

ABSTRACT

Title of Thesis: DOES DISTANT LEADERSHIP MAKE A DIFFERENCE?
EXPLORING THE EFFECTS OF LEADERSHIP AND
SUBSTITUTES FOR LEADERSHIP ON VIRTUAL WORKER
PERFORMANCE AND SATISFACTION

Julie Stella Lyon, Master of Arts, 2003

Thesis Directed by: Professor Benjamin Schneider
Department of Psychology

Virtual work, or working from a site other than the main office, has been receiving a great deal of attention in recent years. What has not received the attention it deserves is the role of the virtual worker's leader. In the present study I tested a framework for understanding a virtual leader's influence on the subordinate outcomes of performance and satisfaction. I also included several of the variables suggested by the literature on substitutes for leadership (Kerr & Jermier, 1978). Employing a lab study framework, I crossed three levels of leadership (transactional, transformational, and no leadership) with three categories of leadership substitutes (conscientiousness, feedback, and climate for well-being). The effect of leadership on performance quantity was significant, with participants in the transactional condition outperforming participants in the transformational condition. Additionally, interesting

interactions emerged between leadership and feedback and between leadership and conscientiousness on performance. Limitations and implications are discussed.

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by

Julie Stella Lyon

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Advisory Committee:

Professor Benjamin Schneider, Chair
Professor Paul J. Hanges
Professor Katherine J. Klein

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TABLE OF CONTENTS

List of Tables.....	v
List of Figures.....	vi
Introduction.....	1
Toward Understanding the Role of Leadership in Virtual Work	4
Leadership and Virtual Workers.....	5
Transactional and Transformational Leadership	5
Integrating Transactional and Transformational Leadership with Virtual Work	6
Substitutes for Leadership.....	10
Individual Characteristics	14
Task Characteristics.....	15
Organizational Characteristics.....	17
The Relative Role of Leadership and Substitutes for Leadership on Virtual Worker	
Outcomes	18
Summary and Justification of Laboratory Experiment.....	21
Method.....	23
Sample.....	23
Design.....	23
Task.....	24
Procedure	24
Measures	27
Manipulation Checks	27
Independent Variables	28
Dependent Variables.....	29
Results	30
Power Analyses.....	30
Pilot Studies	30
Pilot Study 1.....	30
Pilot Study 2.....	32
Preliminary Analyses.....	32
Descriptive Statistics.....	32
Manipulation Checks	33
Condition Equivalence at Practice Trial	34
Hypothesis Tests	34
Main Effects of Leadership.....	35
Main Effects of Substitutes for Leadership	36
Discussion.....	39
Overview of Findings	39

Summary of Major Findings.....	40
Interactions Between Leadership and Substitutes for Leadership	41
Interpretation of Results.....	43
Practical Implications and Directions for Future Research	47
Additional Limitations	48
Conclusions.....	50
Appendices	68
Appendix A: Procedure.....	68
Appendix B: Informed Consent Form	74
Appendix C: Goldberg Personality Scale	75
Appendix D: Instructions on the Table.....	76
Appendix E: Instructions and Rules for Practice Binder	77
Appendix F: Feedback for Practice Task.....	81
Appendix G: Letter Accompanying No Feedback Distracter Article.....	83
Appendix H: Cover Sheet for Letter From BDR Publishing.....	84
Appendix I: Low Climate for Well-Being Letter	85
Appendix J: High Climate for Well-Being Letter.....	86
Appendix K: Instructions to Check Email.....	87
Appendix L: Transformational Leadership Email	88
Appendix M: Transactional Leadership Email	89
Appendix N: No Leadership Email.....	90
Appendix O: Instructions and Rules for Trial Binder.....	91
Appendix P: Feedback for Trial Binder.....	95
Appendix Q: Post-Questionnaire	97
Appendix S: Manipulation Check Items.....	101
References	105

LIST OF TABLES

Table 1. Description of substitutes for leadership not used in this study, their relationships to performance and satisfaction, and the reasons they are not used in this study.....	51
Table 2. Means, standard deviations, and correlations of all variables	55
Table 3. Means and standard deviations for performance and satisfaction variables by leadership condition.....	57
Table 4. Means and standard deviations for performance and satisfaction variables by feedback condition.....	58
Table 5. Means and standard deviations for performance and satisfaction variables by climate for well-being condition.....	59
Table 6. Analysis of Variance for performance quantity.....	60
Table 7. Analysis of Variance for performance quality.....	61
Table 8. Analysis of variance for satisfaction.....	62

LIST OF FIGURES

Figure 1. Proposed interaction between leadership and climate for well-being	63
Figure 2. Proposed conceptual model	64
Figure 3. Interaction between leadership and conscientiousness for performance quantity	64
Figure 3. Interaction between leadership and conscientiousness for performance quantity	65
Figure 4. Interaction between leadership and feedback for performance quantity	66

Does Distant Leadership Make a Difference? Exploring the Effects of Leadership and Substitutes for Leadership on Virtual Worker Performance and Satisfaction

Virtual work¹, or working from a site other than the main office, has received considerable attention in the popular press lately (e.g., Maruca & Egan, 1998; Dobrian, 1999; Kistner, 2002). The number of virtual workers is growing: an estimated 28 million people worked virtually in 2001 compared to 19.6 million in 1999 (Pratt, 1999; Davis & Polonko, 2001). Virtual work has potential benefits for employees (e.g., increased flexibility, less commute time, fewer distractions, etc.) and employers (e.g., reduced costs for leasing office space, increased productivity, increased job retention, etc.), making it a potentially attractive alternative for both parties to the traditional workday. However, there are also potential downsides for employees (professional and social isolation, lack of access to informal information, difficulty in separating home and work responsibilities, technology and accessibility issues, etc.) and employers (managing without seeing, difficulties in communicating, costs of duplicating equipment in the home, etc.). Virtual work is neither a shining utopia nor a desolate wasteland, but it has potential to have some more moderate features of both.

Organizational researchers have only recently begun to study virtual work. Existing studies of the topic seem diverse, covering issues such as work/life balance in the virtual office (Hill, Miller, Weiner, & Colihan, 1998), virtual work adjustment (Raghuram, Garud, Wiesenfeld, & Gupta, 2001), organizational identification among virtual workers (Wiesenfeld, Raghuram, & Garud, 2001), and job satisfaction of telecommuters (Swenson & Catanzaro, 2002). The basic question underlying all of these

¹ Throughout this paper, I use the terms working remotely, virtual work, and telecommuting interchangeably.

studies is: How can organizations ensure the productivity and satisfaction of virtual workers? For instance, as a proxy for productivity and satisfaction, Raghuram, et al. (2001) studied virtual work adjustment. They wrote that signals of “successful adjustment may include employees’ performance effectiveness, satisfaction with the new work mode (Caliguiri, Hyland, Joshi, & Bross, 1998; Saks, 1995) and, with particular relevance to the virtual work environment, effectiveness in balancing work and non-work demands” (p. 384).

However, to date, most of these studies have examined virtual work and its outcomes from the employee’s perspective only, using self-report measures. For example, