1-1-2014

The Hidden Costs of Being Highly Interested

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The Hidden Costs of Being Highly Interested

Abstract
Intrinsic motivation is widely viewed as a major force behind performance and creativity, and much scholarly attention has been paid to the positive effects of intrinsic motivation. However, while existing research has examined how intrinsic motivation in one task affects performance in that task, little research has examined how intrinsic motivation in one task affects performance in one's other tasks in a multiple-task environment. This is an important question as workplaces are increasingly becoming a multiple-task environment where one task's dynamics are influenced by another task's dynamics. In this dissertation, I explore the nature of the cross-task effects of intrinsic motivation. The main hypothesis is that intrinsic motivation in one task has a curvilinear relationship with performance in one's other tasks such that when intrinsic motivation in the focal task is medium, it helps performance in one's other tasks whereas when intrinsic motivation in the focal task is high, it hurts performance in one's other tasks. Under medium intrinsic motivation in the focal task, spillover of energy savings and positive affect prevails between the focal task and other tasks, but under high intrinsic motivation in the focal task, contrast and goal shielding effects prevail blocking the motivation and attention for the other tasks. Across three studies (one laboratory experiment and two field studies), I find that intrinsic motivation in a task indeed has curvilinear effects on performance in one's other tasks as well as overall performance variance across tasks, especially with high polychronicity. The theory and findings of this dissertation enhance our understanding of the complexities of intrinsic motivation and advance knowledge about motivation and performance management.

Degree Type
Dissertation

Degree Name
Doctor of Philosophy (PhD)

Graduate Group
Management

First Advisor
Adam M. Grant

Keywords
intrinsic motivation

Subject Categories
Business Administration, Management, and Operations | Management Sciences and Quantitative Methods

This dissertation is available at ScholarlyCommons: http://repository.upenn.edu/edissertations/1441
THE HIDDEN COSTS OF BEING HIGHLY INTERESTED

Jihae Shin

A DISSERTATION

in

Management

For the Graduate Group in Managerial Science and Applied Economics
Presented to the Faculties of the University of Pennsylvania

in

Partial Fulfillment of the Requirements for the
Degree of Doctor of Philosophy

2014

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ACKNOWLEDGEMENTS

I am grateful to Adam Grant for his advice, feedback, and guidance. Adam helped me identify the right idea among many, helped me develop the idea through countless rewrites of the proposal, and helped me design the studies to test my idea. Adam was the enabler of every and any progress that I made in this dissertation.

I am grateful to Katy Milkman, Nancy Rothbard, and Sigal Barsade for their comments. Katy provided thorough and detailed feedback on all of my drafts, Nancy identified the weak spots of my logic, and Sigal let me know what are the issues to be resolved to strengthen my theory.

I am grateful to Mom, Dad, Jiyoung, Grandma, Grandpa, Aunt Jinjoo, Uncle Sungdo, Dr. Hahn, and Jeongwha for their support. Mom would send me care packages from Korea that helped me survive through the busy days of writing and running experiments and Dad was always there to talk through my ideas on Skype. My sister, Jiyoung’s love and support were behind every page of this dissertation. Hearing Grandma, Grandpa, Aunt Jinjoo, and Uncle Sungdo’s voice through the phone always cheered me up and gave me additional motivation toward the finish line. Dr. Hahn sent me encouraging emails and Jeongwha sent me warm texts that brightened my days.

I am thankful to Elisa, Racheli, Shinjae, Hengchen, Kinde, and Boris for coffees, lunches, and laughs. I am also thankful to Katherine, Laura, Samir, and Drew for their feedback on my presentation, Dr. Lee at Seoul National for his advice and help on my field studies, and I greatly appreciate the valuable comments and supportive emails from the PhD students at Wharton.
ABSTRACT

THE HIDDEN COSTS OF BEING HIGHLY INTERESTED

Jihae Shin

Adam M. Grant

Intrinsic motivation is widely viewed as a major force behind performance and creativity, and much scholarly attention has been paid to the positive effects of intrinsic motivation. However, while existing research has examined how intrinsic motivation in one task affects performance in that task, little research has examined how intrinsic motivation in one task affects performance in one’s other tasks in a multiple-task environment. This is an important question as workplaces are increasingly becoming a multiple-task environment where one task’s dynamics are influenced by another task’s dynamics. In this dissertation, I explore the nature of the cross-task effects of intrinsic motivation. The main hypothesis is that intrinsic motivation in one task has a curvilinear relationship with performance in one’s other tasks such that when intrinsic motivation in the focal task is medium, it helps performance in one’s other tasks whereas when intrinsic motivation in the focal task is high, it hurts performance in one’s other tasks. Under medium intrinsic motivation in the focal task, spillover of energy savings and positive affect prevails between the focal task and other tasks, but under high intrinsic motivation in the focal task, contrast and goal shielding effects prevail blocking the motivation and attention for the other tasks. Across three studies (one laboratory experiment and two field studies), I find that intrinsic motivation in a task indeed has curvilinear effects on performance in one’s other tasks as well as overall performance variance across tasks,
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CHAPTER 1
INTRODUCTION

“Perhaps no single phenomenon reflects the positive potential of human nature as much as intrinsic motivation, the inherent tendency to seek out novelty and challenges, to extend and exercise one’s capacities, to explore, and to learn.”

– Psychologists Richard Ryan and Edward Deci (in Ryan & Deci, 2000, p.70)

Intrinsic motivation refers to the psychological state where one’s actions and intentions are driven by pleasure and enjoyment inherent in an experience (Brief & Aldag, 1977; Ryan & Deci, 2000). Intrinsic motivation at work is widely recognized as an important source of work performance by researchers and practitioners (Gagné & Deci, 2005; Hackman & Oldham, 1976; Pink, 2010). When workers find their work interesting and enjoyable, it increases performance by enhancing the quality of their work, the quantity of work completed, and persistence on the work. The inherent interest and enjoyment attract natural focus, care, and attention-to-detail, helping workers achieve higher quality results (Vallerand & Ratelle, 2004). The pleasure and vitality created during the work lower the rate of energy drain, enabling workers to work longer hours with heightened intensity (Gagne & Deci, 2005; Tice, Baumeister, Shmueli, & Muraven, 2007; Vallerand, Fortier, & Guay, 1997). Furthermore, intrinsic rewards are accessible as long as one engages in the work, enabling intrinsically motivated workers to maintain
their efforts even in the absence of extrinsic rewards or through the fluctuations in them (Vallerand, 1997). In addition to having these general benefits for work performance, intrinsic motivation is thought to play an especially important role for tasks that involve creativity (Amabile, 1985; Grant & Berry, 2011), as it increases positive affect, cognitive flexibility, and risk-taking tendencies that are proven to be beneficial for creativity (Amabile, 1996; Amabile, Barsade, Mueller, & Staw, 2005; Shalley, Zhou, & Oldham, 2004).

While the existing body of research on intrinsic motivation offers ample evidence of its positive effects on work performance, it may fall short of depicting the full dynamics of intrinsic motivation and work performance in the contemporary work environment. More specifically, while existing research shows how intrinsic motivation in a task enhances performance in that task, little research has examined how intrinsic motivation in a task affects performance in one’s other tasks in a multiple-task environment. Lab studies on intrinsic motivation have examined the effects of intrinsic motivation in a single task on the performance in that task (e.g., Amabile, 1979; Amabile, 1986; for a review, see Deci, Koestner, & Ryan, 1999) ignoring the possibility that there could be other tasks whose performance can be affected by the focal task. Field studies on intrinsic motivation have examined the effects of job-level intrinsic motivation on job-level performance (Burton, Lydon, D’Alessandro, & Koestner, 2006; Dewett, 2007; Grant, 2008; Kuvaas, 2006) failing to reflect the reality that a job is comprised of multiple tasks with varying levels of intrinsic motivation and performance. Therefore, existing research
cannot really answer the question of ‘what is the nature of the cross-task effects of intrinsic motivation?’

From both theoretical and practical perspectives, it is important to understand the cross-task effects of intrinsic motivation in a multiple-task environment. In organizations, the number and diversity of tasks that make up jobs are expanding (Ashford & Northcraft, 2003); work is increasingly done on a project-to-project basis (Sydow, Lindkvist, & DeFillippi, 2004), jobs are becoming more complex with diverse dimensions (Man & Lam, 2003), and many people are now working independently as free agents who often play multiple roles themselves for their own businesses (i.e., entrepreneurs, consultants and designers) (Ashford, George, & Blatt, 2007; Pink, 2002). Furthermore, the fast-paced nature of the contemporary work environment requires workers to work on their multiple tasks simultaneously or in overlapping time frames. Not only is there the need to work on one’s multiple and diverse tasks at the same time, the advanced information technology has made it possible to work on them at the same time. Workers do not have to be in a lot of different places for different tasks, rather many of them can work on their multiple and diverse tasks without leaving their computers. In this increasingly multiple-task environment, the within-task effects of intrinsic motivation would only be a part of the story. How would being intrinsically motivated toward a task affect performance in one’s other tasks in this multiple-task environment? This is the main research question that I seek to address in my dissertation. Exploring the answer to this question (exploring the cross-task effects of intrinsic
motivation) will allow us a more complete picture of intrinsic motivation-performance
dynamics in the contemporary multiple-task environment.

There is a reason to believe that this cross-task influence of intrinsic motivation is
potentially negative – or at least more complex than just uniformly positive as in within-
task effects. Magni and colleagues (2013) have recently found that high cognitive
absorption, while emphasizing focus on the current action, can lead individuals to detach
themselves from the contextual environment they are in, resulting in lower individual
learning. This research suggests the possibility that high intrinsic motivation, which
would prompt deep cognitive absorption in the high intrinsic motivation task itself, can
psychologically detach workers from their other less enjoyable tasks making them
neglect those other tasks. Furthermore, research on attention residue provides empirical
support for the idea that high engagement in a task can lead to difficulties in performing
one’s other tasks. For example, Leroy (2009) found that people needed to stop thinking
about their prior task in order to fully switch attention to their subsequent tasks. Since
intrinsic motivation at a high level may cause individuals to keep thinking about the high
intrinsic motivation task during other tasks, high intrinsic motivation in a task may be
linked to difficulties in performing one’s other less enjoyable tasks. In addition, anecdotal
clues on absent-minded professors and scientists are widely available, describing the
phenomenon that when individuals are deeply into something, they become very absent-
minded in other aspects of life, again raising the possibility that high intrinsic motivation
experience can reduce performance in one’s other less enjoyable tasks.
While recent research on cognitive absorption and attention residue as well as anecdotal clues suggest the possible negative link between high intrinsic motivation in one task and performance in one’s other tasks, this potential negative link has not been theoretically developed or systematically examined. Furthermore, it has not been examined how this potential negative effect would interact with potential positive cross-task effects of intrinsic motivation (i.e., spillover of energy savings and positive affect).

In this dissertation, I review relevant research suggesting the positive and negative cross-task effects of intrinsic motivation and explore the nature of overall cross-task effects of intrinsic motivation.

In order to examine how intrinsic motivation in one task affects performance in one’s other tasks in a multiple-task environment, I take a step-by-step approach in my theorizing. First, I examine the cross-task effects of intrinsic motivation in a simple two-task environment (i.e., where there is one focal task whose intrinsic motivation varies and there is another task whose performance is influenced by the focal task’s intrinsic motivation). Next, I examine the cross-task effects of intrinsic motivation in a more complex multiple-task environment where there are more than two tasks (i.e., where there is one focal task whose intrinsic motivation varies and there are two or more other tasks whose performance is influenced by the focal task intrinsic motivation). Finally, I identify the critical moderating conditions that would strengthen the cross-task effects of intrinsic motivation: polychronicity and task relatedness.

As a preview of my hypotheses, I propose that intrinsic motivation in one task has a curvilinear relationship with performance in one’s other task in a two-task environment.
More specifically, as intrinsic motivation in one task goes from low to medium, it helps performance in one’s other task(s). However, as intrinsic motivation in one task goes from medium to high, it hurts performance in one’s other task(s). In other words, the positive spillover effects of additional intrinsic motivation prevail at low to medium levels of intrinsic motivation, while the negative contrast and goal-shielding effects of additional intrinsic motivation prevail at medium to high levels of intrinsic motivation. As for a multiple-task environment where there are more than two tasks, I propose that intrinsic motivation in one task has a curvilinear relationship with performance variance across one’s tasks. As intrinsic motivation in one task goes from low to medium, it decreases performance variance across one’s tasks by enhancing performance in the focal task and one’s other tasks. However, as intrinsic motivation in one task goes from medium to high, it increases performance variance across one’s tasks by enhancing performance in the focal task while reducing performance in one’s other tasks.

The key contributions of my theory are that i) I explain why the cross-task effects of intrinsic motivation reverse in direction as it goes from low to high and that ii) I identify when the curvilinear effects are more pronounced versus less pronounced. My theory is differentiated from existing research in psychology and organizational behavior that viewed intrinsic motivation as always having positive effects on performance and my theory is also differentiated from existing research in economics and organizational behavior that viewed additional motivation toward a goal as generally having detrimental effects on the pursuit of other goals. In my dissertation, I propose and find that the effects of intrinsic motivation on performance outcomes are more complex than just uniformly
positive, and I also propose and find that additional motivation in a task can have beneficial effects on performance in other tasks.

I test my hypotheses with a combination of a laboratory experiment (Study 1) and two field studies (Study 2 and 3). In Study 1, a laboratory experiment, I utilize a two-task design to test the curvilinear hypothesis and facilitate causal inference. I vary the intrinsic motivation level of the first task (low, medium, and high) and hold the second task constant to see the cross-task effects of intrinsic motivation on performance in the second task. In Study 2, a field study at a Korean department store, I examine the hypothesized curvilinear effects of intrinsic motivation on performance outcomes (minimum performance and performance polarization). In Study 3, a field study at a Korean furniture store, I examine the curvilinear effects of intrinsic motivation with the hypothesized moderators, polychronicity and task relatedness. The results from the three studies support the curvilinear cross-task effects of intrinsic motivation and the negative effects of high intrinsic motivation on performance outcomes in a multiple-task environment. In the lab study (Study 1), medium intrinsic motivation in the first task leads to higher performance in the second task compared to low intrinsic motivation in the first task or high intrinsic motivation in the first task, supporting the curvilinear cross-task effects of intrinsic motivation. In the field study at a Korean department store (Study 2), intrinsic motivation in the most enjoyable task has a curvilinear relationship with minimum performance and performance polarization, again supporting the curvilinear cross-task effects of intrinsic motivation. In the field study at a Korean furniture company (Study 3), intrinsic motivation in the most enjoyable task has a curvilinear relationship
with performance in the least enjoyable task, as well as performance in all other tasks, only when polychronicity is high, providing support for one of my moderation hypotheses.

By looking at the effects of intrinsic motivation in a multiple-task environment, this dissertation contributes to research on motivation and performance management. First, this research provides theory and empirical evidence that high intrinsic motivation can have negative effects on performance, thereby challenging and complementing the existing view that intrinsic motivation has uniformly positive effects. Second, this research provides theory on the nature of cross-task effects of intrinsic motivation (in addition to the well-known within-task effects of intrinsic motivation), allowing a more complete understanding of intrinsic motivation-performance dynamics in the contemporary multiple-task environment. Third, this research provides theory on when additional motivation toward one task can positively influence the pursuit of other tasks, thereby challenging and complementing the existing view that higher motivation toward one goal means lower performance in one’s other goals. Fourth, this research illuminates the psychological mechanisms through which performance in one task can be influenced by intrinsic motivation in other tasks, enriching our understanding of the inter-task dynamics in multiple-task environments. Fifth, this research operationalizes performance at the task-level and introduces the notion of performance polarization, providing a useful lens for scholarly investigations of performance in multiple-task environments. Finally, this research identifies the conditions under which intrinsic motivation in one task exerts a positive versus negative influence on other tasks, offering practical insights on how
motivation and performance can be better managed in the contemporary work environment.
‘What is intrinsic motivation?’

Intrinsic motivation at work refers to the state of being eager to put effort into work because the work itself is interesting and enjoyable (Gagné & Deci, 2005; Grant, 2008). It specifies one kind of reason for which employees exert and maintain effort in their work. The substance of intrinsic motivation can be described with two distinctive characteristics: 1) There is pleasure in doing the task and 2) the pleasure is from something inside the task and not outside the task (Diefendorff & Chandler, 2011; Gagné & Deci, 2005; Grant & Shin, 2012). Workers who are experiencing high intrinsic motivation find their tasks enjoyable, ‘This is fun and enjoyable - even though this is my work, it does not really feel like I am working’, as opposed to ‘I hate this task, but I do it in order to keep my job’. Additionally, their enjoyment and pleasure come from the inherent characteristics of the task itself, as opposed to the attainment of more contextual rewards enabled by the task such as a pleasant working environment. Intrinsic motivation is often juxtaposed with extrinsic motivation, for which rewards linked to the task lie outside of the task and not inside of the task. Intrinsic motivation can be conceptualized at different levels, a person-level, a job-level, and a task-level.

Motivation is defined as “an inner desire to make effort” (Dowling & Sayles, 1978, p. 16). Intrinsic motivation can be viewed as one kind of motivation, which specifies the reason behind effort as the enjoyment inherent in an activity. Three major
motivations that have been the topics of organizational research are intrinsic motivation, extrinsic motivation, and prosocial motivation. Whereas intrinsic motivation specifies the reason behind effort as the enjoyment inherent in an activity, extrinsic motivation specifies the reason behind effort as the rewards that are attached to an activity that are not an inherent part of the activity (Diefendorff & Chandler, 2011). Prosocial motivation, on the other hand, specifies the reason behind effort as helping and benefiting others (Grant & Berg, 2010).

**Intrinsic Motivation and Extrinsic Motivation**

Some scholars have conceptualized intrinsic motivation and extrinsic motivation as being the opposite ends of a single continuum - intrinsic motivation at one end and extrinsic motivation at the other end (Ryan & Deci, 2000). However, the problem with this kind of conceptualization is that it assumes high intrinsic motivation cannot coexist with high extrinsic motivation in one person. In other words, it assumes that a person with high intrinsic motivation should have low extrinsic motivation, and vice versa. However, as Grant and colleagues (2010) as well as Amabile (1993) proposed, the two kinds of motivations can exist as separate dimensions in the work domain. For example, for any given task, the extent to which it is intrinsically motivating does not always have to negatively correlate with the extent to which it is extrinsically motivating. Following Grant and colleagues and Amabile’s conceptualizations of intrinsic motivation and extrinsic motivation, I take the perspective that the two motivations can exist as separate dimensions within an individual. This separation of intrinsic motivation and extrinsic
motivation then lets me partial out and examine the unique effects of intrinsic motivation, while holding extrinsic motivation constant, in my theory and in my empirical testing.

Levels of analysis

Intrinsic motivation can be conceptualized at multiple levels of analysis: person trait-level, job-level, and task-level. Psychologists have proposed that motivation can exist at three levels: global, contextual, and situational (Vallerand, 1997). An employee could be the kind of person who seeks and needs intrinsic motivation as his main motivational source (trait-level intrinsic motivation which corresponds to Vallerand’s global-level motivation), or an employee could find one job intrinsically motivating but another job less intrinsically motivating (i.e., pediatrician vs lawyer; job-level intrinsic motivation which corresponds to Vallerand’s contextual-level motivation), or an employee could find one task intrinsically motivating but a different task less intrinsically motivating (task-level intrinsic motivation which corresponds to Vallerand’s situational-level motivation). Among the three levels of intrinsic motivation (trait, job, and task), the focus of this dissertation is the task-level intrinsic motivation and how it affects performance in one’s other tasks in a multiple-task environment.

Intrinsic motivation and performance

In existing research on intrinsic motivation, the intrinsic motivation - performance relationship has been described as being uniformly positive: The higher the intrinsic motivation in a task, the higher one’s performance in it. The positive link has been explained with mechanisms of dedication, persistence, and positive affect. First,
intrinsically motivated employees care more for their tasks, which often result in higher quality of work (Vallerand, & Ratelle, 2004). Those employees care about doing the best job that they can, as opposed to doing the minimum needed to obtain external rewards.

Second, intrinsically motivated employees tend to persist in their tasks, because the activities involved in the tasks are inherently motivating to them (Gagne & Deci, 2005; Tice, Baumeister, Shmueli, & Muraven, 2007; Vallerand, Fortier, & Guay, 1997). Even if employees come across obstacles during their tasks, they persist in the tasks in order to continue working on the enjoyable tasks. As for creativity, intrinsic motivation is regarded as one of the most important antecedents of creativity. When employees find their tasks interesting and enjoyable, they become more playful when doing the tasks, which can lead to higher creativity (Mainemelis & Ronson, 2006). Additionally, when employees find their tasks interesting and enjoyable, they experience positive affect, which can lead to higher creativity (Amabile, Barsade, Mueller, Staw, 2005). Intrinsic motivation is also related to high cognitive flexibility and risk-taking tendencies, which are conducive to creativity (Amabile, 1985; Grant & Berry, 2011). In sum, high intrinsic motivation in a task is thought to result in high quality and quantity of performance as well as high creativity, through the mechanisms of dedication, persistence, and positive affect.

**Intrinsic motivation in a multiple-task environment**

Although the existing research on the performance effects of intrinsic motivation seems to be extensive, there might be something that has been missing from it. More
specifically, while we know how intrinsic motivation in one task affects performance in that task, we do not really know how intrinsic motivation in one task affects performance in one’s other tasks. In other words, we know little about the cross-task effects of intrinsic motivation, while knowing more about the within-task effects of intrinsic motivation. Lab studies have always examined intrinsic motivation with one task, and field studies have lumped task-level intrinsic motivation together at the job-level ignoring the possible variability in intrinsic motivation across tasks and making it impossible to see the cross-task effects.

Lab studies on intrinsic motivation have examined the effects of intrinsic motivation in a single task on the performance in that task (e.g., Amabile, 1979; Amabile, 1986; for a review, see Deci, Koestner, & Ryan, 1999) ignoring the possibility that there could be other tasks whose performance can be affected by the focal task. Field studies on intrinsic motivation have examined the effects of job-level intrinsic motivation on job-level performance (Burton, Lydon, D'Alessandro, & Koestner, 2006; Dewett, 2007; Grant, 2008; Kuvaas, 2006) failing to reflect the reality that a job is often comprised of multiple tasks with varying levels of intrinsic motivation and performance. Therefore, existing research cannot really answer the question: ‘what is the nature of the cross-task effects of intrinsic motivation?’

This is a theoretically and practically important question, since now more than ever employees are living in a multiple-task environment. Although work has always been comprised of multiple tasks (with the possible exception of the era of industrial revolution where division of labor was common and widespread), it is now more than
ever a prominent feature of work. In organizations, the number and diversity of tasks that make up jobs are expanding (Ashford & Northcraft, 2003); Work is increasingly done on a project-to-project basis (Sydow, Lindkvist, & DeFillippi, 2004), jobs are becoming more complex with diverse dimensions (Man & Lam, 2003), and many people are now working independently as free agents who often play multiple roles themselves for their own business (i.e., entrepreneurs, consultants and designers) (Ashford, George, & Blatt, 2007; Pink, 2002). Additionally, with the fast-paced work environment, new tasks are being created in a swifter manner, which means there is a higher possibility that tasks are getting assigned to employees in overlapping time frames. Furthermore, with advances in technology, tasks are often accessible from anywhere, which again means there is a higher possibility that tasks coexist in employees’ minds at any given point in time.

In this work environment, it is more likely now than ever that one task dynamics is influenced by another task dynamics. Now, it is not just the characteristics and qualities of the focal task itself that drive the motivation and performance in that task. Rather, it is increasingly possible that the characteristics and qualities of one’s other tasks affect the focal task motivation and performance. Thus, to understand intrinsic motivation and its consequences in the contemporary work environment, it would be important to have a theoretical lens to examine the cross-task effects of intrinsic motivation. Up till now, intrinsic motivation has only been examined in a single-task environment or in a homogeneous-task environment. In other words, research on intrinsic motivation has not acknowledged the fact that different tasks in one’s job can elicit different levels of intrinsic motivation. In conceptualizing and operationalizing intrinsic motivation, I take
into account this important issue. Lastly, obtaining the full picture of intrinsic motivation-performance dynamics would have valuable implications for managing employee motivation and performance. Fostering intrinsic motivation has always been a key concern for managers and practitioners, as it is known to play an important role for job performance and employee retention (Kanfer, Chan, & Pritchard, 2008). Better understanding the complexities of the intrinsic motivation - performance relationship would help shed light on how intrinsic motivation of the workforce can best be managed.

Therefore, the objective of my dissertation is to explore the nature of the cross-task effects of intrinsic motivation and to enrich our understanding of the intrinsic motivation – performance dynamics in a multiple-task environment. What would be the nature of intrinsic motivation’s cross-task effects? Is it positive, negative, both, or neither?

**Cross-task effects: Spillover, Contrast, Goal-shielding, and Resource allocation**

There is relevant research in different domains of organizational behavior and psychology that suggests possibilities for both the positive and negative cross-task effects of intrinsic motivation. Namely, research on ego-depletion and work-family spillover suggests intrinsic motivation in one task can enhance performance in one’s other tasks through positive spillover. On the other hand, research on resource allocation theory (Kanfer & Ackerman, 1989) and conservation of resources theory (Hobfoll, 1989) suggests intrinsic motivation in one task can reduce performance in one’s other tasks through negative spillover. Additionally, research on human perception and goals suggests that intrinsic motivation in one task can reduce performance in one’s other tasks
through contrast and goal shielding. In sum, existing research suggests three pathways through which intrinsic motivation in one task can influence performance in one’s other tasks: i) an energy mechanism involving spillover effects, ii) a motivational mechanism involving contrast effects, and iii) an attention mechanism involving goal-shielding. And there are two distinct and opposing possibilities – a positive cross-task impact and a negative cross-task impact.

**Energy mechanism: Positive and negative spillover**

Research on ego-depletion and work-family spillover suggests one pathway through which intrinsic motivation in one task can enhance performance in one’s other tasks. Ego-depletion theory posits that energy is a limited resource that can be used up or be replenished, which means the more one uses it, the less is left, and the less one uses it, the more is left (Baumeister & Vohs, 2007; Baumeister et al., 1998). Intrinsic motivation in a task, which would lower the rate of energy drain (Baumeister & Vohs, 2007; Baumeister et al., 1998), can then be translated into more energy for one’s other tasks, and higher performance for those other tasks. Additionally, there is a line of research documenting spillover between work and non-work domains (i.e., family lives) (Ilies et al., 2007; Rothbard, 2001; Sonnentag & Grant, 2012), about how positive or negative affect experienced in one domain of life (i.e., family) can be spilled over to another domain of life (i.e., work). Little research has examined how spillover of positive or negative affect can take place between one’s multiple tasks, however. If positive affect can be spilled over from work to family and vice versa, the same phenomenon may exist between tasks, from a preceding task to the next task. This means that if a person works
on an intrinsically motivating task that generates positive affect before another task, the positive affect from the enjoyable task can be spilled over to the other task increasing performance in it (Isen & Reeve, 2005; Tice et al., 2007).

While research on ego-depletion and work-family spillover suggests a positive spillover effect among tasks, research on resource allocation theory (Kanfer & Ackerman, 1989) and conservation of resources theory (Hobfoll, 1989) suggests a negative spillover effect among tasks. Kanfer and Ackerman (1989), with their resource allocation theory, proposed that individuals allocate their attentional resources across different activities through motivational processes. This means that when there is a highly intrinsically motivating task and other less intrinsically motivating tasks, employees will allocate more of their attentional resources to that highly intrinsically motivating task, at the cost of less intrinsically motivating tasks. Similarly, Hobfoll, with his conservation of resources theory, argued that individuals actively strive “to retain, protect, and build valued resources” to better deal with stress (Hobfoll, 1989). Applied to intrinsic motivation in a multiple-task environment, this means that when there is a highly intrinsically motivating task and other less intrinsically motivating tasks, employees may refrain from using valued resources on the less intrinsically motivating tasks in anticipation of using the resources on the highly intrinsically motivating task.

**Motivational mechanism: Contrast**

Research on contrast effects suggests one pathway through which intrinsic motivation in one task can reduce performance in one’s other tasks. High intrinsic motivation in a task may cause a stark contrast between the interesting task(s) and the
less interesting tasks, leading employees to perceive those less interesting tasks as highly uninteresting/boring (more so than they would in the absence of the highly interesting task(s)). The idea of contrast is familiar to most people. For example, in Gulliver’s Travels, Gulliver seems to “tower as a giant in the land of the diminutive Lilliputians, but seems like a midget among the giant Brobdingnagians” (Suls & Wheeler, 2007). In a similar vein, the level of intrinsic motivation one feels toward a task may be partially relatively determined by the levels of intrinsic motivation in one’s other tasks.

Contrast effects, which describe the phenomenon where ‘the presence of a second condition that is different from the first condition exaggerates the difference between the conditions (Zentell, 2005)’, are believed to exert a significant influence in a variety of animal and human behaviors (Flaherty, 1996). Early studies on incentives and animal behavior provide empirical evidence of the influence of contrast effects on motivational processes. For example, Tinklepaugh (1928) found that monkeys, who normally eat both lettuce and fruits, refused to eat lettuce when they have been accustomed to receiving fruit as a reward (see also Flaherty, 1982). It can be inferred that the motivational value of lettuce declined as a result of experiencing a highly motivating option: fruit. Moreover, the rats that had been training with a large amount of food ran slower when given a smaller amount of food compared to the rats that had been training with that smaller amount of food all along (Crespi, 1942; Mellgren, 1972, see also Bower, 1961). It can be inferred that the same amount of food were perceived to hold different motivational values depending on the amount of food that were presented in the preceding occasion. Together, these studies provide empirical support for the idea that having experienced a
highly motivating option leaves organisms to devalue subsequent options that hold a neutral value.

Psychologists have proposed that similar mechanisms exist in terms of human perception and cognition. For example, a small gray square will look “dark on a white background, light on a black background, blue on yellow, and reddish on green” (Suls & Wheeler, 2007). Early studies in experimental psychology demonstrated contrast effects for several sensory dimensions—color, brightness, size, shape, and taste (Suls & Wheeler, 2007). For example, Riskey and colleagues (1979) found that the same soft drinks were rated sweeter when it was immediately preceded by a soft drink with a lower sucrose concentration level, and were rated less sweet when it was preceded by a soft drink with higher sucrose concentration level. Psychologists have long suspected that this kind of contrast effects is “not restricted to sensory intensity” (Wundt, 1894; Fechner, 1860/1966). In his study of lottery winners, Brickman and Coates (1978) investigated how the peak experience of winning a lottery influenced the subjects’ perception of everyday pleasures. The results indicated that the lottery winners were not any happier than control subjects, and more importantly, seemed to find significantly less pleasure in mundane positive events compared to control subjects who did not win the lottery. These studies provide empirical support that human perceptions and cognitions are also susceptible to contrast effects (Diener, Sandvik, & Pavot, 1991).

The pervasiveness of contrast effects in influencing an organism’s cognition and motivation as represented by the above mentioned studies raises a strong possibility that a similar mechanism might be at play for high intrinsic motivation in a multiple task
environment. If humans are wired to feel stimuli and make judgments in a relative sense (in comparison to the preceding stimuli and experiences), the experience of having a highly interesting task would provide a powerful reference point that act as the standard of comparison for one’s other tasks that follow. Helson (1947, 1964), in his adaptation level theory, proposed that, “judgments are proportional to deviations from a comparison standard” (Suls & Wheeler, 2007). High intrinsic motivation, being a very salient experience laden with intense positive affect, may serve as a powerful comparison standard where all other subsequent tasks are compared to.

In a related vein, according to Parducci (1963, 1984, 1995), “the location of a stimulus relative to the two extremes and also the relative frequency with which various stimuli are distributed (thus the relative rank within the series) determine the evaluation of the target stimulus” (Suls & Wheeler, 2007). High intrinsic motivation in a task may not only increase the maximum stimulus value in the comparison set, but it may also carry a bigger weight in constituting the set further lowering the rank that other tasks are perceived to stand at. It is because a high intrinsic motivation task may always be activated as a comparison value in employees’ mind due to the high positive affect associated with thinking about it as well as the perceived possibility that one could be working on that more interesting task rather than the task at hand. These thoughts may make the other tasks look relatively unattractive, more unattractive than they would be were there not the high intrinsic motivation task to compare to.

Attention mechanism: Goal-shielding
Research on goal shielding effects suggests the second pathway through which intrinsic motivation in one task can reduce performance in one’s other tasks. High intrinsic motivation in a task may prevent cognitive and motivational resources from being allocated to one’s other tasks, reducing the performance in those other tasks and resulting in highly polarized performance across tasks (very high performance in the highly interesting task and very low performance in the other tasks that are deprived of mental resources). The idea of goal shielding is familiar to most people. For example, if one has an important psychology exam coming up tomorrow, one would be less motivated to allocate time and effort in going to a tennis match today. In a similar vein, a high level of intrinsic motivation that one feels for a task might make one perceive the other tasks as distractors, and this may result in the conscious and unconscious neglect of the other tasks.

While the idea of goal shielding is widely recognizable in everyday situations, it is only during the past decade that scholarly investigations about the effect of focal goal activation on the pursuit of alternative goals began to flourish (Achtziger, Gollwitzer, & Sheeran, 2008; Shah, Friedman, & Kruglanski, 2003). Shah and colleagues (2002) focused on the notion that in order to successfully attain a goal, individuals often have to prevent alternative, competing goals from using up their limited mental resources (i.e., effort, attention, self-regulatory strength). They theorized that this inhibition of alternative goals will be reflected on the reduced accessibility in knowledge and information related to those alternative goals. In a series of experiments, they tested whether the activation of a goal inhibited the accessibility of alternative goals in
individuals’ minds. The results demonstrated that as the level of goal commitment increased (i.e., as individuals found the focal goal more desirable), the accessibility of alternative goals (as measured by number of alternative goals that participants were able to generate as well as lexical decision times related to alternative goals) decreased (Shah et al., 2002). While the focus of this initial goal shielding research was the inhibition of alternative goals as a means of higher performance in the focal goal, it offers another important insight regarding the motivational processes involved in multiple goal pursuit: Performance in alternative goals gets reduced as a result of focal goal pursuit.

This goal shielding effect of focal goal pursuit has been found to influence all aspects of cognitive processing: encoding, processing, and remembering information. As focal goals are activated and encoding, processing, and remembering of the information related to the focal goals themselves become more effective, encoding, processing and remembering of the information related to one’s alternative goals become less effective (Balcetis, 2008; Graham & Golan, 1991; Sanitioso, Kunda, & Fong, 1990). For example, Meng and Tong (2004) conducted an experiment where all participants were given two images (a house and a face), and the participants who were treated to willfully maintain the sight of the house were less likely to report seeing the face compared to the participants in the control condition.

