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Creativity and Control: A Paradox—Evidence from the Levers of Control Framework

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ABSTRACT: Both control and creativity are important drivers of organizational success (Gilson, Mathieu, Shalley, and Ruddy 2005; Hirst, van Knippenberg, Chen, and Sacramento 2011). However, they are often regarded as conflicting. We use the Levers of Control (LoC) framework to examine the relationships between a system of controls, empowerment, and creativity. Using survey data from 233 business unit managers, a structural equation model shows that the intensity of use of a LoC system of controls is positively associated with both empowerment and creativity. This suggests that the LoC system provides an environment that is rich with information and motivates employees to take action in purposeful, directed ways. This environment facilitates employees' perception that they have the ability to take actions, make decisions, and produce novel ideas. We conclude that there is not a conflict between control and creativity *per se*. Rather, paradoxically, creativity can flourish in the presence of control.

Keywords: levers of control; creativity; control system; survey; management control.

INTRODUCTION

Creativity and control are both important to organizations. Creativity provides novel ideas, thus facilitating the adaptation necessary to survive and compete in changing markets (Amabile, Conti, Coon, Lazenby, and Herron 1996; Anderson, Potočnik, and Zhou 2014; Shalley, Zhou and Oldham 2004), while management control facilitates goal alignment among organizational members and supports efficiency. Since control and creativity are both necessary features of an organization (Gilson, Mathieu, Shalley, and Ruddy 2005; Hirst, van Knippenberg, Chen, and Sacramento 2011), it is important to understand how they can coexist. The purpose of this paper, thus, is to extend our understanding of how controls and creativity are related.

The organizational behavior and social psychology literatures have concluded that freedom over one's work enables creativity, while control is a barrier to creative thought and output (e.g., Amabile et al. 1996; Shalley, Gilson, and Blum 2000; Zhou 2003; Zhou and George 2003). This idea has a long history and can be traced back at least half a century (Gilson et al. 2005; Hirst et al. 2011) to the work of Burns and Stalker (1961) and Thompson (1965). In the words of Zhou and George (2003, 546):

On the one hand, organizations are highly dependent upon control systems, standardized practices, and routines to ensure smooth and efficient operations. Yet these systems have the unintended consequence of shutting down the innate creative propensities of organizational members.

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The accounting literature, however, is somewhat less pessimistic. For instance, [Adler and Chen's \(2011\)](#) theoretical work argues that creativity and control can in fact coexist. But then, empirical work shows that measures of creativity or innovation receive little weight in performance-based compensation schemes, implying that they are not important motivators ([Ittner, Larcker, and Rajan 1997](#)). Moreover, experimental studies have found that measurement and reward of individual creativity do not reliably enhance creative output. Although this latter literature does not typically show that control is a barrier to creativity, it gives no clear indication that it facilitates creativity either. [Kachelmeier, Reichert, and Williamson \(2008\)](#), for instance, found that even though pure creativity-based rewards may increase creative output, compensation schemes that emphasize both creativity and quantity are not associated with more creative output relative to a reward structure based on quantity alone. Rather, such dual schemes are significantly associated with lower productivity overall. In addition, [Kachelmeier and Williamson \(2010\)](#) found that the offer of a reward structure that emphasizes both creativity and quantity might help attract individuals that produce more creative output initially, but that this effect does not persist. Moreover, individuals on a quantity-only contract actually outperform those on a creativity-weighted scheme over time.

The overall conclusion, thus, seems to be that control cannot really support creativity. This conclusion, although, is hindered by the conceptualization of control. With only very few exceptions (e.g., [Grabner 2014](#); [Moulang 2015](#)), extant literature on the relationship between control and creativity has primarily focused on controls that limit behavior such as monitoring or rewards and found that each, taken alone, may constrain creativity (e.g., [Shalley et al. 2000](#); [Gilson et al. 2005](#); [Hirst et al. 2011](#)). Such limiting controls may have a “hidden cost” in that they incite negative feelings in employees that lead to lower levels of effort ([Falk and Kosfeld 2006](#)). However, recent studies have started to adopt a much broader conceptualization, acknowledging that control includes a variety of different mechanisms, some of which may actually support and enable desirable action choices (e.g., [Grabner 2014](#); [Hall 2008](#); [Marginson, McAulay, Roush, and van Zijl 2014](#)) including creativity. The Levers of Control (LoC) framework, for instance, proposes a control system comprised of beliefs, interactive, boundary, and diagnostic controls ([Simons 1995a](#)). *Beliefs control* inspires employees to commit to the organization's core values and mission in their search for new opportunities. *Interactive control* frames enquiries and actions by communicating highly charged concerns and encouraging vertical information sharing. *Boundary control* establishes and communicates actions and areas that employees must avoid. *Diagnostic control* motivates action, monitors the outcomes of behaviors, and rewards goal achievement. [Simons \(1995a, 2000\)](#) argues that the four control levers do not work in isolation, but rather work together as a system to create an appropriate control environment. He summarizes by stating:

Control of business strategy is achieved by integrating the four levers of beliefs systems, boundary systems, diagnostic control systems, and interactive control systems. The power of these levers in implementing strategy does not lie in how each is used alone, but rather in how they complement each other when used together. The interplay of positive and negative forces creates a dynamic tension between opportunistic innovation and predictable goal achievement that is necessary to simulate and control profitable growth. ([Simons 2000](#), 301)

A growing literature suggests that it matters how control is perceived, and that employee outcomes, such as intrinsic motivation and creativity, depend on whether control is viewed as communicating restrictions and limits or whether it is seen as communicating valuable information and making employees believe they have choices in their actions (e.g., [Akerlof and Kranton 2008](#); [Falk and Kosfeld 2006](#); [Koestner, Ryan, Bernieri, and Holt 1984](#); [Prendergast 2008](#); [Shalley et al. 2004](#)). This finding is consistent with self-determination theory, which argues that self-regulated behaviors need both autonomy support and the provision of specific behavioral structure ([Sierens, Vansteenkiste, Goossens, Soenens, and Dochy 2009](#)). Autonomy support provides employees with the feeling that they have a choice in their course of action, while structure includes the setting of constraints and expectations to provide guidance to employees' endeavors ([Sierens et al. 2009](#)). Together, they facilitate employees' perceptions that they are empowered.

We propose that the LoC as a system provides both autonomy support and structure. On the one hand, the beliefs and interactive levers are positive types of controls that offer autonomy support by allowing employees freedom of choice in selecting their courses of action ([Simons 1995a](#)). Conversely, the diagnostic and boundary levers are negative types of controls that provide structure by placing limits on inappropriate behaviors, setting clear targets and expectations, and monitoring feedback ([Simons 1995a](#)). Thus, we expect that a more intensive use of the control *system* will provide employees with the belief that they have freedom to make choices, but within a certain defined space, thus arranging for both the autonomy support and structure necessary for empowerment and, in turn, creativity. In addition, we contend that the LoC system of controls contributes to an information-rich organizational work environment that provides the encouragement, focus, and opportunities for discourse that directly facilitate creativity.

Our research question, thus, is this: Can the use of a system of controls positively influence creativity and, if so, how? To examine this question, we develop a survey and administer it in person to a sample of 233 business unit (BU) managers. We compute a measure of the LoC system with the intensity of use of the beliefs, boundary, diagnostic, and interactive control levers as indicators. As predicted, our structural equation model shows that the intensity of use of the LoC system is positively

FIGURE 1
Theoretical Model

associated with empowerment and, in turn, with creativity. Moreover, we find that the intensity of use of the LoC system has a positive direct effect on creativity. In a series of additional analyses, we find consistent support for our conclusion that it is the *system* of control that matters (as opposed to the *individual* control levers).

Our results indicate that the tension between control and creativity as it emerges from the literature is a paradox, and that control and creativity can actually coexist. Managers are in fact able to construct a control system that provides space to be creative, while still providing boundaries, information, and direction about problems that need creative solutions, and the motivation and incentives to engage in creative thought. In so doing, they create an environment in which creativity flourishes. This finding is important to managers because it shows that they do not need to make tradeoffs between whether they want a creative organization or an organization characterized by control. Instead, they can have both.

Our primary contribution to the literature is at the intersection of control and creativity (e.g., [Adler and Chen 2011](#); [Grabner 2014](#)). At this intersection, studies have mainly focused on showing how to incentivize creativity (e.g., [Kachelmeier et al. 2008](#); [Kachelmeier and Williamson 2010](#)), particularly in teams ([Chen, Williamson, and Zhou 2012](#)). We complement this line of literature by showing how managers can encourage creativity through the use of a system of controls, if indeed, that is in the best interest of the firm. In so doing, we also add to the emergent turn in the literature to study the joint effects of various control system components (e.g., [Grabner 2014](#)).

Our findings also contribute more generally to the growing stream of accounting literature that examines the LoC framework (e.g., [Mundy 2010](#); [Widener 2007](#); [Kruis, Speklé, and Widener 2016](#)). Prior articles in this line of work have conceptually and empirically examined the structure of control to develop a deeper understanding of the notion of balance and associated organizational outcomes, such as learning and performance. We contribute to these studies by focusing on the systemic effects of the LoC control levers rather than the balance between them, empirically demonstrating that such effects exist, and that they are related to creativity. By providing evidence on empowerment and creativity as two important behavioral outcomes, we also add to the more general literature that examines behavioral consequences of control (e.g., [Hall 2008](#); [Burney and Widener 2007](#)).

