accomplishment, are more likely to see class requirements as consistent with their interests and values than are less conscientious individuals. Thus, we expect that conscientiousness will be positively related to I-PLOC:

Hypothesis 7. Conscientiousness will be positively related to internal perceived locus of causality.

Summary

In the present study, we extend prior research by examining antecedents and consequences of PLOC (Figure 1). We hypothesize that conscientiousness, emotional stability, and extraversion will be related to I-PLOC. In addition, we hypothesize that I-PLOC will predict effort and meta-cognitive strategies, which in turn will influence performance and enjoyment. The hypothesized model is a parsimonious, fully mediated model in which we theorize that the effects of personality on these “downstream” variables will be mediated by I-PLOC. Furthermore, we do not expect a direct relationship of I-PLOC with performance and enjoyment, but rather hypothesize that its effects on those outcomes are through effort and meta-cognitive strategies. We will investigate, however, alternative models of whether personality and I-PLOC have direct effects on downstream variables, in addition to the indirect effects that are hypothesized in our model.

Method

Procedure and Participants

We collected data at four points in time during the semester from 260 undergraduate students who were enrolled in a required introductory management course at a large university in Singapore. The course was taught in English (as are all courses at the university). The students were proficient in English, as it is the primary language used in schools in Singapore. The course was primarily lecture-based, with weekly tutorials. Students were given credit for participating in research studies, and our study was one of five that were provided to students. Students received credit for participating in our study only if they completed all of the surveys. Of the 280 students who signed up to participate in the study, 260 (93%) completed all of the surveys and were included in the study.

The sample was predominantly Chinese (83%) and female (61%; 159 female, 101 male), with a mean age of 21 years. Most of the participants were in their first (45%) or second (32%) year of university.

Time 1. The first data collection occurred during the 4th week of the semester. Participants reported to a lecture hall and completed a survey that included demographic characteristics, personality measures, and perceived locus of causality for taking the course.

Time 2. Participants reported to a lecture hall during the 7th week of the semester and completed a survey that measured their effort and meta-cognitive strategies.

Time 3. Participants reported to a lecture hall during the 10th week of the semester and completed a survey that measured their class enjoyment.

Time 4. Participants' final grades were collected at the end of the 13-week semester.

Measures

Personality characteristics. At Time 1, we measured extraversion, conscientiousness, and emotional stability using the 10-item scale of the International Personality Item Pool (IPIP; 2001) Big-Five Factor Markers. Participants indicated the extent to which each item accurately described them on a 5-point scale ranging from 1 (*very inaccurate*) to 5 (*very accurate*). Coefficient alphas were .89, .68, and .86 for extraversion, conscientiousness, and emotional stability, respectively.

I-PLOC. Perceived locus of causality was measured at Time 1 with 12 items that were based in part on Ryan and Connell (1989). Items were rated on a 5-point scale ranging from 1 (*very inaccurate*) to 5 (*very accurate*). We used three items to measure each of the four reasons: external, introjected, identified, and intrinsic.

Participants indicated the extent to which each of the reasons was accurate regarding reasons for taking the course. Representative items for reasons include "I'm taking it only because I need it to graduate"; "I don't want to take it but the situation demands it" (external); "I would feel bad about myself if I didn't take it"; "I would feel ashamed of myself if I didn't take the course" (introjected); "Learning the material in this course is consistent with my values and goals"; "I think it is important to learn the content provided in the course" (identified); and "Learning the course content is interesting"; and "I am curious to learn the material taught in this course" (intrinsic).

Coefficient alphas for the scales ranged from .55 to .76. For the composite I-PLOC construct, the alpha was .76. Previous research has created I-PLOC scores typically by subtracting the controlled motivations (i.e., external and introjected) from the autonomous motivations (i.e., identified and intrinsic) scales (e.g., Sheldon & Elliot, 1998, 1999). Since we were using structural equation modeling for the present study, we used the four subscales as indicators of I-PLOC and did not constrain the parameters, as will be described in more detail.

Effort. Effort was operationalized with two scales (i.e., effort and persistence) that were validated by Elliot et al. (1999). At Time 2, participants

indicated the extent to which each item accurately described their behavior in the class on a 5-point scale ranging from 1 (*very inaccurate*) to 5 (*very accurate*).