If the very process of actively pursuing a goal necessitates (and inevitably entails) active inhibition of the other goals, this means that the focal goal pursuit, while enhancing the performance in the focal goal, will reduce the performance in alternative goals. In other words, the gap in performance in the focal goal and the other goals will
grow larger as a result of high commitment to the focal goal. Applied to high intrinsic motivation in a multiple task environment, having high intrinsic motivation in a task, while increasing the accessibility of knowledge and information perceived to be helpful in the focal task, will lead to automatic inhibition of the knowledge and information related to the other tasks, reducing performance in those other tasks and resulting in highly polarized performance across tasks.

**Summary**

Intrinsic motivation is an important source of effort and performance at work and a large amount of research provides support for the positive effects of intrinsic motivation on performance outcomes. However, existing research has neglected a key aspect of the intrinsic motivation-performance relationship: the cross-task effects. In order to fully understand intrinsic motivation and performance dynamics in the contemporary multiple-task environment, I explore the cross-task effects of intrinsic motivation in my dissertation. Relevant research in various domains of organizational behavior and psychology suggests multiple (competing) possibilities for the nature of intrinsic motivation’s cross-task effects. Ego-depletion and work-family research suggests a positive spillover effect of intrinsic motivation on performance in one’s other tasks. Resource allocation theory and conservation of resources theory suggest a negative spillover effect of intrinsic motivation on performance in one’s other tasks. Human perception and goals research suggests negative contrast and goal shielding effects of intrinsic motivation on performance in one’s other tasks. The core concern in my theory (which comes in the next section) is explaining when intrinsic motivation in one task
positively influences performance in one’s other tasks and when intrinsic motivation in one task negatively influences performance in one’s other tasks. In other words, the core theoretical question to be answered is when would the positive cross-task effects prevail and when would the negative cross-task effects prevail? How do these seemingly opposing effects work together to form the overall cross-task effects of intrinsic motivation?
CHAPTER 3

HYPOTHESES

“Good things satiate and bad things escalate.”
– Coombs and Avrunin, 1977, p.225

The objective of this dissertation is to explore the nature of the cross-task effects of intrinsic motivation. In order to examine how intrinsic motivation in one task affects performance in one’s other tasks in a multiple-environment, I take a step-by-step approach in my theorizing. First, I examine the cross-task effects of intrinsic motivation in a simple two-task environment (i.e., where there is one focal task whose intrinsic motivation varies and there is another task whose performance is influenced by the focal task intrinsic motivation). Next, I examine the cross-task effects of intrinsic motivation in a more complex multiple-task environment where there are more than two tasks (i.e., where there is one focal task whose intrinsic motivation varies and there are two or more other tasks whose performance is influenced by the focal task intrinsic motivation). Finally, I identify the critical moderating conditions that would strengthen the cross-task effects of intrinsic motivation: polychronicity and task relatedness.

As a preview of my hypotheses, I propose that intrinsic motivation in one task has a curvilinear relationship with performance in one’s other task in a two-task environment. More specifically, as intrinsic motivation in one task goes from low to medium, it helps
performance in one’s other task, however, as intrinsic motivation in one task goes from medium to high, it hurts performance in one’s other task. In other words, the positive spillover effects of additional intrinsic motivation prevail at low to medium levels of intrinsic motivation, while the negative contrast and goal-shielding effects of additional intrinsic motivation prevail at medium to high levels of intrinsic motivation. As for a multiple-task environment where there are more than two tasks, I propose that intrinsic motivation in one task has a curvilinear relationship with performance variance across one’s tasks, a phenomenon I refer to as performance polarization. As intrinsic motivation in one task goes from low to medium, it decreases performance variance across one’s tasks by enhancing performance in the focal task and one’s other tasks, however, as intrinsic motivation in one task goes from medium to high, it increases performance variance across one’s tasks by enhancing performance in the focal task while reducing performance in one’s other tasks.

I make two important assumptions in my theory. First, in a two-task environment, it is assumed that the intrinsic motivation associated with the second task of interest (whose performance is being influenced by intrinsic motivation in the focal task) is not very high. Similarly, in a multiple-task environment, it is assumed that the intrinsic motivation associated with all other tasks (whose performance is being influenced by intrinsic motivation in the focal task) is not very high. In cases where intrinsic motivation in the second task or all other tasks is too high, my theory and predictions may not hold. Second, it is assumed that the two tasks in question (one task influencing the other and one task being influenced by the other) are not critically linked. For example, I assume
that one task performance is not highly dependent on another task performance as a precondition for my theory and predictions to hold.

The rest of this chapter is organized into three sub-sections: 1) a discussion of intrinsic motivation’s cross-task effects in a two-task environment, 2) a discussion of intrinsic motivation’s cross-task effects in a multiple task environment (where there are more than two tasks), and finally, 3) a discussion of the moderators of intrinsic motivation’s cross-task effects. In the first two sub-sections of my theory, I explain why the cross-task effects of intrinsic motivation reverse as motivation moves from a low level to a high level, and in the moderator sub-section of my theory, I explain why the curvilinear effects are more pronounced under certain conditions, such as high polychronicity.

**Two-task environments: The Curvilinear Hypothesis**

In a two-task environment, I propose that intrinsic motivation in one task will have curvilinear effects on performance in the other task. More specifically, as intrinsic motivation in one task goes from low to medium, I predict that it helps performance in the other task. However, as intrinsic motivation in one task goes from medium to high, I predict that it hurts performance in the other task. In my theory, I explain why the positive spillover effects of intrinsic motivation prevail at low to medium levels of intrinsic motivation, and why the negative contrast and goal shielding effects of intrinsic motivation prevail at medium to high levels of intrinsic motivation.

**Low to medium levels of intrinsic motivation**
At low to medium levels of intrinsic motivation in the focal task, any increase in intrinsic motivation would lead to spillover of energy and positive affect to the other task, helping performance in the other task. At low to medium levels of intrinsic motivation, contrast and goal shielding are not yet activated leaving the positive effect of spillover to prevail.

**Spillover**

Intrinsic motivation in a task helps save one’s energy (i.e., less self-regulatory resources are required to do the task) and produces positive affect. It is possible that the positive within-task effects of intrinsic motivation extend to one’s other tasks as well. For example, let’s say two workers (John and Ted) each have two same tasks (a more enjoyable task A, and a less enjoyable task B). John’s intrinsic motivation in task A is medium and in task B is very low. Ted’s intrinsic motivation in task A is low and in task B is very low. We can expect that John’s performance in the less enjoyable task B would be higher than Ted’s because he gets to save some energy during task A and he gets some positive affect spillover from task A. These positive cross-task effects of additional intrinsic motivation would be taking place at low to medium levels of intrinsic motivation and would increase performance in one’s other task.

**Contrast & Goal shielding**

At low to medium levels, intrinsic motivation in one task would prompt spillover and enhance performance in one’s other task. But what about contrast and goal shielding effects that may negatively affect performance in one’s other task? At low to medium
levels of intrinsic motivation, I predict that intrinsic motivation is not high enough to activate contrast effects and not substantial enough to maintain significant goal shielding.

I propose that intrinsic motivation for a task does not exist in one fixed level. Rather, it fluctuates over time as one progresses in the task. For example, an employee might find his summary report task enjoyable at level 3 at one moment but at level 2 at another moment. And if intrinsic motivation for a task exists in fluctuations rather than a set level, intrinsic motivation levels for two separate tasks would overlap at times, unless the two task average intrinsic motivation levels are very far apart. Contrast effect would only be activated in the latter condition, where the focal task intrinsic motivation is high enough such that the focal task intrinsic motivation levels do not overlap with the other task intrinsic motivation levels. In other words, if intrinsic motivation level in the focal task is low or medium such that there is not a big and consistent difference from other task intrinsic motivation levels, contrast effects will not be activated.

And if intrinsic motivation is low such that it does not create a strong drive, one will not keep thinking about that task during one’s other task for goal shielding to occur. Therefore, at low levels of intrinsic motivation in the focal task, the lack of powerful drive toward that task will protect the attention for the other task. In sum, looking at all levels of intrinsic motivation, the negative effects of contrast and goal shielding would only take effect at high levels of intrinsic motivation but not at low levels of intrinsic motivation. At low to medium levels of intrinsic motivation in the focal task, the positive spillover effects will prevail resulting in enhanced performance in one’s other task (see Figure 1).
**Compensation**

In addition to contrast and goal shielding, there may be another mechanism for potential negative cross-task effects at low to medium levels of intrinsic motivation. When the focal task is low in intrinsic motivation, it might prompt a compensation mechanism such that employees seek to satisfy their need for intrinsic pleasure from their other tasks (McGregor, Zanna, Holmes, 2001; Rothbard, 2001). In other words, it is possible that employees who have low intrinsic motivation in the focal task might work harder in their other tasks than employees who have medium to high intrinsic motivation in the focal task, resulting in higher performance in the other task(s). With every additional intrinsic motivation in the focal task, this push through a compensation mechanism may be weakened, meaning that the cross-task effects on other tasks with every additional intrinsic motivation in the focal task may be negative. However, I propose that this compensation effect would not be significant unless other tasks are much more intrinsically motivating than the focal task. In the case where the focal task is low to medium in intrinsic motivation, and when other tasks are not high in intrinsic motivation (this is one of the two assumptions in my theoretical model), employees will not seek to find intrinsic pleasure from other tasks, rather employees will seek to find intrinsic pleasure from other parts of his life through a compensation mechanism. In summary, the effect of the compensation mechanism at low to medium levels of intrinsic motivation will be insignificant unless other tasks are highly intrinsically motivating themselves.
Medium to high levels of intrinsic motivation

At medium to high levels of intrinsic motivation in the focal task, any increase in intrinsic motivation would lead to contrast and goal shielding for the other task, hurting performance in the other task. At medium to high levels of intrinsic motivation, spillover of energy and positive affect is blocked leaving the negative effects of contrast and goal shielding to prevail.

Contrast

At high levels, intrinsic motivation in one task can negatively influence the performance in another task through contrast effects. The pervasiveness of contrast effects in perceiving various stimuli raises a strong possibility that they may be present in perceiving the intrinsic appeal of tasks: High intrinsic motivation experience may create contrast effects during one’s less enjoyable tasks that could lower the appeal of the less enjoyable tasks. When workers engage in a task that is highly intrinsically motivating, they experience strong feelings of enjoyment and vitality, which form a salient positive memory in the worker’s mind. Then when the worker is working on his less enjoyable task, he is likely to recall that salient memory, which should act as a positive reference point. I predict that the high intrinsic appeal of the high intrinsic motivation task(s) is contrasted with the intrinsic appeal of the current task in the worker’s mind, and the perception of the intrinsic appeal of the current task is influenced by the high reference point. As a result, the perceived intrinsic appeal of the current less enjoyable task is reduced (Helson, 1947, 1964). On the other hand, when workers do not have any task that is highly intrinsically motivating, they do not have positive reference points in their
minds to create contrast during their less enjoyable tasks. This means the perceived intrinsic appeal of the less enjoyable tasks will not be driven down lower than their inherent value. In summary, high intrinsic motivation experiences create contrast effects that can lower the intrinsic appeal of the less enjoyable tasks. When the perceived intrinsic appeal of a task is low, past research suggests that workers become less willing to put effort into the task, which ultimately results in reduced effort and performance.

Intrinsic motivation differs from other kinds of motivational rewards that provide positive reference points (i.e., high extrinsic rewards). With intrinsic motivation, what is influenced by a positive reference point is the intrinsic appeal of a task, which is more subjective and malleable. Because it is more subjective and malleable, the appeal of the less enjoyable tasks can be driven down drastically with a positive reference point of high intrinsic motivation experience. However, with extrinsic motivation, the extrinsic appeal of a task is more objective and fixed, which would not be driven down so easily with a high reference point. For example, if there is a task that earns one 15 dollars, and another task that earns one 10 dollars, the fact that one has a 15 dollar task does not make the 10 dollar task look like 5 dollar task (as there is an objective number of 10). On the other hand, if there is a task that is enjoyable at level 15, and another that is enjoyable at level 10, the level 15 task can really make the level 10 task look like a level 5, as there is no objective and fixed value assigned to the intrinsic appeal of tasks. It is the subjectivity and malleability of the intrinsic appeal of tasks that make high intrinsic motivation so destructive in driving down the appeal of less enjoyable tasks.
**Goal shielding**

At high levels, I predict that intrinsic motivation in one task can negatively influence the performance in another task through goal shielding. Goal shielding theory posits that goal shielding is an automatic (and to a large extent subconscious) mechanism that makes our goal pursuits more effective. But it is ‘effective’ when looked at from the perspective of the focal goals; what if the alternative goals are also important? High intrinsic motivation experience can create a strong drive to work on the high intrinsic motivation task that could hinder focused attention in one’s less enjoyable tasks. When workers have a task or tasks that are highly intrinsically motivating, they become very eager to work on those tasks to feel the pleasure, vitality, and enjoyment that come with engaging in the tasks. This would definitely help their performance in the high intrinsic motivation tasks, but at the same time, when one has to work on one’s less enjoyable tasks that strong drive can become a double-edged sword. When the worker is doing work on his less enjoyable task, he is essentially being taken away from the task that he really wants to work on. The desire that is there is not getting satisfied, so he keeps thinking about the high intrinsic motivation task (that he is being kept away from) while he is doing the work on the less enjoyable task. This essentially keeps the high intrinsic motivation task activated in his mind and automatically goal shielding is also activated towards the knowledge and information unrelated to the high intrinsic motivation task (i.e., knowledge and information related to the current less enjoyable task). As the information and knowledge related to the current less enjoyable task become inaccessible to the worker, he becomes unable to encode, process, and remember effectively those
information and knowledge. In summary, high intrinsic motivation creates goal shielding (for the high intrinsic motivation tasks and against one’s less enjoyable tasks) during the less enjoyable tasks disabling focused attention in them and resulting in lowered performance in them.

Intrinsic motivation differs from other kinds of motivation that create a strong drive to work on the more rewarding tasks (i.e., extrinsic motivation). With intrinsic motivation, the source of pleasure and the driver of eagerness lie within the task, which means the content of the task or the process of the task is what workers are drawn to, which ultimately activates goal shielding during the less enjoyable tasks. On the other hand, with other more extrinsic kinds of motivation, the driver of eagerness lies outside the task, in the extrinsic rewards that come with the completion of a task. In such cases, workers are less likely to keep thinking about the tasks (the content or process of them) during other less enjoyable tasks, because it was not the tasks themselves that were driving the drive from the first place. It is the inherentness of intrinsic motivation that makes high intrinsic motivation so uniquely powerful in maintaining the activation of high intrinsic motivation tasks during other less enjoyable tasks and activating goal shielding during those tasks.

**Spillover**

However, at high levels of intrinsic motivation, these positive cross-task effects of additional intrinsic motivation would cease to exist because the benefits of energy savings and affect spillover can no longer be useful for the other tasks. Additional energy and positive affect can be used for other tasks *when* there are some levels of attraction
and attention in place for those tasks. However, at high levels of intrinsic motivation in the focal task, the attraction and attention for the other tasks are driven down to the minimum as the result of contrast effects and goal shielding. When the effort and attention for the less enjoyable tasks are almost blocked, additional energy and positive affect cannot be used to enhance performance in those tasks. Rather the additional energy and positive affect will go back to the high intrinsic motivation task or other more intrinsically motivating activities where some level of attraction and attention are present. Therefore, at high levels of intrinsic motivation in the focal task, the additional energy and positive affect from the focal task will be almost useless for performance in one’s other tasks. In sum, looking at all levels of intrinsic motivation, the positive effects of energy savings and positive affect spillover would only take place at low levels of intrinsic motivation but not at high levels of intrinsic motivation. At high levels of intrinsic motivation in the focal task, the negative contrast and goal shielding effects will prevail resulting in reduced performance in one’s other task (see Figure 2).

I therefore predict that the combined cross-task effects of intrinsic motivation should be curvilinear, with the positive effects of spillover showing up when intrinsic motivation levels in the focal task are low to medium, and the negative effects of contrast and goal shielding showing up when intrinsic motivation levels in the focal task are high (see Figure 1).

H1. In a two-task environment, intrinsic motivation in one task has an inverted-U curvilinear effect on performance in the other task.
Multiple-task environment: Performance polarization

While thinking about the effects of intrinsic motivation in a two-task environment is a significant leap from studying intrinsic motivation only in a single-task environment, it may still be insufficient for understanding the full intrinsic motivation - performance dynamics in the contemporary work environment. Employees often have more than two tasks that they are working on simultaneously. How would having a high intrinsic motivation task affect performance outcomes in a multiple-task environment?

I propose a new concept of performance polarization and hypothesize that intrinsic motivation in a task can have curvilinear effects on performance polarization in a multiple-task environment. That is, intrinsic motivation in a task, while increasing performance in that task, may exert curvilinear effects on one’s other tasks, resulting in an overall curvilinear relationship between intrinsic motivation in the focal task and performance polarization.

Below, I first describe exactly what performance polarization is and why it is important to study it. Then, I review empirical research that provides evidence that performance polarization is a valid concept. Lastly, I propose task-level intrinsic motivation as a key driver of performance polarization.

What is performance polarization and why is it important to examine?