Next, we develop our theory and hypotheses, followed by a description of our methods. We then present our results and, finally, conclude.

BACKGROUND LITERATURE AND THEORY DEVELOPMENT

In order to situate the theoretical foundations of this study, we first discuss aspects of self-determination theory, empowerment, and creativity. We subsequently turn to our hypotheses development by first developing the effect of the LoC system on creativity through empowerment (H1). Next, we develop the direct relationship between the LoC system and creativity (H2). Our theoretical model is depicted in Figure 1.

Self-Determination, Empowerment, and Creativity

Self-determination theory ([Deci and Ryan 1987](#); [Ryan and Deci 2000](#)) purports to explain how people's perceptions of action stimuli and decision contexts influence intentional behavior and, particularly, the intrinsic engagement and commitment

that people feel toward their actions and efforts. According to self-determination theory, positive engagement with a task depends on one's sense of self-determination, which, in turn, depends on the fulfillment of three fundamental human needs, i.e., the need for autonomy, competence, and relatedness (Ryan and Deci 2000). The concept of autonomy refers to the belief that one's actions are one's own, i.e., the belief that one's actions emanate from oneself and the perception that one is in charge of one's own choices (Deci and Ryan 1987). Competence refers to the confidence people have in their ability to be able to execute their tasks and to the degree of control people think they have over the ultimate outcomes of their actions. Relatedness denotes the presence of a social environment in which people feel secure and supported (Ryan and Deci 2000).

In the context of workplace behavior, the concept of self-determination is closely related to the notion of empowerment, which we define as individuals' perception of self-determination, i.e., the extent to which employees believe they can autonomously perform their job tasks and can exercise choices over how they work.¹ Self-determination theory associates various positive behavioral outcomes with self-determined motivation, including people's social development and general well-being (Ryan and Deci 2000). Of particular relevance for our purposes is the connection with creativity. Creativity refers to the production of novel and useful ideas in any domain (Amabile et al. 1996), and is considered essential for organizations (Gilson et al. 2005). Previous research has found that creativity is induced by empowerment and the associated feelings of ownership and control over one's work (Amabile and Sensabaugh 1992; Amabile et al. 1996). Sun, Zhang, Qi, and Chen (2012) suggest that perceptions of empowerment motivate employees to experiment with new ways of doing their job, which results in creative behaviors. Similarly, Shalley et al. (2004) link autonomy to creative behavior in their review of the creativity literature, and Alge, Ballinger, Tangirala, and Oakley (2006) claim that creativity results from individuals' belief that they have the freedom to generate novel ideas and the confidence that such ideas will be valued. Empirical research provides support for these arguments, and many studies find that employees are more creative when they feel more empowered and perceive that they have a choice in how best to perform their assigned duties and tasks (Alge et al. 2006; Chen and Aryee 2007; Shin and Zhou 2003; Sun et al. 2012; Zhang and Bartol 2010). The overall implication of these studies is that if one wants to stimulate creativity, then the work environment should support perceptions of empowerment.

Control, Empowerment, and Creativity

The management control structure is an important part of the work environment. If an empowering work environment facilitates creative behavior, then the question arises as to how control choices affect empowerment. This question has been addressed in prior research. Several studies (e.g., Ergeneli, Saglam Ari, and Metin 2007; Si and Wei 2012) suggest either conceptually or empirically that management may have either control or empowerment, but not both at the same time. For example, Shalley et al. (2004) and Si and Wei (2012) conclude that leaders who emphasize leadership through control are associated with less empowerment and less creative output. They argue that transformational leaders should not adopt a control strategy, but rather focus on empowerment through supportive, noncontrolling leadership. In effect, they argue that control suppresses empowerment. Contrary to these findings, however, Hall (2008) finds that if managers use a diverse set of performance measures to capture the key performance areas of the business unit, then managers experience more freedom, autonomy, and opportunity to do their job. These comprehensive performance measures provide essential information for the manager because their jobs require consideration of multiple aspects of their unit's operations and consideration of strategic issues (Hall 2008). In a similar vein, Marginson et al. (2014) find a positive relationship between an interactive use of nonfinancial performance measures and self-determination, also suggesting that a more intense use of management controls can actually enhance empowerment.

We propose that the reason for these conflicting findings is that it matters how individuals in organizations experience the management controls. Empowerment is strongly associated with intrinsic, self-determined motivation. However, self-determined motivation can also have extrinsic origins, provided that the extrinsic influences become internalized and integrated (Ryan and Deci 2000). If internalized and integrated, then externally imposed regulation becomes part of self-regulated behavior, without undermining one's sense of being in charge. Accordingly, if management controls are designed and presented in such a way that they are internalized and assimilated, then they actually support and enhance self-determination

¹ In general, empowerment refers to the extent individuals believe they have the ability to exercise choice (Velthouse 1990). In a more precise conceptualization, empowerment is seen as a multifaceted conceptualization of four dimensions that include self-determination, competence, impact, and meaningfulness (Liden, Wayne, and Sparrowe 2000; Spreitzer 1995; Spreitzer, Kizilos, and Nason 1997; Thomas and Velthouse 1990). As such, empowerment seems a somewhat broader notion than self-determination, adding impact and meaningfulness as additional components. Meaning, however, is the value of a task's purpose as seen from the perspective of the individual him- or herself (Thomas and Velthouse 1990), and can accordingly be seen as one of the outcomes of self-determination. Impact is the belief that one's actions can actually influence organizational outcomes (Spreitzer 1995; Thomas and Velthouse 1990) and is thus part of the competence dimension in self-determination theory. For these reasons, researchers have concluded that self-determination is the essence of empowerment, and that impact, meaningfulness, and competence are actually either antecedents or outcomes of self-determination (Spreitzer et al. 1997).

and, thus, perceptions of empowerment. This requires the management control structure to be supportive of autonomy (Deci and Ryan 1987; Ryan and Deci 2000) and to provide appropriate structure to the decision problems that individuals face (Grolnick and Ryan 1989; Koestner et al. 1984; Sierens et al. 2009). Autonomy support includes the provision of choice in conducting work activities, while the provision of structure includes setting constraints and expectations (Sierens et al. 2009). These constraints and performance expectations could undermine perceived autonomy and decrease empowerment. However, they can also have a positive effect, particularly if they help people to understand how their action choices affect ultimate outcomes and if they hold information that employees need to truly “own” their tasks and that helps them improve their decisions (Grolnick and Ryan 1989; Koestner et al. 1984; Sierens et al. 2009).

We propose that the LoC as a system provides both autonomy support through beliefs and interactive controls and structure through diagnostic and boundary controls. Beliefs control communicates the core values to employees, thus allowing for freedom of behaviors within the context of the firm’s mission and core values. Once employees understand the firm’s core values, mission, and vision, they will feel better equipped to make appropriate choices. Beliefs control motivates employees to take initiative in searching for opportunities, making decisions, and devising solutions to problems consistent with the organization’s values. Interactive control communicates the concerns of top managers throughout the organization. Employees become aware of where potential opportunities and threats may arise, and are motivated to be proactive in searching for new opportunities and guarding against threats.

In contrast, structure communicates expectations of behavior, sets limits on what is acceptable behavior, and provides feedback and goals (Sierens et al. 2009). In the LoC system, boundary control establishes the rules of the game, setting limits on acceptable employee behaviors. Diagnostic control communicates targets on critical performance measures that serve to guide behaviors and provides feedback to facilitate employee learning. These controls emphasize accountability for results, which motivates employees to take action, and fosters “know-how.” Since they act as constraints on employee behavior, Simons (1995a) conceptualizes both boundary control and diagnostic control as negative forces. Their effects, however, can be quite positive, because through the provision of feedback, setting of goals, and limit definition, employees are given structure that influence feelings of competence (Sierens et al. 2009).

One of the fundamental propositions in the LoC framework is that the four control levers work together to create an effective control environment. Specifically, Simons (1995a, 29) states, “The four levers are nested. Beliefs systems and interactive systems expand and define the opportunity space of the firm. Boundary systems and diagnostic systems constrain and focus attention on strategic domains and opportunities.” With an effective control environment, employees are empowered because they believe they can take actions and engage in creative behaviors (Simons 1995a). In Simons’s (1995a, 153) thinking, this requires an integration of all four levers: “[t]he power of the control levers does not lie in how each is used alone but rather in how they complement each other when used together.” This position implies “a perspective in which the value of each individual lever depends on the use of the other three levers, and in which desired outcomes require the simultaneous presence of opposing forces ([instead of] the insulated presence of individual forces)” (Kruis et al. 2016, 30). Accordingly, Simons (1990, 1995a) adopts a systems approach to management control (Grabner and Moers 2013).