Effort ($\alpha = .81$) was measured with seven items. A representative item is "I am putting a lot of effort into this class."

Persistence ($\alpha = .64$) was measured with four items. A representative item is "When I become confused about something I'm reading for this course, I go back and try to figure it out." The composite reliability for effort was .82.

Meta-cognitive strategies. We operationalized meta-cognitive strategies with three measures collected at Time 2: deep processing, disorganization, and focus. The measures of deep processing and disorganization were validated by Elliot et al. (1999). Participants indicated the extent to which the item accurately described their behavior in the class on a 5-point scale ranging from 1 (*very inaccurate*) to 5 (*very accurate*).

Deep processing ($\alpha = .70$) was measured with five items. A representative item is "Whenever I read or hear a theoretical point in this course, I think about possible alternatives."

Disorganization ($\alpha = .86$) included five items. A representative item is "I find it difficult to organize my study time effectively."

Finally, mental focus ($\alpha = .89$) was measured with six items from Lee et al. (2003) that were measured on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) scale. A representative item is "When I study the material for this class, I feel distracted and find it hard to pay attention" (reverse-scored). The composite reliability for meta-cognitive strategies was .86.

Enjoyment. We used an eight-item measure of class enjoyment developed by Elliot and Church (1997) and used by Lee et al. (2003). Enjoyment was measured at Time 3 with items measured on a 5-point scale ranging from (*very inaccurate*) to (*very accurate*). A representative item is "I am enjoying this class very much." The alpha for this scale was .87.

Performance. Performance was participants' final grade attained in the course and ranged from A+ to D. We assigned scores such that higher grades received higher scores. The highest grade (A+) was assigned a 10. For the present sample, the mean grade was 6.15, which is approximately a B.

Final grades were based on final examination performance (50%), group projects (30%), participation in class (10%), and subject pool participation (10%). Note that all participants in our study received full credit for subject pool participation. Participation points were assigned at the end of the semester, and group projects were turned in during the final 2 weeks of the semester. Thus, students did not receive performance feedback until after completing all of our survey measures.

Grade point average. We used self-reported grade point average (GPA), measured at Time 1, as a control variable, as we expected it would be related

Table 1

Measurement Model Comparisons

Model	χ^2	df	χ^2/df ratio	CFI	IFI	RMSEA
Null model	3277.34	210	15.61	—	—	.24
1-factor model	2515.90	189	13.31	.24	.25	.22
4-factor model	1742.38	183	9.52	.49	.50	.18
5-factor model	1700.63	179	9.50	.50	.42	.18
6-factor model	374.15	174	2.15	.94	.94	.07
7-factor model	320.44	168	1.91	.95	.95	.06

Note. PLOC = perceived locus of causality; CFI = comparative fit index; IFI = incremental fit index; RMSEA = root mean square error of approximation. 1-factor model: all combined as one factor; 4-factor model: personality traits as one factor, effort/meta-cognitive strategies as one factor, PLOC as one factor, and enjoyment as one factor; 5-factor model: personality traits as one factor, effort as one factor, meta-cognitive strategies as one factor, PLOC as one factor, and enjoyment as one factor; 6-factor model: each personality trait as a separate factor, effort/meta-cognitive strategies as one factor, PLOC as one factor, and enjoyment as one factor; 7-factor model: each variable as a separate factor, as hypothesized.

to performance. Prior research has indicated that self-reported GPA is strongly correlated ($r = .97$) with university records (Cassady, 2001).

Results

Measurement Model

As recommended by methodologists (Anderson & Gerbing, 1988), before examining our structural model, we conducted a series of confirmatory factor analyses to investigate our measurement model. For each of the personality measure constructs and enjoyment, we created three parcels to serve as indicators of our constructs. For meta-cognitive strategies, we used the three scales—deep processing, disorganization, and mental focus—as indicators. For the effort construct, there were two indicators: effort and persistence. Finally, for I-PLOC, we used the four subscales as indicators: external, introjected, identified, and intrinsic.