Some employees excel on certain tasks, but perform very poorly on other tasks. Their managers wonder how these employees can perform so well and so poorly at the same time. Based on their performance on the tasks that they excel at, they seem to have the ability to do well in those other tasks as well, but they do not. Why is that so? On the
other hand, those employees themselves cannot understand why they perform so poorly at some of their tasks. They know that they have the ability to perform well, they know that they will be rewarded if they perform well in those other tasks, but they just cannot get themselves to put effort into them and perform well in them. Rather what happens is, they perform so poorly in those other tasks that they actually perform worse in them than their peers who have the same (or even lower) level of ability. How could this be happening?

Performance polarization refers to the phenomenon where an employee excels at certain tasks but performs very poorly in other tasks. Contemporary organizations are in an ever more complex environment due to globalization, sophisticated consumer needs, and advancing technology (Batt, 2002; Friedman, 2005). Accordingly, the number and diversity of tasks in any given job is increasing (Schmidt & Dolis, 2009), and employees have a large array of tasks at any given time (Lord, Diefendorff, Schmidt, & Hall, 2010; Schmidt & DeShon, 2007). For organizations to be successful in this environment, it is important that their employees perform well in all parts of their work and not just some parts of their work. Although it is critical for organizational success that employees perform well in all parts of their work and not just in some parts of it, the organizational literature has been relatively silent on this phenomenon of performance polarization: we do not know what causes it, what its mechanisms are, or how it can be fixed.

**Empirical research on the performance polarization phenomenon**

Existing research suggests that employees often vary in their performance from task to task. Considerable evidence indicates that there is often high variance in
employees’ effectiveness across different dimensions of performance. For example, in a study of scientists and engineers, innovativeness (i.e., number of patents) and management skills (i.e., promotability based on people skills) were not significantly correlated (.04, ns; DiTomaso, Post, Smith, Farris, & Cordero, 2007). Similarly, a meta-analysis of the relationship between research productivity and teaching ratings of professors revealed that the relationship is zero (Hattie & Marsh, 1996). A study of physicians suggests that a physician who has excellent clinical skills can still perform poorly in managing the psychosocial aspects of illness (Ramsey, Wenrich, Carline, Unui, Larson, & LoGerfo, 1993), and a recent study of lawyers reveals that a lawyer who is good at managing client relationships is not necessarily as effective in researching law and fact finding (Shultz & Zedeck, 2008). Furthermore, in a study of bus drivers, the correlations between various performance measures (i.e., being courteous, absences, accidents) were very low, ranging from -.14 to .05 (Jacobs, Conte, Day, Silva, & Harris, 2006), and in a study of hair salon stylists, the sales performance and creativity of the stylists were not significantly correlated (-.08, ns; Van Dyne, Jehn, & Cummings, 2002).

Why would an employee who excels at certain tasks perform poorly in other tasks?

What are some drivers of performance polarization?

Existing research on performance variance has mainly focused on performance variance over time (Hofmann, Jacobs, & Baratta, 1993; Sonnentag & Frese, 2002) caused by factors such as aging, learning, and experience (Avolio, Waldman, & McDaniel, 1990; McDaniel, Schmidt, & Hunter, 1988; Quinones, Ford, & Teachout, 1995). At the same time, the issue of performance variance across tasks has not been examined in depth.
Although some scholars have recognized that task performance is a multidimensional construct (i.e., Campbell’s (1990) five factors (1) job-specific task proficiency (2) non-job-specific proficiency (3) written and oral communication proficiency, (4) supervision, (5) management/administration), it has been neglected that there could be multiple, content-wise very distinct tasks in one’s job, and that there could be large variance in performance across those tasks. What would cause an employee’s performance to vary substantially across tasks?

Performance is thought to be a function of ability, motivation, and opportunity (resources) (Campbell & Pritchard, 1976; Schmitt, Cortina, Jose, Ingerick, & Wiechmann, 2003; Vroom, 1964). Variance in ability could be one reason behind the observed performance variance across tasks. According to research on occupational aptitudes (Bingham, 1937; Ghiselli, 1955; Gottefredson, 1986; Hull, 1928), employees often have more skill and talent for some domains of work than for others. Past research shows that aptitude test scores are a valid predictor of job performance (Ghiselli, 1973; Muchinsky, 1993, 1986), suggesting that differences in aptitudes can explain performance variance across tasks. In order to prevent large performance variance based on ability, managers can hire people who have the aptitude for the core tasks (Ghiselli, 1973; Muchinsky, 1993, 1986), or they could train employees to develop the ability necessary to perform well in the core tasks (Goldstein, 1991).

However, even when an employee has adequate levels of ability for all his core tasks, his performance can still vary across tasks due to motivation and opportunity. Even when an employee has adequate levels of ability in all his tasks, he might perform well in
some tasks while not in others due to lack of motivation or lack of attentional resources. What factors would make some tasks less motivating and what factors would drain attentional resources for other tasks? What can be done to fix the problem of performance polarization? Compared to the large amount of research shedding light on how ability-based performance variance can exist and can be resolved, little research has examined the motivation-based or resource-based explanation of performance variance and how it can be resolved.

**Task-level intrinsic motivation as a key driver of performance polarization**

In this dissertation, I propose that one key factor that can cause performance polarization is high task-level intrinsic motivation. High intrinsic motivation motivates employees intrinsically, which means employees are eager to spend time and effort on the tasks because they find them captivating and enjoyable (Ryan & Deci, 2000). However, unless all tasks in one’s job are highly intrinsically motivating, high intrinsic motivation in a task may have hidden costs to one’s overall performance by negatively influencing the motivation, attention, and ultimately performance in one’s other tasks. I propose that intrinsic motivation in one task has a curvilinear relationship with performance polarization. As intrinsic motivation in one task goes from low to medium, it would decrease performance variance across one’s tasks (by enhancing performance in the focal task and one’s other tasks), however, as intrinsic motivation in one task goes from medium to high, it would increase performance variance across one’s tasks (by enhancing performance in the focal task while reducing performance in one’s other tasks).
H2. In a multiple-task environment, intrinsic motivation in one task has a U-shaped curvilinear effect on performance polarization.

H3. In a multiple task environment (with more than two tasks), intrinsic motivation in one task has an inverted-U curvilinear effect on average performance in all other tasks.

Moderators: Polychronicity and Task Relatedness

In this part, in order to understand when these curvilinear cross-task effects of intrinsic motivation are more prominent, I investigate the moderators of the effects. Scholars taking the interactionist view on employee behavior agree that both personal and situational factors matter in driving employee behavior (Chatman, 1989). Following the interactionist framework, I propose that the individual factor of polychronicity and the contextual factor of task relatedness moderate the extent to which intrinsic motivation in a task exerts curvilinear effects on one's other tasks. Examining the key moderators of intrinsic motivation’s cross-task effects i) will help us gain a better understanding of when intrinsic motivation in a task may hurt or help the performance in other tasks and ii) may provide us with clues on how to mitigate the costs of high intrinsic motivation in a multiple task environment.

Both polychronicity and task relatedness share the characteristic that they make one’s tasks more closely linked in one’s mind. I propose that the hypothesized curvilinear effects will be more pronounced when the tasks are more closely linked in one’s mind through polychronicity or task relatedness. Polychronicity would be an individual factor
that links tasks more closely in one’s mind whereas task relatedness would be a contextual factor that links tasks more closely in one’s mind.

**Polychronicity**

I investigate polychronicity as one of the key moderators of intrinsic motivation’s curvilinear effects. Polychronicity refers to ‘the extent to which an employee prefers to engage in multiple tasks simultaneously’ (Bluedorn, Kaufman, & Lane, 1991; Kaufman, Lane, Lindquist, 1991; Persing, 1998; Slocombe, 1998). Polychronicity is differentiated with multitasking: polychronicity is a relatively stable personality trait, whereas multitasking is the actual behavior of working on multiple tasks at the same time (König and Waller, 2010). Slocombe (1998) uses the theory of reasoned action to explain the link between polychronicity and multitasking. It is proposed that polychronicity, an attitude regarding multitasking, through forming a behavioral intention regarding multitasking, results in the behavioral outcome of multitasking. This means that employees with high polychronicity would actually multitask more than employees with low polychronicity.

Researchers have identified what actually happens with the behavior of multitasking. When multitasking, “two or more activities are performed within the same time block, apparently at the same time” (Kauffman, Lane, & Lindquist, 1991: 393). When employees perform two or more tasks at the same time, their attention is divided into multiple tasks and multiple tasks are coactivated in employees mind at the same time (Kahneman, 1973; Norman & Bobrow, 1975). With this kind of coactivation, contrast effects and goal shielding can be intensified: the contrast between interesting tasks and less interesting tasks may become starker as multiple tasks are compared very closely.
side by side in one’s mind and goal shielding may be intensified as employees see the
tasks as directly competing with one another for available cognitive and motivational
resources at any given point in time. On the other hand, employees with low
polychronicity are more likely to work on their tasks one at a time, which would result in
lower contrast effect and goal shielding. When the tasks are more separate in the
employees’ minds, the contrast will be less stark, and when there is a lower need to pull
cognitive and motivational resources away from other tasks, goal shielding may be
weakened.

*H4. The curvilinear cross-task effect of intrinsic motivation is strengthened by
polychronicity (the tangent lines to the curve will be steeper).*

**Task relatedness**

I investigate task relatedness as another key moderator of intrinsic motivation’s
curvilinear effects. I operationalize task relatedness with task instrumentality linkages –
that is, I utilize task instrumentality linkages as one proxy for task relatedness.
Instrumentality refers to the belief that an achievement of a certain outcome will lead to
another valued outcome (Vroom, 1964). If task A is instrumentally linked to task B, it
means performing well in task A helps one do task B.

Regarding the direction of the moderation effect, two scenarios are possible. First,
expectancy theory (Porter & Lawler, 1968; Vroom, 1964) and goal activation theories
(Fishbach, 2006) suggest that having a strong instrumentality linkage to a high intrinsic
motivation task could actually enhance the performance in the linked tasks. When
employees perceive their tasks to be strongly instrumentally linked to another highly
intrinsically motivating task, those other task goals may be shielded in—not shielded out—and the performance in all linked tasks can be enhanced by high intrinsic motivation in the focal task. This can be explained by expectancy theory (Porter & Lawler, 1968; Vroom, 1964) and goal activation theories (for a review, see Fishbach, 2006). According to expectancy theory, increase in instrumentality will directly heighten motivation leading to higher performance. Furthermore, goal activation theories suggest that goals are interconnected such that an activation of a goal can spread over to its connected goals based on whether the other goals facilitate or inhibit the focal goal (Bargh, Chen, & Burrows, 2006; Fishbach, Friedman, & Kruglanski, 2003). This means that the activation of a task goal A will be spread over to activate task goal B as long as task goal B facilitates task goal A. In other words, the stronger the instrumentality linkages between the highly intrinsically motivating task and other tasks, high intrinsic motivation in the focal task will have an enriching effect (Rothbard, 2001) of improving performance in other linked tasks, rather than reducing performance in those tasks and inducing performance polarization.

On the other hand, according to self-determination scholars and cognitive evaluation theories (Deci, Koestner, & Ryan, 1999), the effect may be the opposite. That is, strong instrumentality linkages may further reduce the performance in other linked tasks and aggravate the performance polarization problem. Self-determination scholars have demonstrated that extrinsic rewards can reduce intrinsic motivation in a task (Deci, Koestner, & Ryan, 1999). Instrumentality linkages may be perceived as an extrinsic motivator to the employees. In other words, while the perception that task B is helpful for
task A may increase the instrumental value of task B, it may not make task B any more enjoyable or interesting. In fact it may make task B less intrinsically motivating than before (reducing performance in it), as Task B now becomes something that one needs to do in order to obtain another valued outcome rather than what one does for the enjoyment of the work itself.

*H5a. The curvilinear cross-task effect of intrinsic motivation is strengthened by task relatedness (the tangent lines to the curve will be steeper).*

*H5b. The curvilinear cross-task effect of intrinsic motivation is weakened by task relatedness (the tangent lines to the curve will be less steep).*

**Summary**

I propose that intrinsic motivation in one task has a curvilinear relationship with performance in one’s other task in a two-task environment. More specifically, as intrinsic motivation in one task goes from low to medium, it helps performance in one’s other task(s), however, as intrinsic motivation in one task goes from medium to high, it hurts performance in one’s other task(s). As for a multiple-task environment where there are more than two tasks, I propose that intrinsic motivation in one task has a curvilinear relationship with performance polarization. Furthermore, I propose that the hypothesized cross-task effects of intrinsic motivation are moderated by polychronicity and task relatedness.
CHAPTER 4

METHOD

In order to test my hypotheses, I conducted three studies – a laboratory experiment (Study 1) and two field studies (Study 2 and 3). In Study 1, I set up a two-task environment and varied the intrinsic motivation level in the first task, while holding the second task constant. In that way, I could examine how different levels of intrinsic motivation in one task affect performance in one’s other task. In Study 2, I tested my ideas with a survey method at a Korean department store. All employees had the same set of six core tasks, which enabled me to examine my hypothesis about intrinsic motivation’s performance polarization effects. I took the intrinsic motivation level in the most enjoyable task and used it as a key predictor of performance polarization. In Study 3, I tested my moderation hypotheses (on polychronicity and task relatedness) at a Korean furniture company. Again, I took the intrinsic motivation level in the most enjoyable task and examined how it interacted with the moderators of polychronicity and task relatedness to predict performance in one’s other tasks.

Study 1: Methods

Study 1 was designed 1) to provide high internal validity and 2) to test my hypotheses in a setting where the effects of intrinsic motivation in one task on another task performance could be isolated and tested. I devised a two-task design to test my key
hypothesis and examined whether intrinsic motivation in one task has curvilinear effects on performance in one’s other task.

**Sample, Design, and Procedure**

I conducted an experiment with 168 undergraduates at a large private U.S. University. The sample was composed of 59% female students and 41% male students. The participants completed the study via computer (using Qualtrics software). I recruited them from the university’s behavioral lab subject pool, and paid them $10 per hour for their participation. There were two tasks for each participant, the first task where the intrinsic motivation level varied by condition (high, medium, and low intrinsic motivation) and the second less enjoyable task that was held constant across participants. There were three conditions in the experiment: high intrinsic motivation, medium intrinsic motivation, and low intrinsic motivation. The three conditions were used to test the curvilinear effects of intrinsic motivation on another less enjoyable task performance, with medium intrinsic motivation expected to lead to the highest performance in the second, less enjoyable task.

**Main tasks.** The first task was a sentence unscrambling task and the second task was a data entry task. For the first task, participants were asked to unscramble 10 sentences. There were three conditions (high intrinsic motivation, medium intrinsic motivation, and low intrinsic motivation) and there were 10 sentences for each condition. For the full list of sentences, please see Appendix A. The participants were given 15 minutes on the first task and as they finished, they were advised to go to their second
task, a data entry task. For the data entry task, the participants were asked to insert a list of numbers—99 numbers varying from 1~10 digits—in the 99 small boxes below.

**Intrinsic motivation manipulation.** A challenge of manipulating intrinsic motivation is that intrinsic motivation is dependent on the task itself. While I had to vary the levels of intrinsic motivation, I also had to give the participants the same task, in order to see the effects of intrinsic motivation on performance and not the effects of different tasks on performance. My solution was to hold the task structure constant, and vary the content of the task (highly interesting, medium interesting, or low interesting). The task I chose for this purpose was sentence unscrambling. This task fits my purpose well, since I could hold the task structure the same (unscrambling sentences) and change the task content with different sentences so that the task would elicit varying levels of intrinsic motivation. For the high intrinsic motivation condition, the participants were given 10 humorous sentences. For the medium intrinsic motivation condition, the participants were given 10 neutral sentences (from an ELS textbook). For the low intrinsic motivation condition, the participants were given 10 rather boring sentences about dust mites (i.e., the size of the dust mites, their typical life span etc.) (See Appendix A for the full list of sentences). While what the participants were asked to do was technically the same (unscrambling sentences), by varying the content of the sentences, the goal was to elicit different levels of intrinsic motivation. This intrinsic motivation manipulation was pretested with the same student pool, and the manipulation proved to be effective in eliciting three different levels of intrinsic motivation: high, medium, and low (details on this manipulation check appear below).
Measures

**Performance.** I measured the performance in the second data entry task in two different ways: performance quality and productivity. Performance quality was measured with the number of errors made in inserting the numbers and productivity was measured with ‘how many numbers participants correctly entered’ divided by ‘the time participants took for the data entry task’.

**Manipulation check.** To ensure that my intrinsic motivation manipulations were effective, I asked the participants to what extent they found the sentence unscrambling task fun and enjoyable at the end of the task. The items were, ‘The sentence unscrambling task was fun’ and ‘The sentence unscrambling task was enjoyable’. The scale was anchored at 1=disagree strongly, and 7=agree strongly (alpha = .98)

**Study 1: Results and Discussion**

In support of the validity of the manipulation, a two sample t-test showed that participants in the high intrinsic motivation condition found the sentence unscrambling task more fun and enjoyable ($M = 4.33, SD = 1.71$) than the participants in the medium intrinsic motivation condition ($M = 3.67, SD = 1.74$), $t(106) = 1.96, p < .05$. Further, participants in the medium intrinsic motivation condition found the sentence unscrambling task more fun and enjoyable ($M = 3.67, SD = 1.74$) than the participants in the low intrinsic motivation condition ($M = 3.03, SD = 1.67$), $t (105) = 1.94, p < .05$. The fact that the average intrinsic motivation in the high intrinsic motivation condition was 4.33 makes this study a conservative test of my hypotheses—I am examining whether the
Curvilinearity is present even when the differences in intrinsic motivation across conditions are not extreme. Additionally, to make sure that the difficulty of the manipulation tasks did not vary across conditions, I examined ‘the time spent in the manipulation task’ and ‘performance in the manipulation task’ for all conditions. In the high intrinsic motivation condition, participants spent 752 seconds in the manipulation task, in the medium intrinsic motivation condition, 782 seconds, and in the low intrinsic motivation condition, 759 seconds. There were not any significant differences across conditions. As for performance in the manipulation task, participants got the scores of 9.70, 9.83, 9.53, respectively, in the high intrinsic motivation (humorous sentences), medium intrinsic motivation (neutral sentences), and low intrinsic motivation condition (dust mites sentences). The scores were calculated through a 1/0 coding where an answer was coded as ‘0’ when the participant did not write anything for the question. The maximum possible score was 10, as there were 10 sentences in the manipulation task. There were not any significant differences across conditions.