Empirical evidence supports the LoC as a system. Mundy (2010) explains how the levers can function as a synergetic package creating dynamic tension by balancing the levers. Tuomela (2005) provides additional support for the idea that the levers are not employed individually, but rather work together as a system. He concludes from his case study that reliance on one of the levers has implications for the use of other levers within the control framework. Widener (2007) empirically shows that the levers are related and complementary. She concludes that the four control levers together impact performance more than the sum of each of the four levers as individual practices. These complementarities facilitate the creation of dynamic tensions and unique organizational capabilities (Mundy 2010; Henri 2006).

Our key argument is that emphasizing the LoC *system* (as opposed to the individual components) will create an environment that is characterized by self-management and freedom within stipulated boundaries; thereby, fostering empowerment (Simons 1995b). Mundy (2010) provides some initial evidence supporting this argument. Her field study illustrates, for example, how a system of LoC controls is of particular importance in managers’ attempts to concurrently direct and empower employees. More intense use of the control system provides greater clarity and a clearer understanding of the work environment. She further shows that the LoC system is explicitly concerned with the dual use of MCS to facilitate creativity, while simultaneously providing constraints on employees’ behavior. Use of the levers “allow experimentation and creativity to flourish, while at the same time providing constraints on employee’s behavior” (Mundy 2010, 500). To add context to this conclusion, one of her respondents stated the following:

I think by having the controls there and setting [the managers’] targets, it does actually mean that [the managers] can get pretty creative. I don’t necessarily believe it holds them back, because they can be told they’ve only got a particular amount of money. They will then go out and see whether they can source it in a different way, or is there a new system out there. I don’t believe it unduly puts a damper on their creativity. (Mundy 2010, 508)

In sum, we argue that employees often perceive more intense use of controls as increased freedom instead of increased constraints. We propose that this is because the LoC system of controls creates an environment that provides both the autonomy support and structure needed to foster intrinsic motivation and self-regulated behaviors, as opposed to fostering an environment characterized as “controlling.” Given that creativity is associated with empowerment (as discussed earlier), we can now state our first hypothesis:

H1: The intensity of use of the levers of control system is positively associated with empowerment and, subsequently, with creativity.

The LoC System and Creativity

A large stream of research in social psychology and organizational behavior has investigated various drivers of creativity (e.g., Abbey and Dickson 1983; Amabile and Sensabaugh 1992; Amabile et al. 1996; Hirst, van Knippenberg, and Zhou 2009; Zhou 2003; Zhou and George 2003). This research has concluded that feelings of autonomy matter, but that the work environment itself plays a significant role, too (e.g., Amabile and Pillemer 2012; Anderson et al. 2014; Hirst et al. 2011). Accordingly, we also propose a direct relationship between the intensity of use of the LoC system and creativity.

Beyond providing opportunities for employees to believe that they can make choices regarding their actions within defined boundaries (as manifested in empowerment), organizational and supervisory encouragement has been found to be an important stimulant for creativity in organizational work environments (Amabile et al. 1996). Providing explicit instructions, recognizing creative thought, encouraging risk taking, supporting collaboration, encouraging a discourse supportive of creativity and idea generation, and valuing creativity are all aspects of providing the organizational encouragement necessary for stimulating creativity (Amabile et al. 1996). Thus, organizations seeking to facilitate creativity must create an information-exchange process that is encouraging and supportive of creativity. Empirical evidence provides support that information-exchange is important to teams striving toward achieving increased creative production (Chen et al. 2012; Gong, Cheung, Wang, and Huang 2012). Simons (1990, 1995a) suggests that the LoC system of control helps create an environment with the rich information-exchange processes necessary for facilitating creativity and the ability to seize upon emergent strategy (Simons 1990, 1995a). Accordingly, we contend that the LoC control levers, working together as a system, create the work environment employees need to be creative.

Interactive control allows for the exchange of information in an environment where people are encouraged to challenge the *status quo*, to engage in debate and dialogue, and to unearth creative and innovative solutions. It communicates strategic uncertainties vertically throughout the organization, and provides a focus for employees’ creative juices. Beliefs control communicates core values meant to encourage and inspire employees to take action. Because it provides employees with direction, it removes concern that creative endeavors will be unwelcomed. We already suggested that performance targets and boundaries do not need to be perceived as negative constraints on one’s self-realization or self-fulfillment, but can, in the presence of inspiring belief control and supportive interactive control, be perceived as challenges that only make the problems at hand more interesting, priming individuals to think of unusual solutions and nonstandard approaches (Burroughs, Dahl, Moreau, Chattopadhyay, and Gorn 2011). Targets and constraints can help to frame the decision problem in such a way that creative thinking is actually required because standard solutions will not do to meet all decision parameters. They can also serve to provide direction and to enhance individuals’ understanding of action-outcome relations, further guiding creative behavior.

In sum, thus, the LoC system of control is an important tool in the workplace that can produce both the inspiration and encouragement needed to spur creativity, as well as the necessary information employees need to think creatively about problems, concerns, and solutions. Accordingly, we propose the following:

H2: The intensity of use of the levers of control system is positively associated with creativity.

RESEARCH METHODS

Survey Design and Sample

We use a survey to collect data with which to examine our hypotheses. In developing the survey, we subjected it to various pretests. First, we used an academic review to ensure correspondence between our theory and the measurement of our constructs. Second, we pretested the survey in the field using an extensive Three-Step Test-Interview (TSTI)² method (Hak,

² Specifically, the three steps are concurrent thinking aloud aimed at collecting observational data, a focused interview aimed at remedying gaps in observational data, and a semi-structured interview aimed at eliciting experiences and opinions. (Hak et al. 2008).

van der Veer, and Jansen 2008). The TSTI is a mechanism for pretesting questionnaires through observing the actual interaction between the instrument and respondents. Because the completion of a survey mainly consists of cognitive processing, “thinking aloud” is used as a technique for making the thought process observable (Hak et al. 2008). TSTI helps identify problems in questionnaires, which often leads to modification of the wording and/or layout of questions. We conducted three rounds of TSTI with a total of seven unit managers.³ These extensive pretests help ensure both the content and face validity of our constructs and the survey as a whole.

Control systems may vary within larger organizations (e.g., Chenhall 2003). Therefore, we focus on understanding control and creativity at the level of the BU and its manager.⁴ For our purposes, BU managers are ideal respondents since they must function within the control system that is imposed on them, must be creative themselves, and are responsible for the creativity of their BU.⁵ Since there is no general inventory of BU managers to select a random sample, we use a convenience sample created through personal networks of the Master’s students in a Research in Management Accounting and Control class. We asked the students to identify managers who were responsible for a business unit and that report to at least one supervisor. In 2012, each trained student researcher approached (approximately) four BU managers, resulting in 276 completed surveys.

Because our reliance on student-mediated responses could introduce noise into the data-collection process, we relied on a very specific protocol. All students were enrolled in the same course, in which they received clear and very strict instructions as to how to administer the survey, and in which we took considerable care to ensure a strong awareness of the importance of following the protocol. The protocol required students to read the survey questions aloud to the respondent, asking the respondents to answer the questions on their own copy of the questionnaire. This procedure allowed respondents to shield their answers from the student. The students are from a part-time program, are relatively mature (their ages range from 23 to 44, with a mean of 33), and hold responsible positions (most of them hold a position as a controller).

The reliance on student-mediated respondent selection has four important benefits that offset the potential drawbacks to having numerous middle persons and having a nonrandom sample. First, we know the identity of the person who completed the survey and can be sure that respondents fit our selection criteria. Second, we administer the survey face-to-face, which improves the respondents’ careful response to the questions. Third, using the strict protocol referred to earlier to prevent any biasing, the interviewer is able to explain the survey questions to the BU manager to ensure a valid interpretation. Finally, knowing that our students come from different organizations across a variety of different industries, reliance on their networks facilitates the construction of a diverse sample likely to contain the desired variation in the variables of interest. As Van der Stede, Young, and Chen (2005, 668) argue, the use of a convenience sample is most appropriate when it “maximizes the likelihood that the resulting sample exhibits the variation in the independent variable(s) necessary to examine the hypotheses with sufficient power.”

Forty-three of the completed surveys come from non-profit firms, and we exclude these from our study. This leaves us with 233 useable observations from a variety of sectors, including service (25 percent), retail and wholesale trade (18 percent), finance, insurance, and real estate (16 percent), and manufacturing (16 percent). The distribution of observations over industries is broadly similar to the distribution of firms over industries in the Dutch economy, suggesting that our sample covers the field relatively well.⁶ On average, the respondents oversee a BU with 281 employees and are part of a larger organization, comprised of 13,895 employees, on average. The respondents have been in their function for 4.8 years on average, and have worked for the organization for an average of 12.9 years. Most respondents have full profit and loss responsibility (83 percent), but some have revenue or cost responsibility.⁷ See Table 1 for descriptive statistics.

³ The participants in the pretests are not included in the empirical data used to examine our hypotheses.

⁴ We ask about the *organization’s* core values and codes of conduct because our assumption is that they are imposed by the organization (specifically by senior management) on the BU. This assumption is consistent with IFAC’s statement on Ethical Leadership and Developing a Code of Conduct for Organizations (Gould 2013).

⁵ Zhou and George (2003, 547) state, “there is the potential for creativity in a wide variety of jobs” and illustrate this statement as follows: “Hence, while a Pulitzer prize-winning author and a designer of a functioning prosthetic limb are creative at work, so too is a secretary who designs a new scheduling system to reduce errors and a nurse who comes up with a way to reallocate nursing responsibilities in a unit to increase the quality of patient care.”