We compared the seven-factor measurement model with five other possible measurement models (see Table 1). As indicated in Table 1, our hypothesized measurement model fit the data best. Thus, for our seven-factor model,

we examined the standardized path coefficients between the indicators and the latent construct. In all cases, except one, the path coefficients were significant and greater than .50 (standardized estimate). For I-PLOC, the introjected path was negative as expected, but not statistically significant. Thus, the I-PLOC latent variable loaded positively on the intrinsic and identified scales, negatively on the external scale, and with a nonsignificant loading on the introjected scale. To maintain consistency with prior research examining I-PLOC, we retained the introjected indicator, despite its weak loading.

Table 2 presents descriptive statistics and correlations among the variables. Examination of the correlations indicates initial support for our hypotheses concerning I-PLOC. For example, I-PLOC was related to effort ($r = .21, p \leq .01$) and meta-cognitive strategies ($r = .36, p \leq .01$). Furthermore, each of the personality measures was significantly correlated with I-PLOC.

Hypothesized Structural Model Test

Table 3 provides the overall fit statistics for the model comparisons. In the hypothesized model (and the alternative models), we allowed the personality variables to correlate with each other. However, because such relationships are tangential to the focus of our study, these paths are not shown. As seen in Table 3, the hypothesized model provided a relatively good fit to the data, $\chi^2(200, N = 260) = 458.64$ (comparative fit index [CFI] = .92; incremental fit index [IFI] = .92; root mean square error of approximation [RMSEA] = .07). Although the chi square for the overall model was significant, as is typical for large samples and complex models, the chi square to degrees of freedom ratio of 2.29 and the model fit indexes indicate that the fit of our hypothesized model to the data was acceptable.

Table 4 presents the standardized parameter estimates from the hypothesized structural model, which provides the test of the specific hypotheses (i.e., paths). Results indicate that I-PLOC was positively related to effort and meta-cognitive strategies, in support of Hypotheses 1a and 1b. In support of Hypothesis 2, effort was related to meta-cognitive strategies. In terms of effects of the self-regulatory activities on outcomes, effort was not related to enjoyment or performance, contrary to Hypotheses 3a and 3b. In support of Hypotheses 4a and 4b, meta-cognitive strategies were related to performance and enjoyment, respectively.

Turning to the personality antecedents of I-PLOC, extraversion (Hypothesis 5) and conscientiousness (Hypothesis 7) were significantly related to PLOC, while emotional stability (Hypothesis 6) was not. To summarize,

Table 2
Means, Correlations, and Coefficient Alpha for Study Variables

	M	SD	1	2	3	4	4a	4b	4c	4d	5	5a	5b	6	6a	6b	6c	7	8
Time 1																			
1. Extraversion	3.22	0.73	(.89)																
2. Conscientiousness	3.41	0.49	.09	(.68)															
3. Emotional stability	3.05	0.72	.17**	.25**	(.86)														
4. PLOC	1.66	1.05	.24**	.19**	.16**	(.76)													
4a. External goal pursuit	2.24	1.01	-.18**	-.14**	-.08	-.84**	(.75)												
4b. Introjected goal pursuit	1.96	0.72	.02	.03	-.04	-.34**	.16*	(.55)											
4c. Intrinsic goal pursuit	3.80	0.73	.26**	.16**	.17**	.75**	-.50**	.11	(.75)										
4d. Identified goal pursuit	3.72	0.67	.17**	.23**	.15**	.68**	-.39**	.13*	.60**	(.67)									
Time 2																			
5. Effort	3.44	0.48	.01	.26**	.07	.21**	-.15*	.20**	.31**	.31**	(.82)								
5a. Effort subscale	3.35	0.55	.10	.23**	.12	.19**	-.15*	.19**	.29**	.26**	.86**	(.81)							
5b. Persistence	3.54	0.56	-.08	.20**	.00	.17**	-.11	.16**	.24**	.27**	.86**	.49**	(.64)						
6. Meta-cognitive strategies	3.11	0.32	.28**	.36**	.29**	.36**	-.09	.09	.14*	.20**	.37**	.43**	.21**	(.86)					
6a. Deep processing	3.41	0.60	.30**	.15**	.13*	.19**	-.14*	.09	.26**	.21**	.26**	.32**	.13*	.64**	(.70)				
6b. Disorganization	2.84	0.80	-.22**	-.37**	-.34**	-.28**	.24**	-.03	-.30**	-.23**	-.26**	-.33**	-.13*	-.82**	-.34**	(.86)			
6c. Focus	3.09	0.73	.13*	.25**	.14*	.32**	-.27**	.08	.30*	.34**	.30**	.32**	.20**	.75**	.21**	-.41**	(.89)		
Time 3																			
7. Enjoyment	3.50	0.64	.15**	.14*	.11	.35**	-.27**	.04	.37**	.33**	.30**	.36**	.15**	.39**	.22**	-.25**	.38**	(.87)	
Time 4																			
8. Performance (course grade)	6.15	2.10	.01	.12	.05	.06	-.03	-.03	.07	.05	.10	.10	.05	.19**	.16**	-.18**	.09	.07	(-)
9. GPA (Time 1)	3.30	0.59	-.02	.12*	.00	-.01	.03	-.02	-.04	.03	.06	.00	.11	.06	.10	-.11	-.07	-.17**	.30**