**Curvilinear Effects**

*Performance quality* In terms of performance quality in performance, a two sample t-test showed that participants in the high intrinsic motivation condition made more errors in the data entry task ($M = 12.00$, $SD = 25.75$) than the participants in the medium intrinsic motivation condition ($M = 3.20$, $SD = 8.08$), $t(107) = 2.41$, $p < .01$ (see Figure 7). Further, participants in the medium intrinsic motivation condition made fewer errors in the data entry task ($M = 3.20$, $SD = 8.08$) than the participants in the low intrinsic motivation condition ($M = 7.47$, $SD = 16.48$), $t(105) = 1.71$, $p < .05$. 
An ANOVA with all three conditions returned significant results as well, $F(2,161) = 3.14, p < .05$, suggesting significant differences in performance quality across conditions. Planned contrast test confirmed that the participants in the medium intrinsic motivation condition exhibited significantly higher performance quality than those in the other two conditions (high intrinsic motivation and low intrinsic motivation), $t(133) = 2.78, p < .01$.

**Productivity** In terms of productivity in performance, an independent-samples t-test showed that participants in the high intrinsic motivation condition showed lower productivity in the data entry task ($M = .18, SD = .07$) compared to the participants in the medium intrinsic motivation condition ($M = .22, SD = .09$), $t(108) = 2.16, p < .05$ (see Figure 8). Further, participants in the medium intrinsic motivation condition showed higher productivity in the data entry task ($M = .22, SD = .09$) compared to the participants in the low intrinsic motivation condition ($M = .19, SD = .06$), $t(105) = 2.12, p < .05$.

An ANOVA with all three conditions returned significant results as well, $F(2,162) = 3.38, p < .05$, suggesting significant differences in productivity across conditions. Planned contrast test confirmed that the participants in the medium intrinsic motivation condition exhibited significantly higher productivity than those in the other two conditions (high intrinsic motivation and low intrinsic motivation), $t(160) = 2.59, p < .05$.

Whereas performance differed across conditions, perceived intrinsic motivation (for the data entry task) did not differ across conditions (high intrinsic motivation condition: 2.23, medium intrinsic motivation condition, 2.23, low intrinsic motivation
condition: 2.23). This suggests that the differences in performance across conditions is not caused by differences in perceived intrinsic motivation.

Taken together, the results on productivity and performance quality support the hypothesized curvilinear cross-task effects of intrinsic motivation. The participants who experienced medium intrinsic motivation in the first task showed highest performance in their second task, providing support for H1.

**Study 2: Methods**

Study 2 was designed 1) to provide an extension of Study 1 in a setting with high external validity and 2) to test my hypotheses in a setting where there are more than two tasks.

**Sample and Procedures**

I collected data from 105 salespeople and their supervisors at one of the largest department stores in Seoul, South Korea. This was an especially nice setting to test my hypotheses: i) The 105 salespeople all worked in a single department store building which provide a semi-controlled environment for contextual factors such as location and culture, ii) The employees in this department store building had the same set of six core tasks (sales, inventory management, product learning, display, after-service (taking returns and exchanges), and managing a good relationship with coworkers), which would provide an adequate environment to detect the possible performance polarization effect of high intrinsic motivation (otherwise, I would not be able to assess whether performance variance in some cases is due to inherent differences in task characteristics). The salespeople were 65% female and averaged 5.1 years of tenure in their jobs. I worked
closely with the store’s human resource manager to learn more about the employees at
the store and get feedback on my questionnaire. One important issue at this phase was
identifying the correct set of core tasks for the employees in this department store. As
described above, the six core tasks studied were: sales, inventory management, product
learning, display, after-service (returns and exchanges), and maintaining a good
relationship with coworkers. The original draft of the survey only had the first five tasks,
and the sixth (product learning) was added to the list after discussions with the human
resource manager. Five to six was identified as an appropriate number of core tasks for
service jobs in previous research (Taber & Alliger, 1995, Champion & Wong, 1991, and
Little, 2007). The supervisors were asked to rate the performance of each employee on
the six core tasks. The human resources manager informed the employees that they were
all invited to participate in an academic survey study. I received completed surveys from
105 employees, for a response rate of 71%. I also asked their supervisors (there were 11
supervisors for the 105 employees) to evaluate the performance of the employees. I
received supervisor ratings for all 105 employees, obtaining a 100% response rate from
the supervisors.  

\[1\] I obtained an intraclass correlation (ICC) value, to see whether there was a supervisor
effect on performance ratings. There was not a supervisor effect as the ICC value was
close to zero. However, to address the possible nonindependence of observations with
regards to performance ratings, which can result in too large or too small standard error
estimates, I used the clustered robust standard errors method (Kreft, De Leeuw, & de
Leeuw, 1998; Rabe-Hesketh & Skrondal, 2008). This method takes into account that the
(residuals for) performance ratings within each cluster may be correlated (due to them
coming from the same supervisor) and adjusts the standard error for each regression
coefficient accordingly producing more accurate regression results. This method is
identified as appropriate for standard regression models involving survey data (Kreft et
Measures

Task-level intrinsic motivation. The employees were asked to indicate their levels of intrinsic motivation for each of their core tasks: sales, inventory management, product learning, display, after-service (returns and exchanges), and maintaining a good relationship with coworkers. All questions were asked on a 1-7 Likert scale (anchors: 1 = disagree strongly; 7 = agree strongly). Four items were used to measure task-level intrinsic motivation: “interesting” “enjoyable” “fun” “engaging” (Grant, 2008). The instructions read “Please rate from 1 to 7 the extent to which you find each task interesting, enjoyable, fun, and engaging” ($\alpha = .87$).

Maximum intrinsic motivation. For the purpose of testing my hypotheses, I needed to identify the intrinsic motivation level in the most enjoyable task (for each employee). I looked at which task each employee found most intrinsically motivating and I took the intrinsic motivation level in that task. In other words, I took the highest intrinsic motivation score among each employee’s tasks to operationalize intrinsic motivation on the focal task.

Task-level performance. Supervisors rated the performance of each employee in each of their core tasks (in a 1-7 Likert scale): sales, inventory management, product learning, display, after-service (returns and exchanges), and maintaining a good relationship with coworkers.

Performance polarization. Performance polarization was operationalized as ‘the standard deviation score of performance ratings across tasks’ (for each employee). Past al., 1998; Rabe-Hesketh & Skrondal, 2008) and has been used in other studies with supervisor ratings of employee performance (i.e., Baer, 2012).
research has also used standard deviation scores to measure performance variance (though previously it was to measure performance variance across individuals rather than across tasks (Locke, 1982; Hirst & Yetton, 1999)).

**Minimum Performance.** Since there were six core tasks for everyone, each employee received six performance ratings (for each of their tasks). Out of the six ratings, I looked at the lowest performance score each employee received to measure minimum performance.

**Control Variables.** When conducting my regression analyses, I controlled for age, gender, job experience, intrinsic motivation variance (the standard deviation of intrinsic motivation scores across tasks), extrinsic motivation, and overall performance. By including these control variables, I wanted to make sure it was not demographic factors or other factors that are commonly known to influence work performance that were driving the effects in this study.

**Study 2: Results**

Means, standard deviations, and correlations for all study variables appear in Table 1. Before I tested my curvilinear hypothesis about the cross-task effects of intrinsic motivation, I first tested the within-task effects of intrinsic motivation. Intrinsic motivation in a task is supposed to be positively related to performance in that task, as theorized and extensively supported by existing research (Amabile, 1979; Amabile, 1986; for a review, see Deci, Koestner, & Ryan, 1999). To test whether this positive

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2 I do get the same results with and without these controls (compare the first and second column of Table 2 as well as the first and second column of Table 3).
relationship holds in my data, I predicted task-level performance with task-level intrinsic motivation clustering by each employee. The result of this regression analysis showed that indeed task-level intrinsic motivation was positively correlated with performance in that task ($b = .09, SE = .03, t(561) = 2.98, p < .001$).

Next, to test my hypothesis that intrinsic motivation in a task has curvilinear effects on the performance in one’s other tasks and performance polarization, I followed the multiple regression procedures recommended by Aiken and West (1991; see also Cohen, Cohen, West, & Aiken, 2003). I standardized the predictor variables of maximum intrinsic motivation and constructed 1) an ordinary least squares regression equation which included maximum intrinsic motivation squared and all of the lower order terms to predict minimum performance (Table 2) and 2) an ordinary least squares regression equation which included maximum intrinsic motivation squared and all of the lower order terms to predict performance polarization (Table 3).

As shown in Table 2, the results of the regression analyses show that the coefficients for the maximum intrinsic motivation squared is statistically significant in predicting minimum performance, $b = -.32, SE = .03, t(100) = -10.50, p < .01$. Also, as shown in Table 3, the coefficient for the maximum intrinsic motivation squared is statistically significant in predicting performance polarization, $b = .15, SE = .05, t(100) = 3.29, p < .01$. To interpret the form of the curvilinear relationship, I followed the procedures suggested by Cohen, Cohen, West, & Aiken (2003).

I first plotted the fitted relationship between maximum intrinsic motivation and minimum performance (See Figure 4). As depicted in Figure 4, maximum intrinsic
motivation shows an inverted-U relationship with minimum performance, providing support for H3. Second, I plotted the fitted relationship between maximum intrinsic motivation and performance polarization (See Figure 5). As depicted in Figure 5, maximum intrinsic motivation shows a plain-U relationship with performance polarization, providing support for H2. The employees who reported high maximum intrinsic motivation (who had a task that is highly intrinsically motivating to them) showed lower minimum performance and higher performance polarization compared to employees who had medium maximum intrinsic motivation (who did not have any highly intrinsically motivating tasks).

**Study 2: Discussion**

While Study 2 results provide support for my hypothesis on performance polarization (H2), Study 2 design does not allow testing for hypothesized moderators of the curvilinear effect (i.e., polychronicity and task relatedness). It would be beneficial to test the cross-task effects of intrinsic motivation with another field study to establish higher generalizability (across different organizations) and to find out what are the key moderating conditions of the curvilinear effects.

**Study 3: Methods**

Study 3 was designed to address the aforementioned limitations of Study 2. In Study 3, the work setting is again a multiple-task environment where there are more than two tasks. However, unlike Study 2, everyone has a different set of core tasks, which means each employee’s polychronicity level would have been better reflected in their actual level of multitasking (compared to Study 2 where all employees had the same set
of core tasks). This provides a nice setting to test my moderation hypotheses as there would be higher variance in multitasking and task relatedness.

**Sample and Procedures**

I collected data from 170 employees and their direct supervisors at a furniture company in South Korea. I distributed the questionnaires to 261 employees, asking them to participate in a confidential academic study about work motivation and job satisfaction, and 178 completed the surveys, for a response rate of 68%. I also asked their direct supervisors to complete the evaluation questionnaire. I received supervisor responses for 170 employees. The employees were 65% male, averaged 31 years of age, and averaged 4.06 years in their current job. There were 27 supervisors, resulting in an average of just over six employees per supervisor.  

The final sample of 170 employees was appropriately representative of the employees from the whole company. This furniture company engaged in every aspect of making and selling furniture. Accordingly, the company had many diverse departments such as strategy, accounting, sales, design, marketing, quality management, production

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3 I obtained an intraclass correlation (ICC) value, to see whether there was a supervisor effect for performance ratings. There was a supervisor effect as the ICC value was close to .30. To address the issue of nonindependence of observations with regards to performance ratings, which can result in too large or too small standard error estimates, I used the clustered robust standard errors method (Kreft, De Leeuw, & de Leeuw, 1998; Rabe-Hesketh & Skrondal, 2008). This method takes into account that the (residuals for) performance ratings within each cluster may be correlated (due to them coming from the same supervisor) and adjusts the standard error for each regression coefficient accordingly producing more accurate regression results. This method is identified as appropriate for standard regression models involving survey data (Kreft et al., 1998; Rabe-Hesketh & Skrondal, 2008) and has been used in other studies with supervisor ratings of employee performance (i.e., Baer, 2012).
management, customer service, etc. The final sample included employees from each of those departments, all of whom had a 9-5 job in an office environment.

Compared to the employees at the department store in Study 2 who all had the same set of core tasks, employees in this furniture company each had a fairly different set of core tasks, as the company engaged in designing, manufacturing, and selling furniture. Accordingly, the employees were asked to write down their own tasks onto the questionnaire before they rated their levels of intrinsic motivation in each of the core tasks. The listed core tasks were then copied onto the supervisor questionnaire for task-level performance ratings.

**Measures**

Unless otherwise indicated, all items used a 7-point Likert-type scale anchored at 1 = disagree strongly and 7 = agree strongly.

**Task-level intrinsic motivation.** The employees were asked to indicate their levels of intrinsic motivation for each of their core tasks. Since each employee had a unique set of core tasks, employees were first asked to write their own core tasks onto the questionnaire before they rated their levels of intrinsic motivation in each of them. The same four items were used to measure intrinsic motivation: “interesting” “enjoyable” “fun” “engaging” (Grant, 2008). The instructions read “Please rate from 1 to 7 the extent to which you find each task interesting, enjoyable, fun, and engaging” ($\alpha = .89$).

**Maximum intrinsic motivation.** For the purpose of testing my hypotheses, I needed to identify the intrinsic motivation level in the most enjoyable task (for each employee). I looked at which task each employee found most intrinsically motivating and
I took the intrinsic motivation level in that task. In other words, I took the highest intrinsic motivation score among an employee’s tasks for operationalizing intrinsic motivation in the focal task.

**Task-level performance.** Since each employee had a different set of core tasks, these core tasks had to be copied onto the supervisor questionnaire before the supervisors could rate each employee’s task-level performance. Supervisors were asked to rate the performance of each employee in each of their core tasks.

**Average performance in all other tasks.** Average performance in all other tasks other than the focal maximum intrinsic motivation task was measured by averaging the performance ratings in all other tasks other than the focal maximum intrinsic motivation task.

**Performance in the least enjoyable task.** Performance in the least enjoyable task was measured by first identifying the least enjoyable task for each employee. Each employee was asked to rank order their own core tasks in terms of their enjoyableness. From the employees’ answers for this question, I identified the task that each employee found least enjoyable. Then I identified the performance rating each employee received for that task. In that way, I could obtain an objective measure of performance in each employee’s least enjoyable task.

**Polychronicity.** Polychronicity is measured with the five item-measure developed by Kaufman, Lane, & Lindquist (1991). The items included “I do not like to juggle several activities at the same time” “When I sit down at my desk, I work on one project at
a time” “I am comfortable doing several things at the same time” \( (\alpha = .74) \). This was to measure the preference for polychronicity at the individual level.

**Task relatedness.** Task relatedness is measured with task instrumentality linkages. That is, employees were asked to report the extent to which each one of their core tasks were helpful in successfully performing each one of their other core tasks. For example, if an employee reported that he had five core tasks, A, B, C, D, and E, and he indicated that task A is the most enjoyable to him, he was then asked, to what extent he agreed that ‘Doing well in task B helps my performance in task A’, ‘Doing well in task C helps my performance in task A’, ‘Doing well in task D helps my performance in task A’, ‘Doing well in task E helps my performance in task A’. In this way, I measured the task relatedness for all possible pairs within one’s core task set.

**Other control variables.** When conducting my regression analyses, I controlled for age, gender, job experience, extrinsic motivation, conscientiousness, minimum intrinsic motivation, and overall performance. By including these control variables, I wanted to make sure it was not demographic factors or other factors that are commonly known to influence work performance that were driving the effects in this study.

**Study 3: Results**

Means, standard deviations, and correlations for all study variables appear in Table 4. To test my hypotheses that intrinsic motivation in a task has curvilinear effects on performance in one’s other tasks (H3) and that this effect is moderated by either polychronicity or task relatedness or both (H4 and H5), I followed the multiple regression procedures recommended by Aiken and West (1991; see also Cohen, Cohen, West, &
Aiken, 2003). Before I tested my curvilinear hypothesis about the cross-task effects of intrinsic motivation, I first tested the within-task effect of intrinsic motivation. As mentioned previously, intrinsic motivation in a task is supposed to be positively related to performance in that task, as theorized and extensively supported by existing research (Amabile, 1979; Amabile, 1986; for a review, see Deci, Koestner, & Ryan, 1999). To test whether this positive relationship holds in my data, I predicted task-level performance with task-level intrinsic motivation clustering by each employee. The result of this regression analysis showed that indeed, task-level intrinsic motivation was positively correlated with performance in that task \((b = .15, SE = .03, t(773) = 4.91, p < .001\). Then, I looked at how performance in all other tasks was affected by the intrinsic motivation level in the most enjoyable task and whether this effect was moderated by polychronicity and task relatedness. Finally, I looked at how performance in the least enjoyable task was affected by intrinsic motivation level in the most enjoyable task and whether this effect was moderated by polychronicity and task relatedness.

Analysis 1: Maximum intrinsic motivation and average performance in all other tasks

**Main effect**

I standardized the main predictor variable of maximum intrinsic motivation as well as the control variables and constructed a regression equation that predicted average performance in all other tasks (Table 5). As shown in Table 5, first column, the results of the regression analysis show that the coefficient for maximum intrinsic motivation
squared is not statistically significant in predicting average performance in all other tasks, \( b = -.06, \ SE = .04, \ t(163) = -1.29, p = \text{n.s.} \)

**Moderated curvilinear: polychronicity**

I standardized the predictor variables of maximum intrinsic motivation and polychronicity and constructed a regression equation which included an interaction term of maximum intrinsic motivation squared and polychronicity and all of the lower order terms to predict average performance in all other tasks (Table 5). As shown in Table 5, second column, the results of the regression analyses show that the coefficient for the interaction term (maximum intrinsic motivation x maximum intrinsic motivation x polychronicity) is statistically significant in predicting average performance in all other tasks, \( b = -.08, \ SE = .02, \ t(163) = -4.14, p < .01 \). To interpret the form of the interactions, I followed the procedures suggested by Cohen, Cohen, West, & Aiken (2003) and Dawson & Richter (2006).

I plotted the relation between maximum intrinsic motivation and average performance in all other tasks at high and low levels of polychronicity (See Figure 6). I used the conventional values of one standard deviation above and below the mean to plot the lines (Aiken & West, 1991; Cohen et al., 2003). As depicted in Figure 6, maximum intrinsic motivation shows an inverted-U relationship with average performance in all other tasks only when polychronicity is high, providing support for H4.

**Moderated curvilinear: task relatedness**

I standardized the predictor variables of maximum intrinsic motivation and task relatedness and constructed a regression equation which included an interaction term of
maximum intrinsic motivation squared and task relatedness and all of the lower order terms to predict average performance in all other tasks (Table 5). As shown in Table 5, third column, the results of the regression analyses show that the coefficient for the interaction term (maximum intrinsic motivation x maximum intrinsic motivation x task relatedness) is not statistically significant in predicting average performance in all other tasks, \( b = -0.01, SE = 0.01, t(163) = -0.70, p = \text{n.s.} \). Therefore, H5a and H5b are not supported in my data.

**Analysis 2: Maximum intrinsic motivation and performance in the least enjoyable task**

**Main effect**

I standardized the main predictor variable of maximum intrinsic motivation as well as the control variables and constructed a regression equation that predicted performance in the least enjoyable task (Table 7). As shown in Table 7, first column, the results of the regression analysis show that the coefficient for maximum intrinsic motivation squared is not statistically significant in predicting performance in the least enjoyable task, \( b = -0.06, SE = 0.05, t(163) = -1.15, p = \text{n.s.} \).

**Moderated curvilinear: polychronicity**

I standardized the predictor variables of maximum intrinsic motivation and polychronicity and constructed a regression equation which included an interaction term of maximum intrinsic motivation squared and polychronicity and all of the lower order terms to predict performance in the least enjoyable task (Table 7). As shown in Table 7, second column, the results of the regression analyses show that the coefficient for the
interaction term (maximum intrinsic motivation x maximum intrinsic motivation x polychronicity) is statistically significant in predicting performance in the least enjoyable task, $b = -.14, SE = .03, t(163) = -5.06, p < .001$. To interpret the form of the interactions, I followed the procedures suggested by Cohen, Cohen, West, & Aiken (2003) and Dawson & Richter (2006).

I plotted the relation between maximum intrinsic motivation and performance in the least enjoyable task at high and low levels of polychronicity (See Figure 7). I used the conventional values of one standard deviation above and below the mean to plot the lines (Aiken & West, 1991; Cohen et al., 2003). As depicted in Figure 7, maximum intrinsic motivation shows an inverted-U relationship with performance in the least enjoyable task only when polychronicity is high, providing support for H4.

**Moderated curvilinear: task relatedness**

I standardized the predictor variables of maximum intrinsic motivation and task relatedness and constructed a regression equation which included an interaction term of maximum intrinsic motivation squared and task relatedness and all of the lower order terms to predict performance in the least enjoyable task (Table 7). As shown in Table 7, third column, the results of the regression analyses show that the coefficient for the interaction term (maximum intrinsic motivation x maximum intrinsic motivation x task relatedness) is not statistically significant in predicting performance in the least enjoyable task, $b = -.04, SE = .03, t(163) = -1.25, p = n.s$. Therefore, H5a and H5b are not supported in my data.

**Study 3: Discussion**

66
As expected, maximum intrinsic motivation showed an inverted-U relationship with average performance in all other tasks and performance in one’s least enjoyable task. The employees who reported high levels of maximum intrinsic motivation showed lower average performance in all other tasks and lower performance in the least enjoyable task compared to the employees with medium levels of maximum intrinsic motivation. However, the curvilinear pattern was only present under high polychronicity but not under low polychronicity. This may be because when employees have low preference for multitasking, they strictly work on one task at a time, preventing any significant cross-task effects from taking place. Study 3 provided a nice setting for testing the moderating role of polychronicity as everyone had a different set of core tasks, which means each employee’s preference for multitasking (polychronicity) would have been better reflected in their actual behavior of multitasking (compared to Study 2 where all employees had the same set of core tasks). Additionally, my Hypothesis 4 about the moderating role of polychronicity was supported but my Hypothesis 5 about the moderating role of task relatedness was not supported. It is possible that for task relatedness, both of the competing mechanisms might be at play, which might have resulted in the overall effect that is neither significantly positive nor negative.

Summary

In Study 1, I tested my main curvilinear hypothesis in a two-task environment. In Study 2, I extended the test to a more complex multiple-task environment where there were more than two tasks and examined my performance polarization hypothesis. Finally,
in Study 3, I tested the moderators of the curvilinear cross-task effects. For all my analyses, I controlled for supervisor effects using clustered standard errors.

Study 1 was designed 1) to provide high internal validity and 2) to test my hypotheses in a setting where the effects of intrinsic motivation in one task on another task performance could be isolated and tested causally. I devised a two-task design to test my key hypothesis and examined whether intrinsic motivation in one task has curvilinear effects on performance in one’s other task. I found that the participants who experienced medium intrinsic motivation in the first task showed the highest performance in their second task, in terms of performance quality and productivity. The results of this study provide support for the hypothesized curvilinear cross-task effects of intrinsic motivation.

Study 2 was designed 1) to provide high external validity and 2) to test my hypotheses in a setting where there are more than two tasks. This was an especially nice setting to test my performance polarization hypothesis as the employees in this department store all had the same set of six core tasks (sales, inventory management, product learning, display, after-service, and managing a good relationship with coworkers). This minimized the inherent differences in task characteristics. I found that maximum intrinsic motivation shows an inverted-U relationship with minimum performance and a plain-U relationship with performance polarization: The employees who reported high maximum intrinsic motivation (who had a task that is highly intrinsically motivating to them) showed lower minimum performance and higher performance polarization compared to employees who had medium maximum intrinsic motivation (who did not have any highly intrinsically motivating tasks).
Study 3 was designed to address the limitations of Study 1 and Study 2. In Study 3, each employee has a unique set of core tasks, which means there is more variance in multitasking and task relatedness. Although the variance in polychronicity could have been present among employees in Study 2 as well, all employees had the same set of core tasks in Study 2, which means that the variance in polychronicity may not have been fully reflected in the behavior of multitasking in Study 2. The fact that there would have been more variance in multitasking and task relatedness in Study 3 made Study 3 a nice setting to test my moderation hypotheses. I found that intrinsic motivation in the most enjoyable task has a curvilinear relationship with performance in the least enjoyable task, as well as performance in all other tasks, only when polychronicity is high. The results of this study provide additional support for my main curvilinear hypothesis and provide support for one of my moderation hypotheses.
CHAPTER 5
GENERAL DISCUSSION

The objective of my dissertation is to explore the nature of the cross-task effects of intrinsic motivation in a multiple-task environment. The results of Study 1, a laboratory experiment, provide support for the hypothesized curvilinear cross-task effects of intrinsic motivation in a two-task environment. In Study 2, a field study at a Korean department store, I found that intrinsic motivation in the most enjoyable task shows an inverted-U relationship with minimum performance and a plain-U relationship with performance polarization, again showing the curvilinear cross-task effects of intrinsic motivation. In Study 3, a field study at a Korean furniture company, I found that intrinsic motivation in the most enjoyable task has a curvilinear relationship with performance in the least enjoyable task, as well as average performance in all other tasks, only when polychronicity is high. The results of Study 3 provide additional support for my main curvilinear hypothesis and provide support for one of my moderation hypotheses. The combination of an experimental method and a field survey method strengthens both internal and external and validity of the findings while providing both theoretical and practical implications.

Theoretical contributions
This dissertation contributes to the research on intrinsic motivation, inter-task dynamics, and performance management. First, this research takes an initial step in identifying the
hidden costs of high intrinsic motivation. By focusing on the fact that tasks often vary in their intrinsic motivation levels in a multiple-task environment, I was able to hypothesize and examine the negative cross-task effects of high intrinsic motivation on performance in one’s other tasks. My hypotheses and findings challenge the dominant assumption in intrinsic motivation research that intrinsic motivation is uniformly beneficial (Amabile, 1979; Amabile, 1986; Gagné & Deci, 2005; Hackman & Oldham, 1976). The results of this research suggest that intrinsic motivation can have detrimental effects on performance outcomes—high intrinsic motivation can reduce performance in one’s less enjoyable tasks and lead to performance polarization—opening up possibilities for further investigations on how to manage the costs of high intrinsic motivation.

Second, this research explains some of the inter-task dynamics in multiple-task environments. Up till now, motivation scholars have focused on the effects of motivation in task A on the performance in task A. However, motivation in task A could also affect the performance in task B in a multiple-task environment (when they are frequently worked on together and one task dynamics can affect another task dynamics). In this paper, I conceptualize this cross-task influence of intrinsic motivation and propose that the cross-task influence may be positive or negative depending on the level of intrinsic motivation.

Third, this dissertation contributes to research on performance management. I operationalize performance at the task-level and introduce the notion of performance polarization, providing a useful lens for scholarly investigations of performance in multiple-task environments. While organizational scholars have conceptualized and
examined performance variance over time or across individuals (Hofmann, Jacobs, & Baratta, 1993; Sonnentag & Frese, 2002) caused by factors such as aging, learning, and experience (Avolio, Waldman, & McDaniel, 1990; McDaniel, Schmidt, & Hunter, 1988; Quinones, Ford, & Teachout, 1995), little research attention has been paid to the phenomenon of within-person performance variance across tasks. In this paper, I propose that performance variance can exist across one’s tasks in a multiple-task environment. I further identify a special form of performance variance across one’s tasks, where one shows very high performance in some tasks and very low performance in other tasks, define it as performance polarization, and propose that intrinsic motivation is one of the antecedents of performance polarization. The results of my study support this link between intrinsic motivation and performance polarization: In Study 1, employees who were experiencing high task-level intrinsic motivation showed higher performance polarization across their tasks compared to employees were not experiencing high task-level intrinsic motivation.

Finally, this research identifies when additional intrinsic motivation exerts positive versus negative effects on other tasks, offering practical insights on how motivation and performance can be better managed in multiple-task environments. I present theoretical arguments for both positive and negative cross-task effects and explain what the combined effects would look like. I theorize that the positive and negative cross-task effects each exert their influence at different levels of intrinsic motivation: Positive cross-task effects at low-levels of intrinsic motivation, and negative
cross-task effects at high-levels of intrinsic motivation. I tested the combined curvilinear effects in my studies and found support for it both in a lab experiment and field studies.

**Limitations and future directions**

In Study 1, I did not directly test the mediating mechanisms of my theory. The main theory in this dissertation is that task-level intrinsic motivation, at low levels, can increase performance in one’s other tasks through positive spillover, but task-level intrinsic motivation, at high levels, can reduce performance in one’s other tasks through contrast and goal shielding. While I explain how high intrinsic motivation creates spillover, contrast, and goal shielding and influence performance in one’s other tasks, I did not directly test the proposed mediators in my lab experiment (Study 1). It is quite complicated to test the mediators even in the lab because 1) spillover, contrast, goal shielding to some extent can happen subconsciously which makes it hard to measure them (with methods such as self-reports) and 2) the three mediating mechanisms may be intertwined such that it could be hard to tease them apart. A lab experiment design that can accurately measure these mediating mechanisms as well as tease them apart would be very valuable.

One way to measure the mediators of spillover, contrast, and goal shielding is through examining energy, affect, interest, and attention indirectly. By setting up a multiple-task environment in the laboratory and measuring energy, affect, interest, and attention after the first task (with different levels of intrinsic motivation), it might be possible to identify the mediating mechanisms that are driving the curvilinear effects of intrinsic motivation. Affect can be measured by videotaping lab sessions and have
independent coders code for positive affect and negative affect (of the participants). Energy can be measured by giving participants an additional ego-depletion task and recording persistence. Interest can be measured by providing participants with a separate task and asking participants to choose the task that is more interesting. Attention can be measured by giving participants a lexical decision task (Shah et al., 2002) and see how fast the participants respond to task-related words.

Another limitation of Study 1 is that I was not able to manipulate a very high level of intrinsic motivation for my high intrinsic motivation condition. Whereas the current design provided a more conservative test of my hypotheses, it could be beneficial to devise an experimental design with more extreme differences in intrinsic motivation levels across conditions. In order to have more extreme differences in intrinsic motivation levels across conditions, one could give participants different tasks in each condition (as opposed to giving tasks that are structurally the same). In high intrinsic motivation condition, participants can be given a highly interesting puzzle task. In medium intrinsic motivation condition, participants can be given a moderately interesting word scramble task. And in low intrinsic motivation condition, participants can be given a rather boring copy-editing task. It would be important to control for factors such as task difficulty and task complexity to make sure that those peripheral factors are controlled.

In Study 2 and Study 3, my field settings were such that lower performance in one or two of one’s core tasks would not cause serious performance problems. However, one can imagine a situation where inadequate performance in some of one’s core tasks brings serious consequences for organizational functioning. For example, in an organization
where safety is very important (i.e., hospitals) or in an organization where reliable performance is absolutely required, the importance of each task performance for overall organizational functioning may be very high. In other words, it could be very important that none of the task performance falls below a certain level. On the other hand, there could also be a situation where the performance in some of the tasks carry a minimal weight in the overall performance. For example, in an advertisement company where producing creative ideas is the most important task, the performance in the less enjoyable administrative tasks may carry little weight for overall performance. In such situation, high intrinsic motivation in the focal creativity task and poor performance in other tasks might be less of a problem. Future studies examining the costs of high intrinsic motivation in both types of organizations would be valuable.

One important future direction of research would be exploring how to attenuate the costs of high intrinsic motivation. In many cases, it might not be desirable or even possible to reduce high intrinsic motivation of a worker. Then the question becomes how to keep the benefits of high intrinsic motivation while avoiding the costs of it. Job design strategies regarding combining (bundling), dividing (separating), or sequencing tasks can be explored. In thinking about these strategies, employees may first want to consider whether there is high intrinsic motivation variance across tasks (whether there is a task or tasks that are much more interesting than other tasks or whether one's multiple tasks all provide similar levels of intrinsic motivation). First, employees can bundle tasks that share similar levels of intrinsic motivation. This way, the positive cross-task effects of spillover will take place whereas the negative cross-task effects of contrast and goal
shielding will not (as there is not a task that is much more interesting than other tasks). Second, employees can consciously separate tasks that have very different levels of intrinsic motivation. For example, employees may strictly divide the time among tasks so that the highly intrinsically motivating tasks and boring tasks will not be done together. Additionally, managers may refrain from giving an employee a very high intrinsic motivation task and a very low intrinsic motivation task at the same time. Third, employees can sequence tasks in such a way that contrast and goal shielding may be minimized while positive spillover is maximized. When intrinsic motivation variance across tasks is high (there is a task or tasks that are much more interesting than other tasks), the least interesting task can go first, and the most interesting task can go last. This will minimize contrast effects. Under this condition, positive spillover cannot happen anyway because of the large difference in intrinsic motivation levels. When intrinsic motivation variance across tasks is low (the tasks are similar in their interestingness), the most interesting task should go first and the least interesting task should go last. This will maximize spillover effects. Under this condition, contrast will not happen because intrinsic motivation levels do not vary that much.

Lastly, this dissertation brings a new question for hiring managers. “Do you want an employee who is highly intrinsically motivated in some of his tasks?” The answer likely depends on the kind of jobs at hand. Does the job need reliable performance across tasks? Or is it a job where creativity is the most important? Future research should explore this.
Practical implications and conclusion

“If I had an hour to solve a problem I'd spend 55 minutes thinking about the problem and 5 minutes thinking about solutions.” — Albert Einstein

“A problem well put is half solved.” — John Dewey

Einstein’s and Dewey’s quotes point to the notion that the first step to solving a problem is to know and understand the problem. It may be the case that because the positive effects were so remarkable, we have been blinded from noticing the negative effects of high intrinsic motivation. This dissertation takes an initial step in identifying the hidden costs of high intrinsic motivation. If one or more of one’s tasks are highly intrinsically motivating, it might restrict one’s potential in other tasks by making those other tasks look less appealing and by blocking one’s attention towards those tasks. Releasing this potential in the less enjoyable tasks would be important for organizations and could be meaningful for individual workers. The next step would be identifying under which circumstances are the identified costs of high intrinsic motivation especially potent and figuring out how to protect the potential performance in the less enjoyable tasks while keeping the benefits of high intrinsic motivation. In that sense, this dissertation is more like an introduction, rather than a conclusion, to a problem.
Table 1

Study 2: Means, standard deviations, and correlations

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>s.d.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Maximum intrinsic motivation</td>
<td>6.08</td>
<td>.79</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Minimum performance</td>
<td>4.10</td>
<td>.91</td>
<td>.09</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Performance polarization</td>
<td>.84</td>
<td>.41</td>
<td>.03</td>
<td>-.82***</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Age</td>
<td>31.87</td>
<td>6.06</td>
<td>-.04</td>
<td>.07</td>
<td>.09</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Gender</td>
<td>-</td>
<td>.48</td>
<td>.02</td>
<td>-.32***</td>
<td>.18</td>
<td>-.36</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Intrinsic motivation variance</td>
<td>1.07</td>
<td>.59</td>
<td>.40***</td>
<td>.21*</td>
<td>-.19*</td>
<td>-.20*</td>
<td>.12</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Job experience (in months)</td>
<td>47.74</td>
<td>40.76</td>
<td>.01</td>
<td>.08</td>
<td>-.15</td>
<td>-.21*</td>
<td>.06</td>
<td>.01</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Extrinsic motivation</td>
<td>4.03</td>
<td>1.21</td>
<td>-.11</td>
<td>.02</td>
<td>.11</td>
<td>.31**</td>
<td>-.19</td>
<td>-.05</td>
<td>-.17</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>9. Overall performance</td>
<td>5.01</td>
<td>1.01</td>
<td>.16</td>
<td>.55***</td>
<td>-.26*</td>
<td>.13</td>
<td>-.25*</td>
<td>.16</td>
<td>.00</td>
<td>.05</td>
<td>-</td>
</tr>
</tbody>
</table>

\(a\) \(n = 105\), \(*p < .05\), \(**p < .01\), \(***p < .001\)
### Table 2

**Study 2: Regression analysis for minimum performance**

<table>
<thead>
<tr>
<th></th>
<th>DV: Minimum performance (with controls)</th>
<th>DV: Minimum performance (without controls)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( b )</td>
<td>( SE )</td>
</tr>
<tr>
<td>Intrinsic motivation</td>
<td>-.24</td>
<td>.07</td>
</tr>
<tr>
<td>Intrinsic motivation squared</td>
<td>-.32</td>
<td>.03</td>
</tr>
<tr>
<td>Age</td>
<td>.00</td>
<td>.02</td>
</tr>
<tr>
<td>Gender</td>
<td>-.50</td>
<td>.17</td>
</tr>
<tr>
<td>Intrinsic motivation variance</td>
<td>.14</td>
<td>.08</td>
</tr>
<tr>
<td>Job experience</td>
<td>.14</td>
<td>.05</td>
</tr>
<tr>
<td>Extrinsic motivation</td>
<td>-.05</td>
<td>.04</td>
</tr>
<tr>
<td>Overall performance</td>
<td>.45</td>
<td>.05</td>
</tr>
</tbody>
</table>

\[ R^2 \text{ F(8, 9)} \]

- .45  6857.05 ***
- .06  35.26 ***

**Notes.** *p < .05, **p < .01, ***p < .001*
Table 3

Study 2: Regression analysis for performance polarization

<table>
<thead>
<tr>
<th>DV: Performance polarization (with controls)</th>
<th>DV: Performance polarization (without controls)</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>SE</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Intrinsic motivation</td>
<td></td>
</tr>
<tr>
<td>.15</td>
<td>.05</td>
</tr>
<tr>
<td>Intrinsic motivation squared</td>
<td></td>
</tr>
<tr>
<td>.15</td>
<td>.05</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>.18</td>
<td>.08</td>
</tr>
<tr>
<td>Intrinsic motivation variance</td>
<td></td>
</tr>
<tr>
<td>-.07</td>
<td>.05</td>
</tr>
<tr>
<td>Job experience</td>
<td></td>
</tr>
<tr>
<td>-.07</td>
<td>.03</td>
</tr>
<tr>
<td>Extrinsic motivation</td>
<td></td>
</tr>
<tr>
<td>.06</td>
<td>.03</td>
</tr>
<tr>
<td>Overall performance</td>
<td></td>
</tr>
<tr>
<td>-.08</td>
<td>.03</td>
</tr>
</tbody>
</table>

\[ R^2 \quad F(8, 9) \]
\[ .26 \quad 817.86 \quad *** \]
\[ - \quad - \quad - \quad - \]
\[ R^2 \quad F(8, 9) \]
\[ .06 \quad 18.02 \quad *** \]

Notes. * p < .05, ** p < .01, *** p < .001
### Table 4

**Study 3: Means, standard deviations, and correlations**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>s.d.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Maximum intrinsic motivation</td>
<td>5.50</td>
<td>1.05</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Average performance in all other tasks</td>
<td>4.76</td>
<td>.95</td>
<td>.00</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Performance in the least enjoyable task</td>
<td>4.78</td>
<td>1.16</td>
<td>.10</td>
<td>.78***</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Age</td>
<td>31.22</td>
<td>4.47</td>
<td>.06</td>
<td>.21**</td>
<td>.18*</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Gender</td>
<td>-</td>
<td>-</td>
<td>-.07</td>
<td>-.05</td>
<td>-.02</td>
<td>-.51</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Education</td>
<td>3.03</td>
<td>.21</td>
<td>.13</td>
<td>-.05</td>
<td>-.06</td>
<td>.11</td>
<td>-.18*</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Job experience (in months)</td>
<td>43.31</td>
<td>39.67</td>
<td>.07</td>
<td>.21**</td>
<td>.18*</td>
<td>.67</td>
<td>-.11</td>
<td>-.02</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Extrinsic motivation</td>
<td>4.77</td>
<td>1.29</td>
<td>-.14</td>
<td>-.16*</td>
<td>-.13</td>
<td>.05</td>
<td>-.13</td>
<td>-.11</td>
<td>.05</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Polychronicity</td>
<td>3.13</td>
<td>1.33</td>
<td>-.04</td>
<td>-.03</td>
<td>.01</td>
<td>.01</td>
<td>.11</td>
<td>.16</td>
<td>.06*</td>
<td>-.12</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>10. Task relatedness</td>
<td>3.68</td>
<td>2.17</td>
<td>.10</td>
<td>-.08</td>
<td>-.03</td>
<td>.04</td>
<td>.01</td>
<td>.05</td>
<td>.03</td>
<td>.07</td>
<td>.05</td>
<td>-</td>
</tr>
</tbody>
</table>

\(^a_{n = 178, \ *p < .05, \ **p < .01, \ ***p < .001}\)
Table 5

Study 3: Regression analysis for performance in all other tasks (with controls)

<table>
<thead>
<tr>
<th></th>
<th>Main effect</th>
<th>Moderator: Polychronicity</th>
<th>Moderator: Instrumentality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>SE</td>
<td>B</td>
</tr>
<tr>
<td>Maximum Intrinsic Motivation</td>
<td>-0.08</td>
<td>0.08</td>
<td>-0.09</td>
</tr>
<tr>
<td>Maximum Intrinsic Motivation squared</td>
<td>-0.06</td>
<td>0.04</td>
<td>-0.11</td>
</tr>
<tr>
<td>Polychronicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum IM x Polychronicity</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Maximum IM x Maximum IM x Polychronicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrumentality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum IM x Instrumentality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum IM x Maximum IM x Instrumentality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>age</td>
<td>-0.06</td>
<td>0.03</td>
<td>-0.26</td>
</tr>
<tr>
<td>gender</td>
<td>-0.20</td>
<td>0.25</td>
<td>-0.10</td>
</tr>
<tr>
<td>education</td>
<td>-0.36</td>
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<td>-0.08</td>
</tr>
<tr>
<td>Job experience</td>
<td>0.01</td>
<td>0.003</td>
<td>0.53</td>
</tr>
<tr>
<td>Extrinsic motivation</td>
<td>-0.12</td>
<td>0.07</td>
<td>-0.16</td>
</tr>
<tr>
<td>Minimum IM</td>
<td>0.08</td>
<td>0.08</td>
<td>0.10</td>
</tr>
</tbody>
</table>

\[ R^2 \text{ F(8, 26)} \Delta R^2 \]

|                      | | | | | | | | | | | | | |
|----------------------| | | | | | | | | | | | | |

Notes. * p < .05, ** p < .01, *** p < .001
### Table 6

**Study 3: Regression analysis for performance in all other tasks (without controls)**

<table>
<thead>
<tr>
<th></th>
<th>Main effect</th>
<th>Moderator: Polychronicity</th>
<th>Moderator: Instrumentality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$b$</td>
<td>$SE$</td>
<td>$B$</td>
</tr>
<tr>
<td>Maximum Intrinsic Motivation</td>
<td>-.05</td>
<td>.06</td>
<td>-.06</td>
</tr>
<tr>
<td>Maximum Intrinsic Motivation squared</td>
<td>-.07</td>
<td>.04</td>
<td>-.12</td>
</tr>
<tr>
<td>Polychronicity</td>
<td></td>
<td>.08</td>
<td>.08</td>
</tr>
<tr>
<td>Maximum IM x Polychronicity</td>
<td>-.09</td>
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<td>-.12</td>
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<tr>
<td>Maximum IM x Maximum IM x Polychronicity</td>
<td>-.08</td>
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<td>Instrumentality</td>
<td></td>
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<td>Maximum IM x Instrumentality</td>
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<td>.03</td>
<td>-.10</td>
</tr>
<tr>
<td>Maximum IM x Maximum IM x Instrumentality</td>
<td>-.002</td>
<td>.02</td>
<td>-.01</td>
</tr>
</tbody>
</table>

$R^2$ F(7, 26) $\Delta R^2$  
.01 1.23  

$R^2$ F(5, 26) $\Delta R^2$  
.04 3.73*  

$R^2$ F(5, 26) $\Delta R^2$  
.03 1.23*  

*Notes. * $p < .05$, ** $p < .01$, *** $p < .001$
Table 7

Study 3: Regression analysis for the least enjoyable task (with controls)

<table>
<thead>
<tr>
<th></th>
<th>Main effect</th>
<th>Moderator: Polychronicity</th>
<th>Moderator: Instrumentality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>SE</td>
<td>B</td>
</tr>
<tr>
<td>Maximum Intrinsic Motivation</td>
<td>.004</td>
<td>.08</td>
<td>.003</td>
</tr>
<tr>
<td>Maximum Intrinsic Motivation squared</td>
<td>-.06</td>
<td>.05</td>
<td>-.09</td>
</tr>
<tr>
<td>Polychronicity</td>
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<td>.15</td>
</tr>
<tr>
<td>Maximum IM x Polychronicity</td>
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<td>.04</td>
<td>-.08</td>
</tr>
<tr>
<td>Maximum IM x Maximum IM x Polychronicity</td>
<td>-.14</td>
<td>.03</td>
<td>-.25</td>
</tr>
<tr>
<td>Instrumentality</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Maximum IM x Instrumentality</td>
<td>-.01</td>
<td>.05</td>
<td>-.02</td>
</tr>
<tr>
<td>Maximum IM x Maximum IM x Instrumentality</td>
<td>-.04</td>
<td>.03</td>
<td>-.13</td>
</tr>
<tr>
<td>age</td>
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<td>.03</td>
<td>-.30</td>
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<tr>
<td></td>
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<td></td>
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<td>gender</td>
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<td>.26</td>
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<tr>
<td>education</td>
<td>-.50</td>
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<td>Job experience</td>
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<td>-.08</td>
</tr>
<tr>
<td>Minimum IM</td>
<td>.19</td>
<td>.06</td>
<td>.20</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R² F(8, 26) ΔR²          | .20  | 6.92** |
|                          |     | 15.13*** |
| R² F(10, 26) ΔR²         |     | .07  | 1.75 |

Notes. * p < .05, ** p < .01, *** p < .001
Table 8
Study 3: Regression analysis for the least enjoyable task (without controls)

<table>
<thead>
<tr>
<th></th>
<th>Main effect</th>
<th>Moderator: Polychronicity</th>
<th>Moderator: Instrumentality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$b$</td>
<td>$SE$</td>
<td>$B$</td>
</tr>
<tr>
<td>Maximum Intrinsic</td>
<td>.05</td>
<td>.08</td>
<td>.04</td>
</tr>
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<td>Motivation</td>
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<td></td>
<td></td>
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</tr>
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<td>Motivation squared</td>
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<td></td>
<td></td>
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<tr>
<td>Polychronicity</td>
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<td></td>
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<td>Polychronicity</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Maximum IM x</td>
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<td>.04</td>
<td>-.24</td>
</tr>
<tr>
<td>Maximum IM x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum IM x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum IM x</td>
<td>-.13</td>
<td>.04</td>
<td>-.24</td>
</tr>
<tr>
<td>Polychronicity</td>
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<tr>
<td>Instrumentality</td>
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</tr>
<tr>
<td>Maximum IM x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrumentality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum IM x</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Maximum IM x</td>
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<td></td>
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<tr>
<td>Maximum IM x</td>
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<tr>
<td>Maximum IM x</td>
<td></td>
<td></td>
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<tr>
<td>Instrumentality</td>
<td>$R^2$</td>
<td>$F(7, 26)$</td>
<td>$\Delta R^2$</td>
</tr>
</tbody>
</table>

Notes: * $p < .05$, ** $p < .01$, *** $p < .001$
Figure 1

The curvilinear hypothesis

Performance in the other task

Intrinsic Motivation in the focal Task
Figure 2

Performance in the second task – Performance quality (number of errors)

Intrinsic Motivation in the First Task

Error Bars: +/- 1 SE
Figure 3

Performance in the second task - Productivity

Intrinsic Motivation in the First Task

Error Bars: +/- 1 SE
Figure 4

Study 2: Minimum performance
Figure 5

Study 2: Performance polarization
Figure 6

Study 3: Average performance in all other tasks
Figure 7

Study 3: Performance in the least enjoyable task

![Graph showing task performance in the least enjoyable task for low and high multitasking with low and high maximum IM.](image-url)
Appendix A: Study 1 Manipulation materials

High Intrinsic Motivation Condition:

Construct grammatically correct sentences using all of the listed words. These are humorous sentences, when unscrambled.

Example)
chip a hand chocolate cookie balanced each is a in diet
--> 
the answer: A balanced diet is a chocolate chip cookie in each hand.

1. now and on cereal a I a stepped am killer I cornflake
2. station where stops a bus bus a is
   stops a station where is a train train
   have at desk i work a station my
3. sleep your dreams go future so to on depends
4. accidents backseats cause in children
   accidents in cause children backseats
5. the a house before where live to gets police your in society we pizza
6. than light faster travels sound
   them hear speak some you until people this appear bright is why
7. out diarrhea that does mean 4 it people that suffer 5 of one enjoys from if
8. am nobody I a
   is perfect nobody
   perfect I therefore am
9. eating when an is what an you you animal plant do endangered that do see endangered
10. get if you half death scared happens twice to what

(Answers)
1. I stepped on a cornflake, now I am a cereal killer.
2. A bus station is where a bus stops, a train station is where a train stops, I have a work station at my desk.
3. Your future depends on dreams, so go to sleep.
5. We live in a society where pizza gets to your house before police.
6. Light travels faster than sound; this is why people appear bright until you hear them speak.
7. If 4 people out of 5 people suffer from diarrhea, does that mean one enjoys it?
8. I am nobody, nobody is perfect, therefore I am perfect.
9. What do you do when you see an endangered animal eating an endangered plant?
10. What happens if you get scared half to death twice?

**Medium Intrinsic Motivation Condition:**

Construct grammatically correct sentences using all of the listed words.

Example)
something you feel will to after eat you have better  
-->
the answer: You will feel better after you have something to eat.

1. go before am museum going back I like to Sunday visit I’d the I home on  
2. when the I her party I invite to Kate will call  
3. serious help tried she laughing could to be not she but  
4. was must light home on at there there been somebody a have  
5. wanted away on the I was vacation see whom woman to  
6. very me his enjoying which job he much told about is new Brad  
7. fortunately without lost we a we which map would have had gotten  
8. looking have he where into wouldn’t if going had been wall walked was he the he  
9. back would when away was me that she for got she days said she few going call and a  
10. would that him wore glasses and beard so he recognize fake nobody

(Answers)
1. I am going back home on Sunday; I’d like to visit the museum before I go.
2. When I call Kate I will invite her to the party.
3. She tried to be serious but she could not help laughing.
4. There must have been somebody at home; there was a light on.
5. The woman whom I wanted to see was away on vacation.
6. Brad told me about his new job, which he is enjoying very much.
7. Fortunately we had a map, without which we would have gotten lost.
8. He wouldn’t have walked into the wall if he had been looking where he was going.
9. She was going away for a few days and said that she would call me when she got back.
10. He wore glasses and fake beard so that nobody would recognize him.
Low intrinsic motivation condition:

Construct grammatically correct sentences using all of the listed words. These are sentences containing information about dust mites, when unscrambled.

Example)
have house dust eight legs mites
-->
the answer: House dust mites have eight legs.

1. house for dust the 19 average cycle to a male days life mite 10 is
2. typical house length mite measures millimeters in a 0.4
3. at climates altitude the all in high mite survives dust even house
4. the indoor environment in and thrive house dust homes provided in by bedrooms mites specifically kitchens
5. symptoms worldwide asthma cause house dust mites of a are and allergic common
6. structure unknown are allergen of this biological and the function important
7. dust are eye visible be house small to naked too mites to the
8. length and they are translucent have 300 in bodies microns to 250 only
9. and major survival of limiting factors the is population availability sorption the in for water of development mite one
10. in dry highest lowest dust and regions populations of climates are humid mite in areas

(Answers)
1. The average life cycle for the male house dust mite is 10 to 19 days.
2. A typical house mite measures 0.4 millimeters in length.
3. The house dust mite survives in all climates, even at high altitudes
4. House dust mites thrive in homes provided by the indoor environment, specifically kitchens and bedrooms.
5. House dust mites are a common cause of asthma and allergic symptoms worldwide.
6. The biological structure and function of this important allergen are unknown.
7. House dust mites are too small to be visible to the naked eye.
8. They have translucent bodies and are only 250 to 300 microns in length.
9. One of the major limiting factors in mite population development is the availability of water for sorption and survival.
10. Dust mite populations are highest in regions of humid climates and lowest in dry areas.
Appendix B: Study 2 Survey

<Employee survey>

For how long have you worked in this company? _____ years _____ months
For how long have you worked in this department? _____ years _____ months
For how long have you worked as a salesperson? _____ years _____ months
What is your gender? _____ female _____ male
What is your age?

1. Below are the six core tasks at this department store. Please indicate how fun, enjoyable, interesting, and engaging each task is in a scale from 1 to 7. Also indicate your level of performance as well as the level of importance for each task in a scale from 1 to 7.

   1--------- 2---------- 3---------- 4---------- 5---------- 6---------- 7
   very low   medium    very high

   Fun: I find this task fun. 1 if not fun at all, 7 if very fun.
   Enjoyable: I find this task enjoyable. 1 if not enjoyable at all, 7 if very enjoyable.
   Interesting: I find this task interesting. 1 if not interesting at all, 7 if very interesting.
   Engaging: I find this task engaging. 1 if not engaging at all, 7 if very engaging.
   Performance: I am good at this task. 1 if not true at all, 7 if very true.
   Importance: This task is a very important part of my work. 1 if not important at all, 7 if very important.

Below is an example.

<table>
<thead>
<tr>
<th>Task</th>
<th>Fun</th>
<th>Enjoyable</th>
<th>Interesting</th>
<th>Engaging</th>
<th>Performance</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 1. Sales</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Task 2. Inventory</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please write a number between 1 to 7 in the blanks below.
<table>
<thead>
<tr>
<th>Task 1. Sales</th>
<th>Fun</th>
<th>Enjoyable</th>
<th>Interesting</th>
<th>Engaging</th>
<th>Performance</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 2. Inventory management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 3. Product learning</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 4. Display</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 5. After-service</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 6. Maintaining a good relationship with coworkers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*If any of the six tasks do not apply to you, please indicate that on the right side of those tasks.*

2. The following questions focus on your personality in general. Please indicate the degree to which you agree to each statement in a number between 1 to 7.

| 1 ------------ 2 ------------ 3 ------------ 4 ------------ 5 ------------ 6 ------------ 7 |
| Disagree strongly | Neither agree nor disagree | Agree |

I get chores done right away.
I often forget to put things back in their proper place.
I like order.
I make a mess of things.
I sympathize with others’ feelings.
I am not interested in other people’s problems.
I feel others’ emotions.
I am not really interested in others.
I am the life of the party.
I don’t talk a lot.
I talk to a lot of different people at parties.
I keep in the background.
I have a vivid imagination.
I am not interested in abstract ideas.
I have difficulty understanding abstract ideas.
I do not have a good imagination.
I have frequent mood swings.
I am relaxed most of the time.
I get upset easily.
I seldom feel blue.

I enjoy tackling problems that are completely new to me.
I enjoy trying to solve complex problems.
The more difficult the problem, the more I enjoy trying to solve it.
I want my work to provide me with opportunities for increasing my knowledge and skills.
Curiosity is the driving force behind much of what I do.
I want to find out how good I really can be at my work.
I prefer to figure things out for myself.
What matters most to me is enjoying what I do.
It is important for me to have an outlet for self-expression.
I prefer work I know I can do well over work that stretches my abilities.
No matter what the outcome of a project, I am satisfied if I feel I gained a new experience.
I’m more comfortable when I can set my own goals.
I enjoy doing work that is so absorbing that I forget about everything else.
It is important for me to be able to do what I most enjoy.
I enjoy relatively simple, straightforward tasks.

I do not like to juggle several activities at the same time.
People should not try to do many things at once.
When I sit down at my desk, I work on one project at a time.
I am comfortable doing several things at the same time.
I prefer to do one thing at a time.

3. The following questions focus on your job.
Please indicate the degree to which you agree to each statement in a number between 1 to 7.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree strongly</td>
<td>Neither agree nor disagree</td>
<td>Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The job gives me a chance to use my personal initiative or judgment in carrying out the work.
The job allows me to make a lot of decisions on my own.
The job provides me with significant autonomy in making decisions.
The job involves a great deal of task variety.
The job involves doing a number of different things.
The job requires the performance of a wide range of tasks.
The job involves performing a variety of tasks.
The job involves solving problems that have no obvious correct answer.
The job requires me to be creative. The job often involves dealing with problems I have not met before. The job requires unique ideas or solutions to problems.

The time deadlines for completing work assignments are too unreasonable. I have to rush in order to complete my job. There is just not enough time to do my work. I am constantly working against the pressure of time.

I trust my manager. I have a close relationship with my manager. My manager is friendly to me. It sometimes feels like my supervisor is always looking over my shoulder. I am careful not to do things that my supervisor might disapprove of. My supervisor keeps pretty close tabs on me. It is clear to me that to get ahead in [company name], I need to do exactly what I am told. My supervisor likes to see things done in a certain way. My work is constantly being evaluated.

**Why do you work hard?**
To avoid looking bad in front of others.
To avoid looking lazy.
To look better than my co-workers.
To avoid a reprimand from my boss.
Because I fear appearing irresponsible.
To look like I am busy.
To stay out of trouble.
Because rewards are important to me.
Because I want a raise.
To impress my co-workers.

**Why are you motivated to do your work?**
Because I need to support myself and my family.
Because I enjoy the work itself.
Because I care about benefiting others through my work.
Because I need to earn money.
Because it’s fun.
Because I want to help others through my work.
Because I need to pay my bills.
Because I find the work engaging.
Because I want to have positive impact on others.
Because I need the income.
Because I enjoy it.
Because it is important to me to do good for others through my work.
<Manager survey>

1. Please indicate the extent to which you agree with each statement.

<table>
<thead>
<tr>
<th>I know this employee well.</th>
<th>This employee shows good overall performance.</th>
<th>This employee performs well in some tasks but not in other tasks.</th>
<th>This employee exhibits similar levels of performance across tasks.</th>
<th>This employee shows high performance variance across tasks.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex) Sunny Lee</td>
<td>6</td>
<td>4</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>
2. Please evaluate the performance of each employee for each task in a 1-7 scale.

<table>
<thead>
<tr>
<th></th>
<th>Core task 1. Sales</th>
<th>Core task 2. Inventory management</th>
<th>Core task 3. Product learning</th>
<th>Core task 4. Display</th>
<th>Core task 5. After-service</th>
<th>Core Task 6. Maintaining a good relationship with coworkers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex) Sunny Lee</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>2</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1------------------ 2------------------ 3------------------ 4------------------ 5------------------ 6------------------ 7
Very poor performance | Medium performance | Very high performance
Appendix C: Study 3 Survey

<Employee>
For how long have you worked in this company? _____ years _____ months
For how long have you worked in this department? _____ years _____ months
For how long have you worked in this job? _____ years _____ months
On average, how many hours per week do you work?
How much education have you completed? (high school/ some college/ B.A./ M.A./ PhD)
What is your position?
What is your gender? _____ female _____ male
What is your age?

1. First please write down five core tasks you have in your job. Then, please indicate how fun, enjoyable, interesting, and engaging each task is in a scale from 1 to 7. Also indicate your level of performance, the level of importance, and the level of procrastination for each task in a scale from 1 to 7.

<table>
<thead>
<tr>
<th>Core task</th>
<th>Fun</th>
<th>Enjoyment</th>
<th>Interesting</th>
<th>Engaging</th>
<th>Performance</th>
<th>Importance</th>
<th>Procrastination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core task 1. Sales</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Core task 2. Inventory management</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Core task 3. Display</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Core task 4. After-service</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Fun: I find this task fun. 1 if not fun at all, 7 if very fun.
Enjoyable: I find this task enjoyable. 1 if not enjoyable at all, 7 if very enjoyable.
Interesting: I find this task interesting. 1 if not interesting at all, 7 if very interesting.
Engaging: I find this task engaging. 1 if not engaging at all, 7 if very engaging.
Performance: I am good at this task. 1 if not true at all, 7 if very true.
Importance: This task is a very important part of my work. 1 if not important at all, 7 if very important.
Procrastination: I procrastinate on this task. 1 if not at all, 7 if very much.

Below is an example of a salesperson’s response.
Core task 5. Maintaining a good relationship with coworkers

Please fill in the blanks below.

<table>
<thead>
<tr>
<th>Core task 1.</th>
<th>Fun</th>
<th>Enjoyment</th>
<th>Interesting</th>
<th>Engaging</th>
<th>Performance</th>
<th>Importance</th>
<th>Procrastination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core task 2.</td>
<td></td>
<td></td>
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<tr>
<td>Core task 3.</td>
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<tr>
<td>Core task 4.</td>
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<tr>
<td>Core task 5.</td>
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</tr>
</tbody>
</table>

Next, write down the 5 core tasks that you listed above in the order of how interesting they are to you. You may write down the most interesting task at the top (A), and the least interesting task at the bottom (E).

A. Most interesting
B.
C.
D.
E. Least interesting

Then, please indicate the extent to which you agree with the following statements on a 1-7 scale.

1--------------- 2 -------------- 3 ----------------- 4 -------------- 5 -------------- 6 -------------- 7

Not helpful at all  somewhat helpful  very helpful

Doing well in task B helps my performance in task A.
Doing well in task C helps my performance in task A.
Doing well in task D helps my performance in task A.
Doing well in task E helps my performance in task A.
Doing well in task C helps my performance in task B.
Doing well in task D helps my performance in task B.
Doing well in task E helps my performance in task B.
Doing well in task D helps my performance in task C.
Doing well in task E helps my performance in task C.
Doing well in task E helps my performance in task E.

1 -------------- 2 -------------- 3 -------------- 4 -------------- 5 -------------- 6 -------------- 7
Not interfering at all  somewhat interfering  very interfering

Working on task B interferes with my performance in task A. ___
Working on task C interferes with my performance in task A. ___
Working on task D interferes with my performance in task A. ___
Working on task E interferes with my performance in task A. ___
Working on task C interferes with my performance in task B. ___
Working on task D interferes with my performance in task B. ___
Working on task E interferes with my performance in task B. ___
Working on task D interferes with my performance in task C. ___
Working on task E interferes with my performance in task C. ___
Working on task E interferes with my performance in task E. ___

2. The following questions focus on your personality in general.
Please indicate the degree to which you agree to each statement in a number between 1 to 7.

1 -------------- 2 -------------- 3 -------------- 4 -------------- 5 -------------- 6 -------------- 7
Disagree  Neither agree nor disagree  Agree strongly

I get chores done right away.
I often forget to put things back in their proper place.
I like order.
I make a mess of things.
I have a vivid imagination.
I am not interested in abstract ideas.
I have difficulty understanding abstract ideas.
I do not have a good imagination.

I often find myself performing tasks that I had intended to do days before.
I usually make decisions as soon as possible.
I generally delay before starting on work I have to do.
In preparing for some deadlines, I often waste time by doing other things.
I often have a task finished sooner than necessary.
I am continually saying “I’ll do it tomorrow.”

I enjoy tackling problems that are completely new to me.
I enjoy trying to solve complex problems.
The more difficult the problem, the more I enjoy trying to solve it.
I want my work to provide me with opportunities for increasing my knowledge and skills.
Curiosity is the driving force behind much of what I do. I want to find out how good I really can be at my work. I prefer to figure things out for myself. What matters most to me is enjoying what I do. It is important for me to have an outlet for self-expression. I prefer work I know I can do well over work that stretches my abilities. No matter what the outcome of a project, I am satisfied if I feel I gained a new experience. I’m more comfortable when I can set my own goals. I enjoy doing work that is so absorbing that I forget about everything else. It is important for me to be able to do what I most enjoy. I enjoy relatively simple, straightforward tasks. I enjoy coming up with new ideas for products. I enjoy engaging in analytical thinking. I enjoy creating new procedures for work tasks. I enjoy improving existing processes or products.

I enjoy coming up with new ideas for products. ___
I enjoy engaging in analytical thinking. ____
I enjoy creating new procedures for work tasks. ____
I enjoy improving existing processes or products. ___

I often miss concerts, sporting events, or the like, because I don’t get around to buying tickets on time. When planning a party, I make the necessary arrangements well in advance. When it is time to get up in the morning, I most often get right out of bed. A letter may sit for days after I write it before I mail it. I generally return phone calls promptly. Even with jobs that require little else except sitting down and doing them, I find they seldom get done for days. When traveling, I usually have to rush in preparing to arrive at the airport or station at the appropriate time. When preparing to go out, I am seldom caught having to do something at the last minute. If a bill for a small amount comes, I pay it right away. I usually return a “R.S.V.P.” request very shortly after receiving it. I always seem to end up shopping for birthday gifts at the last minute. I usually buy even an essential item at the last minute. I usually accomplish all the things I plan to do in a day. I usually take care of all the tasks I have to do before I settle down and relax for the evening.

I do not like to juggle several activities at the same time. People should not try to do many things at once. When I sit down at my desk, I work on one project at a time. I am comfortable doing several things at the same time.
I prefer to do one thing at a time.

3. **The following questions focus on your job.**

Please indicate the degree to which you agree to each statement in a number between 1 to 7.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree strongly</td>
<td>Neither agree nor disagree</td>
<td>Agree strongly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The job gives me a chance to use my personal initiative or judgment in carrying out the work.
The job allows me to make a lot of decisions on my own.
The job provides me with significant autonomy in making decisions.
The job involves a great deal of task variety.
The job involves doing a number of different things.
The job requires the performance of a wide range of tasks.
The job involves performing a variety of tasks.
The job involves solving problems that have no obvious correct answer.
The job requires me to be creative.
The job often involves dealing with problems I have not met before.
The job requires unique ideas or solutions to problems.

The time deadlines for completing work assignments are too unreasonable.
I have to rush in order to complete my job.
There is just not enough time to do my work.
I am constantly working against the pressure of time.

I don’t have much time for thinking up wild ideas, I’m too busy just getting my job done.
Why is everybody always talking about ideas? I’ve got more work than I know what to do with.
Ideas take too much time to generate.
Thinking of ideas takes time that I don’t have.
I wish I had the time to think up some new ideas.

I trust my manager.
I have a close relationship with my manager.
My manager is friendly to me.
It sometimes feels like my supervisor is always looking over my shoulder.
I am careful not to do things that my supervisor might disapprove of.
My supervisor keeps pretty close tabs on me.
It is clear to me that to get ahead in [company name], I need to do exactly what I am told.
My supervisor likes to see things done in a certain way.
My work is constantly being evaluated.

**Why do you work hard?**
To avoid looking bad in front of others.
To avoid looking lazy.
To look better than my co-workers.
To avoid a reprimand from my boss.
Because I fear appearing irresponsible.
To look like I am busy.
To stay out of trouble.
Because rewards are important to me.
Because I want a raise.
To impress my co-workers

Why are you motivated to do your work?

Because I need to support myself and my family.
Because I enjoy the work itself.
Because I care about benefiting others through my work.
Because I need to earn money.
Because it’s fun.
Because I want to help others through my work.
Because I need to pay my bills.
Because I find the work engaging.
Because I want to have positive impact on others.
Because I need the income.
Because I enjoy it.
Because it is important to me to do good for others through my work.
<Manager>

Employee Name:

Please indicate the extent to which you agree with each statement.

<table>
<thead>
<tr>
<th>1 = Strongly disagree</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 = Strongly agree</th>
</tr>
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</table>
I know this employee well.
This employee shows good overall performance.
This employee performs well in some tasks but not in other tasks.
This employee exhibits similar levels of performance across tasks.
This employee shows high performance variance across tasks.

This employee…

1. Demonstrated originality in his/her work.
2. Took risks in terms of producing new ideas in doing job.
3. Found new uses for existing methods or equipments.
4. Solved problems that had caused other difficulty.
5. Tried out new ideas and approached to problems.
6. Identified opportunities for new products/processes.
7. Generated novel, but operable work-related ideas.
8. Served as a good role model for creativity.
9. Generated ideas revolutionary to our field.

Please evaluate this employee’s performance in each of his core tasks in a 1-7 scale. (1=very poor performance, 7=very high performance)

<table>
<thead>
<tr>
<th>Ex) Sunny Lee</th>
<th>Quality of Performance</th>
<th>Quantity of Performance</th>
<th>Achievement of Work Goals</th>
<th>Creativity</th>
<th>Required Creativity Level</th>
</tr>
</thead>
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<tr>
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References


http://www.entrepreneur.com/article/37892#