⁶ The Dutch Bureau of Statistics does not collect information at the level of business units, but only records data at the firm level. Therefore, we cannot compare the composition of our sample to the population. We did, however, compare our sample to the firm-level sector distribution in the Dutch economy (excluding all non-profit organizations and all firms with less than 50 employees). This information is reported in Panel A of Table 1.

⁷ The fact that respondents may differ in their responsibilities does not affect our analyses. We included a dummy variable in all analyses to control for possible effects related to accountability differences (equal to 1 if the respondent has full profit and loss responsibility, 0 otherwise), but found none. The dummy was insignificant in all models, and its inclusion did not alter the substantive findings of any of our analyses. The results we report in later sections exclude this dummy.

TABLE 1
Sample Characteristics

Panel A: Distribution of Industries

	No. of Respondents (Percent)		Dutch Economy
Construction	20	(8.6%)	8.8%
Finance, Insurance, and Real Estate	37	(15.9%)	3.9%
Manufacturing	37	(15.9%)	22.6%
Retail Trade	24	(10.3%)	21.6%
Services	57	(24.5%)	27.5%
Transportation, Communications, Electric, Gas, and Sanitary Services	31	(13.3%)	9.7%
Wholesale Trade	17	(7.3%)	4.6%
Other	10	(4.3%)	1.2%
Total	233	(100%)	100%

Panel B: Sample Statistics

	n (Missing Values)		Mean	Min.	Max.	Std. Dev.
BU Employees	232	(1)	281	12	4,100	526.7
Firm Employees	232	(1)	13,895	51	140,000	27,768.8
Years in Current Function	232	(1)	4.8	0.3	40.0	5.1
Years Working for Current Organization	233	(0)	12.9	0.3	42.0	9.4

Panel C: Firms and BUs in Size Categories

BU Size Categories			Firm Size Categories		
Lower Boundary	Upper Boundary	n	Lower Boundary	Upper Boundary	n
12	50	66	51	250	35
51	100	50	251	500	21
101	500	91	501	1,000	22
501	1,000	7	1,001	5,000	84
1,001	5,000	18	5,001	50,000	49
			50,001	200,000	21

Panel D: BU Manager in Responsibility Categories

	n	Percent
Full Profit and Loss Responsibility	194	83.3
Revenue Responsibility	18	7.7
Cost Responsibility	15	6.4
Budget Responsibility	6	2.6
Total	233	100.0

Variable Measures

All of the variables were measured using survey data. To the extent possible, we relied on previously used and validated instruments. We empirically established construct validity using the tests suggested by Nunnally (1978) (e.g., reviewing range of responses and cross-loadings, calculating Cronbach's alpha). We also use validation questions where possible to gain assurance that our variables are behaving plausibly. Descriptive statistics for all multi-item first-order constructs are shown in Table 2, Panel A. The correlations between the constructs and the validation questions are presented in Panel B of that table.

TABLE 2
Composition and Validity of Multi-Item Constructs

Panel A: Descriptive Statistics

Variable/Indicator ^a	n	Min.	Max.	Mean	Std. Dev.	Cronbach's Alpha
Empowerment	233	−4.24	1.45	0	1	0.90
Has significant autonomy in determining how he/she does the job	233	2	7	5.97	0.93	
Decides on his/her own how to go about doing the work	233	2	7	5.88	0.93	
Has many possibilities for independence and freedom in how to do the job	233	2	7	5.81	0.94	
Is allowed to make important decisions about how to operate	233	2	7	5.52	1.05	
Is allowed a high degree of initiative	233	2	7	5.89	0.96	
Creativity	233	−3.65	2.32	0	1	0.71
Thinks of other ways to solve problems when running into obstacles	233	2	7	5.43	0.84	
Has fresh perspectives on old problems	233	2	7	5.21	0.95	
Copes with several new ideas and problems at the same time	233	2	7	5.51	0.97	
Helps other people develop new ideas	233	2	7	5.43	0.96	
Has lots of new ideas	233	2	7	5.07	1.04	
Boundary Control	233	−2.96	1.51	0	1	0.87
Code of conduct defines appropriate behavior for workforce	233	2	7	5.48	1.28	
Code of conduct informs workforce about off-limits behavior	233	1	7	5.37	1.36	
Organization communicates to workforce risks that should be avoided	233	1	7	5.32	1.34	
Workforce is aware of the organization's code of conduct	233	2	7	5.06	1.31	
Diagnostic Control	233	−4.29	1.56	0	1	0.83
Higher management uses KPIs to:						
Track progress toward goals	233	2	7	5.56	1.07	
Monitor results	233	1	7	5.85	1.01	
Compare outcomes to expectations	233	2	7	5.57	1.15	
Evaluate performance	233	1	7	5.34	1.25	
Beliefs Control	233	−2.94	2.04	0	1	0.85
Mission statement communicates the core values	233	1	7	5.14	1.44	
Higher management communicates core values	233	1	7	4.98	1.28	
Workforce is aware of core values	233	1	7	4.67	1.31	
Mission statement inspires the workforce	233	1	7	4.23	1.31	
Inspiration	233	−3.64	2.13	0	1	0.85
Enable discussion in meetings of supervisors, subordinates, and peers	233	1	7	5.08	1.23	
Enable continual challenge and debate of underlying data, assumptions, and action plans (dropped because of high cross loadings)						
Provide a shared view of the organization	233	2	7	4.91	1.27	
Tie the organization together	233	1	7	4.71	1.36	
Enable the organization to focus on common issues	233	1	7	4.88	1.20	
Develop a common vocabulary in the organization	232	1	7	4.72	1.33	
Involvement	233	−2.6	2.08	0	1	0.61
Higher management pays day-to-day attention to my performance measures	233	1	7	3.30	1.66	
Higher management interprets performance measurement information	233	1	7	4.77	1.38	
BU involvement with PMS information	233	1	7	5.34	1.19	
Strategic Focus	233	−2.68	1.96	0	1	0.84
Signal key strategic areas for improvement	233	1	7	4.56	1.48	
Signal new strategic challenges we need to face	233	1	7	4.34	1.51	
Discuss the impact of changes in the environment	233	1	7	4.51	1.47	

^a The constructs are measured using factor scores. Standardization of these variables yields means of 0 and standard deviations of 1. The statistics of the underlying questionnaire items are unstandardized scores.

(continued on next page)

TABLE 2 (continued)

Panel B: Correlations among Constructs and Validation Questions

Variable/Validation Question	Scale	r	p
Empowerment			
My own initiative determines my managerial agenda.	0–100%	0.19	0.00
Decentralization	1–7	0.49	0.00
Creativity			
How much room do you get at work for creativity?	1–10	0.34	0.00
How important is being creative as a part of your job?	1–5	0.47	0.00
Boundary Control			
Within my organization we confront each other about compliance with behavioral codes that are used within the organization.	1–7	0.57	0.00
How often do you rely on the organization's ethical codes to come up with solutions to problems?	0–100%	0.35	0.00
Diagnostic Control			
Are stock-price-related targets used for your job?	1–5	0.14	0.04
Are returns targets used for your job?	1–5	0.15	0.02
Are profit targets used for your job?	1–5	0.27	0.00
Are revenue targets used for your job?	1–5	0.14	0.03
Are cost targets used for your job?	1–5	0.14	0.04
Are nonfinancial quantitative targets used for your job?	1–5	0.19	0.00
Are qualitative targets used for your job?	1–5	0.13	0.05
Beliefs Control			
To what extent are core values supported within the organization?	1–7	0.65	0.00
How important is proper fit between the core values and new employees during the hiring process?	1–7	0.47	0.00

Empowerment

We measure empowerment with a five-item instrument that assesses the independence and freedom that respondents have in their jobs, i.e., the perception that they can make choices in their work tasks. The first three items are adapted from Hall (2008) and Spreitzer (1995). They capture respondents' perceptions of the extent to which they can control aspects of their job. To broaden the construct, we include two additional questions that ask about the extent to which respondents are allowed to make important decisions and the level of initiative allowed, based on Lambe, Webb, and Ishida (2009) and Hartline and Ferrell (1996). Factor analysis shows that these five items are one-dimensional and together explain 71.7 percent of the variance in the five items. The Cronbach's alpha is 0.90. To buttress the validity of the construct, we correlate empowerment with an additional questionnaire item that asks respondents to assign points to the extent that their managerial agenda is determined by their own initiative. We expect and find a positive correlation ($r = 0.19$; $p < 0.01$) showing that our construct is behaving as expected.

In addition, we measure decentralization using five questions that ask about the BU managers' relative influence in five types of decisions (strategic, investment, marketing, internal processes, and human resources).⁸ Decentralization and empowerment are conceptually related, but factor analysis shows that they load onto separate factors. This is consistent with the theoretical conceptualization of these constructs. Empowerment is about having choices. It is the extent of freedom, independence, and self-determination managers perceive they have when performing daily tasks, whereas decentralization is the extent of influence or power managers have relative to superiors across five key functional areas. The latter captures a more structural element of power and influence between the center and the unit. Nevertheless, empowerment and decentralization are correlated ($r = 0.49$; $p < 0.01$), providing support for the validity of our measurement.