Note. N = 260. PLOC = perceived locus of causality; GPA = grade point average.
*p < .05. **p < .01.

Table 3
Structural Model Comparisons

Model	χ^2	df	CFI	IFI	RMSEA	Model comparison	$\chi^2\Delta$	df Δ	p
1. Null model	3300.68	231	—	—	.23	—	—	—	—
2. Hypothesized model	458.64	200	.92	.92	.07	—	—	—	—
3. I-PLOC/Outcomes model	453.01	198	.92	.92	.07	2 and 3	5.63	2	ns
4. Personality/Outcomes model	456.87	194	.91	.92	.07	2 and 4	1.77	6	ns
5. Personality/Effort and metacognition	419.47	194	.93	.93	.07	2 and 5	39.17	6	$p < .01$
6. Personality/Effort and metacognition without I-PLOC paths	448.9	197	.92	.92	.07	5 and 6	29.43	3	$p < .01$

Note. PLOC = perceived locus of causality; CFI = comparative fit index; IFI = incremental fit index; RMSEA = root mean square error of approximation.

Table 4

Structural Model Coefficients

Hypotheses	Hypothesized structural model		Revised structural model	
	Estimate	Critical ratio	Estimate	Critical ratio
H1a: I-PLOC to effort	.40	5.35	.34	4.42
H1b: I-PLOC to meta-cognitive strategies	.52	5.20	.33	3.66
H2: Effort to meta-cognitive strategies	.37	4.29	.33	4.08
H3a: Effort to performance	-.05	-0.27	-.03	-0.17
H3b: Effort to enjoyment	.11	1.23	.13	1.59
H4a: Meta-cognition to performance	.42	2.17	.41	2.26
H4b: Meta-cognition to enjoyment	.25	2.48	.22	2.31
H5: Extraversion to I-PLOC	.27	3.96	.26	3.72
H6: Emotional stability to I-PLOC	.12	1.71	.10	1.39
H7: Conscientiousness to I-PLOC	.23	3.42	.18	2.67
Conscientiousness to effort	—	—	.17	2.64
Conscientiousness to meta-cognition	—	—	.25	3.50
Emotional stability to effort	—	—	.02	0.26
Emotional stability to meta-cognition	—	—	.19	2.87
Extraversion to effort	—	—	-0.02	-0.28
Extraversion to meta-cognition	—	—	0.16	2.37

Note. I-PLOC = internal perceived locus of causality. Critical ratios greater than 1.64 are significant at .05 for a one-tailed test; critical ratios greater than 1.96 are significant at .05 for a two-tailed test. For the final model, the variance explained in each of the endogenous variables is as follows: I-PLOC (13%), effort (17%), meta-cognitive strategies (61%), performance (16%), and enjoyment (9.5%). The model was also run with grade point average as a control for performance; the results were similar in direction and magnitude of significance. (The results are available upon request from the authors.)

support was obtained for all of the hypotheses except for Hypotheses 3 and 6. In general, such results provide relatively strong support for hypothesized model of consequences and antecedents of I-PLOC.

Alternate Model Testing

Although these results provide support for our hypothesized fully mediated model, other theoretically relevant alternative models may fit as well or better than our hypothesized model. Thus, we investigated theoretically meaningful alternate models that were nested within our hypothesized model by examining whether I-PLOC and personality had direct effects on downstream variables in addition to the effects hypothesized in our model. For example, Model 3 investigated whether I-PLOC has direct effects on the outcomes of performance and enjoyment, in addition to the effects through effort and meta-cognitive strategies. Examination of the change in chi square indicates that this alternative model did not provide a better fit to the data, $\Delta\chi^2(2, N = 260) = 5.63, ns$. Such results indicate, as expected, that I-PLOC does not have direct effects on outcomes beyond the effects through self-regulatory activities.

We also examined an alternative model (Model 4) with personality having direct effects on the outcomes of performance and enjoyment. The change in chi square indicates that this alternative model did not provide a better fit to the data, $\Delta\chi^2(6, N = 260) = 1.77, ns$, than our hypothesized model. Such results indicate that personality does not have direct effects on outcomes in addition to the effects through I-PLOC and the self-regulatory activities.

Based on prior evidence that personality influences self-regulatory activities, we examined an alternate model (Model 5) in which personality has direct effects on effort and meta-cognitive strategies in addition to the effects via I-PLOC. The addition of these six paths resulted in a significant reduction in chi square (see Table 3), $\Delta\chi^2(6, N = 260) = 39.17, p \leq .01$. Such results suggest that personality has direct effects on self-regulatory activities (effort and meta-cognitive strategies) in addition to the effects on I-PLOC. In other words, I-PLOC cannot completely account for the effects of personality on effort and meta-cognitive strategies.

To examine whether the paths from personality to I-PLOC are needed, we examined an additional model (Model 6) in which personality has direct effects on effort and meta-cognitive strategies, but no paths to I-PLOC. The elimination of these paths resulted in a significant increase in chi square, $\Delta\chi^2(3, N = 260) = 29.43, p \leq .01$, indicating the data better fit a model that included paths from personality to I-PLOC, as hypothesized (i.e., Model 5). Such results are particularly important and indicate that I-PLOC must be

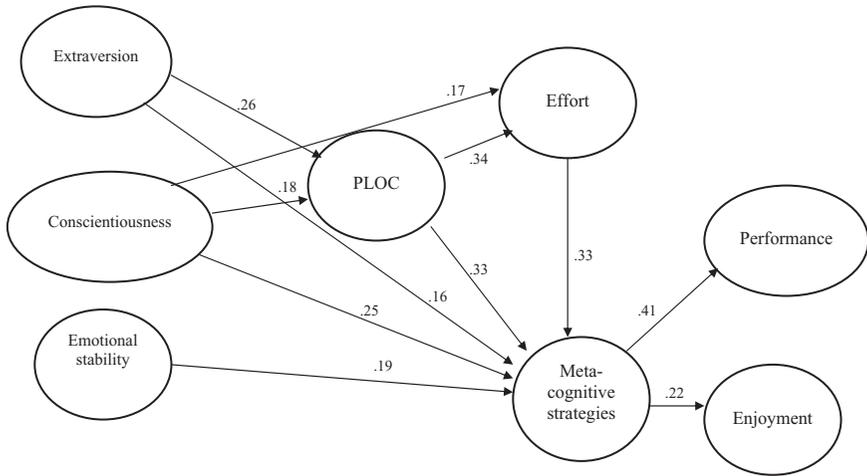


Figure 2. Final model with significant paths. PLOC = perceived locus of causality.

taken into account in order to understand the influence of personality on self-regulatory activities, since omitting those paths resulted in a significantly weaker model. More broadly, these results indicate that both personality and I-PLOC have effects on self-regulatory activities.³

To summarize, Model 5 provides the best fit to the data and appears to fit the data relatively well, $\chi^2(194, N = 260) = 419.47$ (CFI = .93, IFI = .93, RMSEA = .07).⁴ We should note, however, that although our final model is consistent with current theorizing, since it was not our initial hypothesized model and some of the relationships may have resulted from chance associations in our sample, caution in interpreting the results is warranted. Table 4 presents the standardized parameter estimates of Model 5 and the amount of variance explained in each of the endogenous variables.

The final model, with only the significant path coefficients, is presented in Figure 2. Focusing first on the antecedents of I-PLOC, conscientiousness and extraversion predicted I-PLOC. In addition to the effects on I-PLOC, personality had direct effects on the self-regulatory variables although, notably,

³Based on a suggestion from a reviewer, we conducted regression analyses to determine the extent to which personality and PLOC explained unique variance in the meta-cognitive strategies and effort. These results indicated that for meta-cognitive strategies, the unique variance explained by PLOC and the personality variables was 5% and 13%, respectively. For effort, PLOC and personality (conscientiousness) each explained 4% of the unique variance.

⁴We also tested Model 5 using GPA as a control for performance. The results were similar in direction and magnitude of significance of the paths as when GPA was not included. Thus, when discussing the final model, we do not include GPA as a control variable.

our results indicate that I-PLOC is necessary to better explain the relationships between personality and self-regulatory activities. More specifically, conscientiousness had direct effects on both effort and meta-cognitive strategies, and extraversion had a direct effect on meta-cognitive strategies. Emotional stability was related to meta-cognitive strategies, but was not related to I-PLOC. As hypothesized, I-PLOC predicted the self-regulatory activities of effort and meta-cognitive strategies. Finally, as expected, meta-cognitive strategies were positively related to enjoyment and performance although, somewhat surprisingly, effort did not have direct effects on enjoyment or performance. Rather, the effects of effort on the outcomes were through meta-cognitive strategies.

Note that although PLOC did not have direct effects on performance or enjoyment, it did have indirect effects on these outcomes through the self-regulatory variables. Specifically, the indirect—and, in this case, total—effect of PLOC on performance and enjoyment was .17 ($p \leq .01$) and .14 ($p \leq .05$), respectively. Such results indicate that a 1 *SD* increase in PLOC will result in a .17 and .14 *SD* increase in performance and enjoyment, respectively.

Finally, similar to other scholars, we estimated two additional models in which I-PLOC was replaced with the controlled (i.e., extrinsic and introjected) or the autonomous (i.e., identified and intrinsic) motivation components (Bono & Judge, 2003; Judge et al., 2005). Results indicate that when only autonomous motivation was in the model, the results were identical to the model with I-PLOC in terms of significance of paths and conclusions. When only controlled motivation was in the model, however, several of the paths were not significant, and the model did not work as well. Such results are similar to what was found by Judge and colleagues (Bono & Judge, 2003; Judge et al., 2005), who also advocated retaining the overall I-PLOC measure to be consistent with prior research.

Discussion

We designed the present study to investigate both consequences and individual-difference antecedents of perceived locus of causality. The results indicate that when respondents had more internalized reasons for taking the course (i.e., greater I-PLOC), they subsequently reported using more effective meta-cognitive strategies and exerting more effort, which in turn predicted their performance and enjoyment in the class. Thus, we concur with Sheldon et al. (2003), who called for additional research in the organizational sciences investigating how I-PLOC influences performance and other organizational outcomes. Our study begins this effort by extending prior research by:

(a) examining personality antecedents of I-PLOC; (b) examining consequences of I-PLOC; and (c) examining whether personality influences outcomes through I-PLOC.

Personality Antecedents of I-PLOC

We extended prior research by examining the role of personality characteristics in predicting I-PLOC. Judge et al. (2005) found that core self-evaluations were related to self-concordance, which measures the reasons for pursuing a particular goal. We examined the role of personality characteristics on the internalization of task demands associated with taking a class. As hypothesized, extraversion and conscientiousness were positively related to I-PLOC in the structural model, and they explained 13% of the variance in I-PLOC.

Although emotional stability was significantly correlated with I-PLOC, somewhat surprisingly, the path was not significant in the structural model. Nonetheless, our results indicate that I-PLOC, which has typically been conceptualized as a situation-specific variable (Ryan & Deci, 2002) also has personality determinants. Based on hierarchical models of motivation (Valleland, 1997, 2000), we expect that PLOC is influenced by other global as well as domain-specific variables. For example, individuals with a global disposition to experience events as allowing for self-determined behavior (Deci & Ryan, 1985a) are likely to have greater PLOC than individuals who see events as more controlling. Similarly, individuals with more internalized reasons for pursuing higher education may have higher PLOC for taking a specific course.

More broadly, results indicating that extraversion influences I-PLOC extend the recent meta-analysis (Judge & Ilies, 2002) finding that extraversion was related to other measures of performance motivation. Extraversion consists of positive affectivity and energy components and is theorized to be an indicator of the approach component of motivation (Elliot & Thrash, 2002). We theorized that extraverts, who tend to be more sensitive to positive stimuli, would be more likely to attempt to internalize tasks than would introverts. Thus, extraversion would be positively related to I-PLOC.