Creativity

Creativity is a self-assessment of respondents' perceptions that they can develop new ideas and devise solutions for problems in their jobs. We measure creativity with five items from Farmer, Tierney, and Kung-McIntyre (2003). Farmer et al.'s (2003) original instrument consists of eight items to measure self-perceptions of creative behavior, specifically among employees with creative and innovative jobs (e.g., engineers, software developers, and research scientists). Our factor analysis

⁸ These five questions load on a single construct. Cronbach's alpha is 0.76.

of the original eight items results in a three-factor solution in which the second and third factors refer to situations where development and change are important. We use the first factor only because it contains the five items that represent more recognizable manifestations of everyday creativity applicable to BU managers. Factor analysis and Cronbach's alpha support this selection; the one-factor solution explains 46.1 percent of the variance in the remaining five items, and the Cronbach's alpha is 0.71. To assess construct validity, we correlate creativity with two additional questionnaire items that ask about the room for (scale of 1 to 10) and importance of creativity within the respondents' job (scale of 1 to 5). Both correlations are positive and significant ($r = 0.34$, $p < 0.01$; $r = 0.47$, $p < 0.01$). Moreover, creativity is also positively and significantly correlated with a three-item measure of the organization's ability to renew its capabilities in response to strategic change ($r = 0.38$; $p < 0.01$), suggesting that creativity at the level of the business unit manager does have organizational consequences.

Boundary Control

We use Widener's (2007) four-item measure of boundary control. This measure asks about the use and effects of the organization's code of business conduct and communication of organizational risks. Factor analysis indicates that the four items form one dimension, with 71.3 percent of the variance explained. Scale reliability is quite acceptable (Cronbach's alpha = 0.87). Although it is a previously validated measure, we also use two additional purpose-developed questions for corroboration. The first of these validation questions asks to what extent employees confront each other about compliance with behavioral codes that are used within the organization (1 to 7 scale). The second validation question asks the respondents to indicate how often they rely on the organization's ethical codes to come up with solutions to problems (percentage ranging from 0 to 100). We expect and find significant positive correlations, which provide evidence that our measure for boundary control is behaving plausibly in our sample ($r = 0.57$ and 0.35 , respectively; $p < 0.01$).

Diagnostic Control

We measure diagnostic control using four items from Henri (2006) and Widener (2007). The items capture the extent to which higher management relies on BU performance measures to monitor and evaluate BU performance. The factor analysis solution explains 65.6 percent of the variance, and Cronbach's alpha (0.83) shows fully acceptable scale reliability. We validate the measure with seven additional survey items that ask about the reliance on seven specific performance targets (e.g., profits, revenues, and nonfinancial performance) used to evaluate the managers' performance (scale of 1 to 5). These questions are taken from Kruis (2008), who uses a modified version of the instrument developed by Bouwens and van Lent (2007). As expected, we find that diagnostic control is positively correlated to each of the seven items, with correlation coefficients ranging from 0.13 to 0.27 (all $p < 0.05$).

Beliefs Control

We use Widener's (2007) four-item measure of beliefs control. This measure captures the communication of the organizations' core values, the extent employees are aware of these values, and how they inspire the workforce. Factor analysis indicates that the four items form one dimension, with 68.6 percent variance explained. Scale reliability is fully adequate (Cronbach's alpha = 0.85). In addition to this previously validated measure, we use two purpose-developed questions for corroboration. These items address the extent to which core values are supported within the organization, and how important proper fit is between the core values and new employees during the hiring process (scales of 1 to 7). We expect and find significant positive correlations ($r = 0.65$ and 0.47 , respectively; significant at $p < 0.01$).

Interactive Control

The fourth control lever is interactive control. Bisbe, Batista-Foguet, and Chenhall (2007, 797) argue that interactive control is a formative construct and define five properties as "(1) an intensive use by top management; (2) an intensive use by operating managers; (3) a pervasiveness of face-to-face challenges and debates; (4) a focus on strategic uncertainties; and (5) a non-invasive, facilitating and inspirational involvement. We capture these properties with a series of items derived from Henri (2006) and Widener (2007), as well as three purpose-developed items, adding to a total of 12 items. We add the purpose-developed items to pick up on the extent to which management uses performance metrics to focus attention on strategy-related issues so as to complement available instruments and to make our measure conceptually complete (in accordance with Bisbe et al. [2007]). The descriptive statistics for the survey items are shown in Table 2. It should be noted that our conceptualization of interactive control focuses on how the organization uses the performance measurement system. This is somewhat more stringent than Simons (1995a), who argues that every lever can be used interactively. The reason for our focus is that the performance measurement system is commonly used across all firms, which makes it particularly suitable for a cross-sectional

analysis. Moreover, we wish to maintain a close connection with prior literature, which also has tended to emphasize the performance measurement system.

Because this construct is comprised of multiple dimensions, we first conduct a factor analysis on the 12 questions, which yields a three-factor solution. After dropping one item because of high cross-loadings, the rotated factor solution⁹ combines five questionnaire items into the first factor (Cronbach's $\alpha = 0.85$) that measures the extent to which performance metrics inspire discussions within the organization and facilitate a shared view of the organization.¹⁰ The second factor measures the reliance of higher management on the BU performance metrics to signal strategic challenges and opportunities (Cronbach's $\alpha = 0.84$). The third factor consists of three items that measure management involvement with performance metrics (Cronbach's $\alpha = 0.61$).¹¹ The total variance explained of the 11 items is 64.9 percent.

To calculate the scores on interactive control, we run a principal components analysis on each of the three underlying dimensions, save the standardized regression scores, and sum.¹² We assess the reliability and the validity of the formative construct through an examination of indicator multicollinearity and significance of regression weights as suggested by Diamantopoulos et al. (2008). The VIFs have values below 1.1, suggesting that multicollinearity is not a problem. All indicators are significant, indicating that they all significantly contribute to the construct (Diamantopoulos and Winklhofer 2001). Table 3 provides more detailed statistics on these analyses.

Intensity of Use of the LoC System

To test our hypotheses, we estimate the effect of the intensity of use of the system of control levers on both empowerment and creativity. We operationalize LoC intensity as a second-order factor that is reflected in four first-order dimensions, i.e., the four levers of boundary, beliefs, diagnostic, and interactive control. The second-order factor, thus, captures the communality of the four levers of control, i.e., the variance that they have in common with LoC intensity as the second-order construct. This communality reflects the extent to which the four levers “move together” in a systematic way. Accordingly, this way of modeling the intensity of use of the LoC system allows us to make inferences about the use of a system of controls, providing direct evidence on our research question.¹³

We include the estimation of the second-order factor in our AMOS model, which is further described in our “Analyses and Results” section. However, to first ensure construct validity, we run a second-order factor analysis as shown in Table 4. All indicators have significant coefficients and the model fit is acceptable.

Common Method Bias

Since we are interested in managers' interpretation of organizational reality as they perceive it, all of our constructs are perceptual (Van der Stede et al. 2005). This is also the case for the dependent variable, i.e., creativity. The reason for this is that we need a generic measure that is relevant in a diverse sample. More objective measures of creativity are often context- or even organization-specific (Shalley, Gilson, and Blum 2009), and do not lend themselves easily to a broader research setting. Employees are a valuable source of information because they have unique knowledge of the subtle things they do in their jobs

⁹ We do not expect the factors to be orthogonal, thus we use principal components with oblimin rotation to estimate the factor analyses and extract all factors with eigenvalues > 1 .

¹⁰ Because the “Inspiration” dimension has been used as a stand-alone operationalization of interactive control in previous literature (Henri 2006), an anonymous reviewer suggested we run a sensitivity analysis that uses only this dimension. The statistical results of this analysis are somewhat stronger and the statistical inferences remain the same.

¹¹ The Cronbach's alphas for management involvement of 0.61 lies below conventional standards. This is not uncommon with two- or three-item scales (Pallant 2010, 97). Pallant (2010) suggests assessing the mean inter-item correlation, which is 0.34. Briggs and Cheek (1986) propose an optimal range of 0.2 to 0.4. Consequently, we use the three items as one factor.

¹² Formative construct measurement is receiving increasing attention in (among others) the psychology, management, and accounting literatures, but still faces numerous potentially problematic issues (Diamantopoulos, Riefler, and Roth 2008, 1204). There are multiple ways that a formative construct can be measured—none without problems (e.g., Bagozzi 2007). We use an index that assumes “that all betas of the observables are fixed to 1” (Wilcox, Howell, and Breivik 2008, 1222).

¹³ A variable can be either reflective or formative depending on the meaning ascribed to it (Wilcox et al. 2008). We assume that firms have constructed a system of controls. The respondents' scores on the individual levers reflect the emphasis on the levers and, when combined into a system, some semblance of balance is achieved in the cross-section of firms (Kruis et al. 2016). However, since we are interested in what happens to creativity and empowerment at different levels of use of the system of control levers, we hold “balance” constant and instead examine the intensity of use of the system as reflected in higher or lower use of the underlying control levers. In contrast, if we were interested in balance and labeled the construct as the balance of the LoC system, then it would have been a formative construct. In this latter specification, a change in the use of any one lever would create or form a new balance. Although we contend that, given the meaning of our construct, it is appropriately measured reflectively, we also compute a formative measure of the LoC system comprised of the sum of all four levers (note that this confounds balance with intensity of use). We find that our statistical inferences are unchanged and that the LoC system is significantly positively associated with empowerment ($p < 0.05$) and creativity ($p < 0.01$). Thus, we conclude that measurement of the LoC system does not affect our statistical inferences.

TABLE 3
Construction and Reliability of Interactive Control

Panel A: Exploratory Factor Analysis and Descriptive Statistics for the First-Order Constructs of Interactive Control

Component	1	2	3
Eigenvalue	3.87	1.97	1.30
Variance Explained (%)	35.2	17.9	11.8
Factor 1: Inspiration			
Enable discussion in meetings of supervisors, subordinates, and peers	0.75	0.16	0.22
Enable continual challenge and debate of underlying data, assumptions, and action plans (dropped for high cross loadings)			
Provide a shared view of the organization	0.79	0.25	0.08
Tie the organization together	0.84	0.16	0.12
Enable the organization to focus on common issues	0.82	0.26	0.16
Develop a common vocabulary in the organization	0.73	0.23	0.30
Factor 2: Involvement			
Higher management pays day-to-day attention to my performance measures	0.03	0.10	0.74
Higher management interprets performance measurement information	0.29	0.34	0.80
BU involvement with PMS information	0.26	0.27	0.68
Factor 3: Strategic Focus			
Signal key strategic areas for improvement	0.15	0.84	0.25
Signal new strategic challenges we need to face	0.27	0.92	0.25
Discuss the impact of changes in the environment	0.26	0.85	0.22

Panel B: Reliability and Validity of Second-Order Formative Construct (Interactive Control)

First-Order Constructs	Standardized Coefficient	Collinearity Statistics (VIF)
Inspiration	0.38***	1.09
Involvement	0.65***	1.03
Strategic focus	0.45***	1.09

*, **, *** Indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively, two-tailed.

that make them creative (Shalley et al. 2009). Using self-reported measures, however, could introduce bias in the answers. This risk, however, is not too large. Previous studies have found a strong correlation ($r = 0.62$) among self-reported measures of creative behavior and superior ratings (Axtell et al. 2000), suggesting that self-reports are a reliable source of information.

To provide further assurance on the suitability of our perceptual measures, we took the following actions. To mitigate common measure bias *ex ante*, we (1) used an ambiguous title for the project, “Control at the Level of the Business Unit Manager,” ensuring that respondents would not anticipate our interest in examining the relations between a system of controls, empowerment, and creativity; (2) used questions with different response formats to validate our constructs (e.g., assignment of points, five-point scales, seven-point scales); (3) informed respondents both verbally and in writing that there were no correct answers; (4) provided for anonymity; and (5) thoroughly pretested the survey instrument to ensure that it was not ambiguous. P. Podsakoff, MacKenzie, Lee, and N. Podsakoff (2003) argue that these steps will help prevent common method bias. *Ex post*, we use an (unreported) exploratory factor analysis on all items underlying the constructs in our study (e.g., Podsakoff and Organ 1986). It yields eight factors with eigenvalues greater than 1. The first factor explains 22 percent of the total variance. The questionnaire items load on the appropriate constructs. In addition to this exploratory factor analysis, we perform Harman’s test using confirmatory factor analysis. Craighead, Ketchen, Dunn, and Hult (2011) argue that this approach is more robust because differences between a one-factor model and the multifactor model can be tested by comparing the fit statistics. The one-factor model yields a χ^2 of 2,654.5 (df 495), whereas the multifactor model returns a χ^2 of 698.2 (df 467). Other fit statistics are also considerably better for the multifactor model, including CFI (0.35 for the one-factor solution versus 0.93 for the multifactor model) and RMSEA (0.14 versus 0.05). In sum, we conclude that the potential for common method bias is low.

TABLE 4
Construction of LoC System
Second-Order Construct—Confirmatory Factor Analysis

First-Order Constructs	Standardized Coefficient
Boundary Control	
Code of conduct defines appropriate behavior for workforce	0.82***
Code of conduct informs workforce about off-limits behavior	0.71***
Organization communicates to workforce risks that should be avoided	0.80***
Workforce is aware of the organization's code of conduct	0.83***
Diagnostic Control	
Higher management uses KPIs to:	
Track progress toward goals	0.73***
Monitor results	0.77***
Compare outcomes to expectations	0.75***
Evaluate performance	0.70***
Beliefs Control	
Mission statement communicates the core values	0.79***
Higher management communicates core values	0.69***
Workforce is aware of core values	0.78***
Mission statement inspires the workforce	0.79***
Second-Order Construct: Intensity of Use of LoC System	
Beliefs Control	0.58***
Boundary Control	0.56***
Diagnostic Control	0.58***
Interactive Control	0.46***
Model Fit:	
χ^2	144.63***
df	62
CMIN/df	2.33
GFI	0.91
CFI	0.94
RMSEA	0.08

*, **, *** Indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively, two-tailed.

ANALYSES AND RESULTS

Our tests are based on the assumption that while firms have constructed a reasonably effective LoC system that will support empowerment and creativity, there still exists cross-sectional variation. Even though some degree of creativity is important for all firms, individual firms will vary with regard to their preference for creativity. For example, a company such as McDonald's Corporation may prefer lower levels of creativity relative to a company such as Apple Inc., which may prefer higher levels of creativity. Even within firms, business units will differ in their preferences for creativity. For instance, Merck & Co., Inc. may prefer low creativity in their production processes, but high creativity in their R&D labs. Thus, it is not true that all creativity is good, and that more creativity is to be preferred over less. [Anderson et al. \(2014\)](#) refer to this misconception as the innovation maximization fallacy, and argue that excessive creativity and innovation may actually be counterproductive to other dimensions of organizational performance. [Grabner \(2014\)](#) makes a similar point when she argues that employees can actually be too creative, and [Gilson et al. \(2005\)](#) point out that creative processes are time consuming and require considerable cognitive effort, which may well come at the expense of employees' attention to other valuable tasks. [Kachelmeier et al. \(2008\)](#) provide experimental evidence to support such substitution effects, and their findings indicate that prioritizing creativity substantially impairs productivity more generally. Thus, there is not one optimal solution for all firms, and it is reasonable to expect variation in a sample of firms.

The correlation matrix is presented in Table 5. Given the results of the second-order factor analysis reported in Table 4, it should come as no surprise that all four control levers are significantly positively correlated. Although varying levels of

TABLE 5
Correlation Matrix

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
1: Creativity	0.68					
2: Empowerment	0.27***	0.85				
3: Boundary Control	0.10	0.01	0.85			
4: Diagnostic Control	0.16**	0.09	0.29***	0.81		
5: Beliefs Control	0.20***	0.10	0.35***	0.20***	0.83	
6: Interactive Control	0.19***	0.17**	0.14**	0.33***	0.26***	NA

*, **, *** Indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively, two-tailed.

Listwise $n = 233$.

The table contains the bivariate inter-item correlation coefficients between the variables in our main analysis. For all variables, except interactive control, the diagonal contains the squared root of AVE. As a formative construct, Interactive Control is calculated as a summated scale, and AVE is not a meaningful statistic for this variable.

emphasis are placed on each individual control lever, they do move together in a systematic positive pattern—at least partially. The correlations are, however, low enough not to prompt multicollinearity concerns.

As expected, empowerment and creativity are also significantly positively correlated. The results also show that three (out of four) control levers are significantly positively correlated with creativity. The only exception is boundary control, which appears to be uncorrelated with creativity. These correlations should be interpreted with care, however, since this is only a bivariate analysis.

Table 5 also provides evidence on discriminant validity. Because the square root of the average variance extracted (AVE) is consistently higher than the bivariate correlations between the exogenous variables in the analysis, discriminant validity is ensured (Fornell and Larcker 1981).

For the multivariate analysis, we use maximum likelihood (ML) estimation in IBM's SPSS Amos 20.¹⁴ Due to a sample size of 233 observations, the constructs (except for the intensity of use of the LoC system) are treated as manifest variables,¹⁵ using the factor scores as weights. The measurement of the intensity of use of the LoC system is included in the estimation, as shown in Figure 1. In Table 6, Panel A we report the standardized weights for the structural model, as well as the second-order reflective construct that captures the intensity of use of the LoC system. The results show that all four control levers (beliefs, boundary, diagnostic, and interactive controls) load positively and significantly on the second-order factor. These positive and significant coefficients indicate that the LoC system is comprised of the four control levers working together in a supportive way. As visualized in Figure 2, an increase (decrease) in the intensity of use of the LoC system is reflected in (proportional) increases (decreases) in each of the four control levers, with the largest effect occurring in the beliefs control lever, although they are all relatively comparable (the standardized coefficients range from 0.49 to 0.54).

The goodness-of-fit statistics generally indicate an adequate fit to the data (see Table 6, Panel A). GFI and CFI surpass the acceptable fit level of 0.90, and the RMSEA is also better than the rule-of-thumb value of 0.08 (Browne and Cudeck 1993). Since VIF scores cannot be calculated in AMOS, we obtain them by estimating two alternative models in OLS. These models incorporate the full set of variables included in the structural equation model (i.e., the four control levers, empowerment, and creativity), with either creativity or empowerment as the dependent variable, thus providing information on the multicollinearity among the full set of variables. We found no evidence of multicollinearity (all VIFs < 1.25).

The results provide support for H1 and H2. We predict that the intensity of the use of the LoC system is positively related with creativity, both via empowerment (H1) and directly (H2). Consistent with these predictions, we find a significant positive association between the intensity of use of the LoC system and both empowerment ($p < 0.10$) and creativity ($p < 0.01$), whereas empowerment is positively related to creativity as well ($p < 0.01$). We also test whether empowerment actually mediates the effect of the LoC system on creativity. In untabulated tests, we find that the direct effect of the intensity of the use

¹⁴ Multivariate kurtosis is 10.04, just higher than the 10.0 cutoff recommended by Byrne (2001). Therefore, we also run a model with bootstrapping (Byrne 2001). We find that our statistical results are unchanged. Furthermore, in an untabulated robustness test, we test the measurement and structural model using a partial least squares approach, which does not assume a normal distribution; the statistical inferences are again unchanged.

¹⁵ This technique is used when working with small sample sizes since it reduces the number of parameters that are estimated, thus accommodating smaller samples. In our base model, we estimate 13 parameters with 233 observations (1:17.9), which well exceeds the rule of thumb to have a ratio of at least 1:5 parameters estimated to observations. In the joint measurement and structural model we estimate 52 parameters with 233 observations (1:4.5), which is slightly less than desired. Thus we present the latter model as a robustness test in Table 7 (Model 4).

TABLE 6
Structural Model

Panel A: Structural Model Results

DV or Second-Order Construct	IV or Indicator Variable	Model 1 Base Model Levers as a System			Model 2 Unbundled Levers	Model 3 Unbundled Levers (Correlated)
		Hypothesis	Expected Direction	Standardized Coefficient	Standardized Coefficient	Standardized Coefficient
Intensity of LoC	Boundary Control		+	0.49***		
Intensity of LoC	Diagnostic Control		+	0.53***		
Intensity of LoC	Beliefs Control		+	0.54***		
Intensity of LoC	Interactive Control		+	0.50***		
Creativity	Intensity LoC	H2	+	0.28***		
Empowerment	Intensity LoC	H1	+	0.18*		
Creativity	Empowerment	H1	+	0.22***	0.23***	0.23***
Creativity	Boundary Control				0.01	0.01
Creativity	Diagnostic Control				0.07	0.07
Creativity	Beliefs Control				0.14**	0.14**
Creativity	Interactive Control				0.09	0.09
Empowerment	Boundary Control				−0.05	−0.06
Empowerment	Diagnostic Control				0.05	0.06
Empowerment	Beliefs Control				0.07	0.07
Empowerment	Interactive Control				0.14**	0.13*
n				233	233	233
χ^2				17.63**	89.54***	12.11**
df				8	6	5
CMIN/df				2.20	14.92	2.42
GFI				0.98	0.87	0.99
CFI				0.94	0.25	0.94
RMSEA				0.07	0.25	0.08
R ²				0.15	0.10	0.12

Panel B: Standardized Indirect and Total Effects on Creativity

	Model 1 Levers as a System		Model 2 Unbundled Levers		Model 3 Unbundled Levers (Correlated)	
	Indirect	Total	Indirect	Total	Indirect	Total
Intensity of LoC	0.04**	0.32***				
Boundary Control			−0.01	0.00	−0.01	0.00
Diagnostic Control			0.01	0.08	0.01	0.09
Beliefs Control			0.02	0.15**	0.02	0.15**
Interactive Control			0.03*	0.13	0.02*	0.12

*, **, *** Indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively, two-tailed.

of the LoC system on creativity is 0.32, which decreases to 0.28 when empowerment is included as a mediator. In accordance with guidance given by Baron and Kenny (1986), this result suggests that empowerment partially mediates the relation between the intensity of the use of the LoC system and creativity. Also, the indirect effect is significantly different from 0 ($p < 0.05$; see Table 6, Panel B).¹⁶ These results are consistent with Simons's argument (Simons 1995a, 2000) that the four controls together

¹⁶ We use bootstrapping (2,000 samples), with bias-corrected confidence intervals.

FIGURE 2
Varying Intensity of LoC System Use

create a dynamic tension that fosters empowerment and creativity. The LoC system of controls has both a direct effect on creativity and influences creativity indirectly through empowering the employees. Taken together, these results suggest that indeed, paradoxically, creativity and control can coexist.

To buttress our interpretation that it is really the system (as opposed to the individual levers) that drives the results, we examine the error terms of the second-order factor analysis that we use to model the intensity of the use of the LoC system. As discussed earlier, all four levers load significantly on the second-order construct that expresses the intensity of the LoC system's use. This second-order construct extracts about 26 percent on average of the variance of the four levers of control as its first-order dimensions.¹⁷ Accordingly, a considerable part of the underlying variance is parceled out in the error terms, isolating it from the structural relationships in the model. To analyze the effects of this "unused variance," we calculate the error terms associated with the levers of control in our base model (i.e., Model 1 reported in Table 6).¹⁸ We subsequently regress creativity

¹⁷ The usual rule of thumb holds that a factor should only replace its indicators in an analysis if the factor extracts at least 50 percent on average of the variance of its indicators. Our purpose here, however, is quite different. We apply a second-order factor analysis to determine the part of the variance of the four levers that they have in common so as to identify the intensity of use of the LoC system. Because the emphasis on individual levels in business units may be driven by other causes than the need to construct a system, we have no prior expectations regarding the amount of communality, and the fact that, apparently, the LoC system construct accounts for "only" 26 percent of the average variance is no reason for concern.

¹⁸ Because AMOS does not provide the option to save these error terms, we calculate them in SPSS, using the factor score coefficients to predict the scores on the levers from the intensity of use of the LoC system.

on the four error terms (while controlling for the intensity of use of the LoC system) and find no significant effects. This supports our argument that the positive effect of management control must be ascribed to the system rather than the individual components.

To further examine our conclusion that a systems approach to the LoC framework is appropriate, we estimate the effects of the four control levers, *individually*, on both empowerment and creativity. We report on this analysis in the last two columns of Panel A of Table 6 (Models 2 and 3; unbundled levers). In Model 3, we allow the four levers to be correlated, whereas Model 2 examines the relationships without taking possible correlations between the levers into account. In both these alternative models, we find that interactive control is significantly positively associated with empowerment ($p < 0.05$ and $p < 0.10$ for Models 2 and 3, respectively), and that beliefs control and empowerment are both significantly positively associated with creativity ($p < 0.05$ and $p < 0.01$, respectively, in both models). The explanatory power of these alternative models, however, is lower than our base model in which we take in the effects of the four levers as a system (15 percent in Model 1 as opposed to 10 percent and 12 percent in Models 2 and 3, respectively). We then examine the indirect effects on creativity.¹⁹ In both Models 2 and 3, interactive control appears to have a significant effect on creativity through empowerment ($p < 0.10$), but the total effect (i.e., the combined direct and indirect effect) is not significant (see Table 6, Panel B). The only significant total effect on creativity we observe in these alternative models is for beliefs control. This effect is much smaller, however, than the total effect of the use of the LoC system on creativity (0.15 versus 0.32, respectively), supporting our conclusion that a systems approach is appropriate when trying to sort out the relation between control and creativity. Also consistent with this interpretation is the change in fit between Models 2 and 3, whereas Model 3 fits the data quite decently, the fit statistics of Model 3 are clearly unacceptable. Because the only difference between these models is that in Model 3 the levers are allowed to correlate, while Model 2 constrains the levers to be orthogonal, this change in fit is indicative of the importance of shared variance between the levers.

Finally, we run an (untabulated) OLS model containing all conceivable two-way, three-way, and four-way interactions between the levers (plus the direct effects of these levers and the direct effect of empowerment). In line with our claim that a systems perspective is appropriate, we find that the four-way interaction between the levers is significantly and positively related to creativity.

Robustness Tests

To ensure that our results are robust to alternative specifications and the inclusion of control variables, we run a series of models and compare the results to the base model specification presented in Table 6. The results of these alternative models are reported in Table 7.

To gain full benefit from using a structural equation model, a joint measurement and structural model is necessary as this allows for the inclusion of measurement error in the estimation process. Due to constraints on sample size, we treated the variables in our base model as manifest, effectively only running a structural model. However, Model 4 shows that a well-fitting model is obtained when the joint measurement and structural model are run. Importantly, the results of Model 4 show that the base model results are robust.

In Model 5, we control for several contingency factors that have been shown to affect the design and use of the management control system (e.g., [Chenhall 2003](#)): information asymmetry, strategy, decentralization, BU size, firm size, and potential industry effects. We measure information asymmetry using six questions from [Dunk \(1993\)](#) that capture the relative information advantage the BU manager has in various aspects of the BU. This construct is unidimensional and has an alpha of 0.86. The measure of decentralization was described earlier. To measure business units' strategic priorities, we apply the instrument developed by [Chenhall \(2005\)](#) based on the work of [Miller, Meyer, and Nakane \(1992\)](#). The analysis returns three factors that deviate somewhat from [Chenhall's \(2005\)](#) prior solution, but that are interpretable as representing a low-cost low-price strategy (Cronbach's alpha = 0.66), a differentiation strategy (Cronbach's alpha = 0.62), and a strategy emphasizing delivery and service (Cronbach's alpha = 0.59), respectively. We measure BU size and firm size using the log of fulltime equivalent employees for the BU and the firm, respectively. We do not find a significant relation between information asymmetry, firm size, or industry dummies with creativity; however, we do find that firms that pursue a differentiation strategy report higher levels of creativity ($p < 0.01$) and that decentralization is positively associated with creativity ($p < 0.01$). Also, we find that BU size is negatively associated with creativity ($p < 0.01$). Inferences regarding the hypothesized relations between control, empowerment, and creativity from our base model are, however, unchanged.

Some of our observations come from relatively small firms. In smaller firms, formal controls may be less important and may affect behavior differently. To examine whether our results are influenced by this characteristic of our sample, we rerun the

¹⁹ We (again) use bootstrapping (2,000 samples), with bias-corrected confidence intervals.

TABLE 7
Alternative Model Specifications

DV or Second-Order Construct	IV or Indicator Variable	Base Model (Table 6)	Model 4	Model 5	Model 6	Model 7
Intensity of LoC	Boundary Control	0.49***	0.52***	0.49***	0.49***	0.47***
Intensity of LoC	Diagnostic Control	0.53***	0.58***	0.52***	0.45***	0.58***
Intensity of LoC	Beliefs Control	0.54***	0.59***	0.55***	0.57***	0.45***
Intensity of LoC	Interactive Control	0.50***	0.50***	0.49***	0.42***	0.57***
Creativity	Intensity of LoC	0.28***	0.33***	0.23***	0.25**	0.36**
Empowerment	Intensity of LoC	0.18*	0.18*	0.18*	0.16	0.22*
Creativity	Empowerment	0.22***	0.29***	0.19***	0.24***	0.11
Control Variables						
Creativity	Decentralization			0.26***		
Creativity	Information Asymmetry			−0.05		
Creativity	Low Cost-Low Price			0.02		
Creativity	Differentiation			0.26***		
Creativity	Delivery and Service			0.06		
Creativity	BU Size (FTE)			−0.17***		
Creativity	Firm Size (FTE)			0.01		
Creativity	Construction			0.01		
Creativity	Finance, Insurance, and Real Estate			0.05		
Creativity	Manufacturing			0.04		
Creativity	Retail Trade			0.12		
Creativity	Services			0.08		
Creativity	Transportation, Communications, and Utilities			0.15*		
n		233	233	233	198	136
χ^2		17.63**	388.21***	215.20***	14.78*	16.26**
df		8	224	73	8	8
CMIN/df		2.20	1.73	2.948	1.85	2.03
GFI		0.98	0.87	0.92	0.98	0.96
CFI		0.94	0.93	0.80	0.92	0.88
RMSEA		0.07	0.06	0.09	0.07	0.09

*, **, *** Indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively, two-tailed.

Model 4: A joint measurement and structural model. The structural model is presented; the measurement model is available upon request.

Model 5: Controls for environmental characteristics, strategy, and industry are included. For six observations, we imputed mean scores to replace missing values for one or two of the contingency variables.

Model 6: Excludes smaller firms with less than 250 employees. This costs us 35 observations.

Model 7: Includes no more than one observation per firm. This costs us 97 observations.

analysis, excluding firms with less than 250 employees. This costs us 35 observations and the remaining sample size is 198. The results of this analysis (Model 6 in Table 7) are similar to Model 5, except for the relationship between control and empowerment, which becomes marginally insignificant ($p = 0.11$). Our other substantive results remain qualitatively the same as in our base model (and as in Model 5). Finally, we rerun the analysis with only single observations per firm (Model 7). The original sample includes 46 firms with two or more BUs in the sample. From this group of firms that occurred more than once in our sample, we randomly select a single observation per firm, and delete the unselected observations. For 41 other observations, we have insufficient information to identify the firm to which they belong.²⁰ We delete these as well, and are left with 136 observations. The results do not support the existence of a relationship between empowerment and creativity ($p = 0.22$), but the remainder of our inferences are not affected. In sum, we conclude that our results are fairly robust, except for the relationship between empowerment and creativity. This relationship however, is only marginally insignificant in one-tailed analyses. In smaller samples, this would seem an acceptable concession to make.

²⁰ To ensure anonymity, respondents were given the option not to provide any information that would allow us to identify them. Most respondents provided such detail nonetheless.

CONCLUSION

Creativity is an important driver of success for organizations competing in today's knowledge-based, uncertain, and highly competitive market (Zhou and George 2003). Twenty years ago, Simons (1995a, 1995b) proposed that organizations needed a new and different type of control in order to empower employees and facilitate creative thought and innovative activities. While the social psychology and organizational behavior literatures (e.g., Zhou and George 2003) acknowledge that control is necessary to ensure that organizations are working efficiently and effectively, a commonly held belief is that control may impede creativity. The objective of this study is to bring Simons's (1995a, 1995b) framework to bear on the intersection between control and creativity, and take the next step in understanding the relationship between control and creativity by examining a system of control.

Our study has several findings with important implications. First and foremost, we empirically establish that creativity and a system of control can coexist. Moreover, we show how they can coexist. When managers implement a system consisting of beliefs, boundary, diagnostic, and interactive control, they can have both creativity and control. For practice, the implication is that managers do not need to make a tradeoff between encouraging creativity and having adequate control. Instead, managers can implement a system of controls that creates an information rich environment ripe for creative thought while still maintaining control. The results imply that (within our range of data) managers who desire more creativity can increase their emphasis on the system of control, thus encouraging and inspiring employees to pursue more creative action choices, while also providing the necessary structure for the creativity to flourish. In contrast, if managers desire less creativity, then they can reign in their emphasis on the control system and de-emphasize the autonomy support, structure, and information-exchange environment that influence creativity.

For theory, this finding adds to the extant literature that examines singular controls and creativity (e.g., Shalley et al. 2000; Gilson et al 2005). Koestner et al. (1984) argued that it is how the controls are presented that matters. We document evidence consistent with the proposition that beliefs and interactive control provide autonomy support while boundaries and diagnostic control provide structure. Together, it appears that the system of controls communicates to employees that they have choices in the performance of their work tasks; thus, creativity is positively affected through empowerment (Ambrose and Kulik 1999). Moreover, we find that the LoC system provides the organizational support needed to directly facilitate creativity, and that the system of controls provides valuable information viewed as encouraging and inspirational instead of restrictive and controlling. In sum, our results suggest that the LoC provides information that (1) signals to employees the problems, issues, and/or opportunities that need creative action, (2) motivates, encourages, and inspires employees to take actions, and (3) allows employees the freedom to be creative within specified boundaries.

Our study uses a convenience sample of business unit managers and survey data. Although convenience samples are frequently used and can be valuable for obtaining variation in the variables of interest (Van der Stede et al. 2005), they also may impede generalizability. We have no indication that our convenience sample is biased, however. Moreover, the purpose of the study is to test theory and, thus, a sample must be relevant, but not necessarily random. Nevertheless, caution must be taken when generalizing the results. The use of a survey allows us to gather perceptions of business unit managers, which is our interest (Van der Stede et al. 2005). We took steps to minimize noise and bias in our measurement; and based on diagnostics of our measures have no expectations that our measures are biased. However, surveys undoubtedly contain noise and thus the results should be interpreted with this in mind.

One interesting direction for future research is to examine the intersection of leadership style and control. The literature shows that different leadership styles (e.g., characterized as transformational versus transactional) have different effects on creativity (Haq et al. 2010). In fact, Haq et al. (2010) conclude that transactional leadership styles impede creativity. Shalley et al. (2004) make a similar point. It would be interesting to determine whether the use of the LoC system is positively associated with creativity in the presence of different leadership styles. For example, it could be that firms configure their system of control differently depending on the type of leadership, and the relation between the intensity of use of the LoC system and creativity may well remain positive under different leadership styles. Conversely, perhaps the use of a control system configured to fit with a transactional leader may have a less positive or perhaps even negative association with creativity. Another future direction could integrate incentives with the LoC. A common conclusion is that rewards either have no relation with creativity, or even impede it. Shalley et al. (2004) summarize the empirical findings as being inconclusive. Our study is set in The Netherlands, which relies less on incentive compensation as compared to, for example, the U.S. (Jansen, Merchant, and Van der Stede 2009). It would be interesting to determine whether a LoC system can still generate the dynamic tension necessary to produce an environment characterized by creativity in the presence of higher levels of incentive compensation.

In closing, we would emphasize that extant literature holds that a conflict may exist between creativity and control. We, however, find it to be a paradox since our results show that creativity is enhanced in the presence of a system of controls. Firms are able to structure their LoC system so as to foster empowerment and creativity.

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