We encourage future research to continue examining the role of extraversion in motivation. For example, extraversion may be related to a performance-approach goal orientation (Elliot & McGregor, 2001; Elliot & Thrash, 2002), which can positively influence performance (Brett & VandeWalle, 1999; Elliot et al., 1999).

Research is needed to investigate additional antecedents of I-PLOC in work contexts, beyond the personality characteristics that we investigated.

Based on research indicating that autonomy support is related to I-PLOC (Deci & Ryan, 2000; Ryan & Deci, 2002) and theorizing that leaders vary in the autonomy support provided to subordinates, one might expect that leader behavior influences subordinates' I-PLOC. Interestingly, recent evidence indicates that transformational leadership positively influenced I-PLOC, operationalized as self-concordant goals (Bono & Judge, 2003). Similarly, one might expect that subordinates with higher quality relationships with their leaders are more likely to have higher I-PLOC than leaders with lower quality relationships (Liden, Sparrowe, & Wayne, 1998). More broadly, we urge researchers to investigate both contextual factors and personality variables that will positively influence I-PLOC.

Consequences of I-PLOC

A notable contribution of the present study is demonstrating the relationship of I-PLOC to meta-cognitive strategies. Our results replicated findings that I-PLOC influences effort, but extended them to show that I-PLOC also influences how participants approached task accomplishment. Importantly, our results indicate that I-PLOC was not related to performance and enjoyment directly, but influenced these outcomes through two different, but related mechanisms: more active engagement with the task and increased effort. Such results extend SDT by examining specific self-regulatory activities influenced by I-PLOC.

We encourage researchers to investigate other self-regulatory activities that may mediate the relationships among I-PLOC and the outcomes of performance and enjoyment. Further, we encourage more longitudinal studies investigating effects of changes in I-PLOC and self-regulatory strategies (e.g., effort, meta-cognition) on outcomes. For example, in a study investigating class performance in an organic chemistry class, Black and Deci (2000) found that students' initial autonomous motivation was not related to performance, but that increases in students' autonomous motivation resulted in better performance.

Future research would be useful to determine the situations under which I-PLOC may have more or less powerful effects on outcomes. For example, based on our results, one might theorize that I-PLOC would have greater influence in situations in which differences in effort and strategies would be related to important outcomes, such as performance on complex tasks or tasks requiring creativity. Similarly, we expect that I-PLOC might have stronger relationships with behaviors perceived as discretionary (i.e., extra-role behaviors) than with role-prescribed behaviors. Although speculative, we expect that individuals with a more internalized PLOC for task demands

at work would be more likely to take charge (Morrison & Phelps, 1999) and engage in innovative behaviors (Scott & Bruce, 1994) than individuals with a more externalized PLOC.

I-PLOC as a Mediator of Personality Effects

As noted by Barrick et al. (2001), although considerable research has indicated that personality influences performance, little research has investigated the mechanisms through which such effects occur. Our results indicate that personality influences performance through I-PLOC and through effort and meta-cognitive strategies. More specifically, conscientiousness directly predicted both effort and meta-cognitive strategies, in addition to its effects on I-PLOC. Such results support propositions that conscientiousness influences performance by influencing both how individuals plan and organize work, and their effort and persistence in accomplishing tasks (Barrick et al., 1993, 2002; Hogan & Ones, 1997).

Emotional stability was not related to I-PLOC, but did directly predict meta-cognitive strategies. Individuals with higher emotional stability were better able to develop and enact strategies for task accomplishment. Such results suggest a potential mechanism for the relationship between emotional stability and job performance (Barrick et al., 2001). Our results are also consistent with evidence that emotional stability is positively related to an action orientation; that is, the ability of individuals to devote their cognitive resources to task accomplishment (Diefendorff, Hall, Lord, & Streat, 2000). Thus, emotional stability may influence performance through its effect on initiating and enacting strategies that influence goal attainment.

To summarize, our results suggest that personality has direct effects on effort and meta-cognitive strategies in addition to the indirect effects through effort and meta-cognitive strategies. Thus, although I-PLOC appears to be an important mediating mechanism between personality and performance, clearly there are other important mechanisms also (e.g., effort, strategies). Nonetheless, our results suggest that research is needed that incorporates I-PLOC with other mediating mechanisms and with other motivation approaches. For example, Kanfer and Heggestad (1997, 1999) argued that for optimal performance, individuals need to strive for excellence while controlling their anxiety. We theorize that individuals who are engaging in a behavior for autonomous reasons (i.e., high I-PLOC) experience less anxiety because they are using less energy to monitor others' evaluations of their behavior and, therefore, can devote more of their capacity (i.e., greater attention and effort) to the task.

Limitations

We want to acknowledge some potential limitations of our study. First, the data were collected in an academic setting. Therefore, the results have unknown generalizability. Nonetheless, we believe—as others have also argued (Chen, Gully, Whiteman, & Kilcullen, 2000; Lee et al., 2003; Phillips & Gully, 1997)—that the classroom is a natural setting, with important implications for its adult participants. It is, therefore, a useful setting to examine the self-regulation of work behavior. Although our study provides an initial examination of how I-PLOC is related to self-regulatory activities, further research in other settings is warranted.

Some may see our data collection in Singapore as a limitation, although we see it as a strength of our study since we were able to examine PLOC in a collectivistic culture. There has been considerable controversy over the cross-cultural applicability of SDT (for a review, see Deci & Ryan, 2000), and our ability to show the importance of I-PLOC in a collectivistic culture offers further support for Deci and Ryan's claims regarding the universality of the theory (also see Chirkov, Ryan, Kim, & Kaplan, 2003; Sheldon et al., 2004; for an opposing view, see Markus, Kitayama, & Heiman, 1997; and Oishi & Diener, 2001). Clearly, additional research is needed to investigate the universality of SDT.

Another study limitation is that, with the notable exception of performance, the data were all self-report measures collected via surveys from the same source. Although surveys seemed to be the most appropriate research tool, given our conceptual focus, self-report data can be susceptible to monomethod bias. We attempted to deal with such concerns by measuring our key variables at different time periods and by using established measures (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Further, it seems unlikely that method bias is an alternative explanation for the specific pattern of results found.

Finally, as noted by statisticians, for any given model, there may be alternative models with different paths among the constructs that provide equivalent goodness of fit to the sample data (MacCallum, Wegener, Uchino, & Fabrigar, 1993). Thus, although our final model is consistent with propositions from SDT, it may capitalize on chance associations in the data, and the support found for it does not imply that it is the only model that fits the covariance matrix.

To the extent that our results generalize to organizational settings, they have important implications for managers. Our results suggest that if managers can increase employees' internal motivation, then employees may exert extra effort at work and also may think about how to better accomplish work objectives. By extension, it seems likely that individuals with higher I-PLOC

may engage in greater organizational citizenship behaviors than individuals with more externalized motivation, although research is needed to confirm this relationship. Employees with greater internal motivation also have higher job satisfaction (Judge et al., 2005), and thus may have lower turnover.

How do managers increase employees' internal motivation? Evidence suggests that employees have greater internal motivation when managers provide autonomy support at work (Deci, Eghrari, Patrick, & Leone, 1994; Sheldon et al., 2003). Autonomy support involves taking the person's perspective in the situation, providing as much choice as possible, and providing a meaningful rationale for the task. Evidence indicates that autonomy support influences internal motivation of tasks that are not intrinsically motivating (Deci et al., 1994; Ryan & Stiller, 1991). Thus, in order to increase internal motivation, managers might provide employees with a rationale for tasks, while also providing as much choice as possible.

In conclusion, we extended prior research by examining antecedents and outcomes of an internal perceived locus of causality. I-PLOC had positive effects on performance and enjoyment through effort and meta-cognitive strategies, suggesting the importance of I-PLOC for employee performance and attitudes, an area that is just beginning to be investigated (Bono & Judge, 2003; Judge et al., 2005). Furthermore, our results provide insight into personality antecedents of I-PLOC and how personality characteristics can influence performance. Self-determination theory has had substantial influence on research in various domains, such as health and education, but has rarely been applied to organizational phenomena (Sheldon et al., 2003). We hope that our study provides an impetus for organizational scholars to continue applying self-determination theory to investigate predictors of employee motivation, performance, and attitudes.

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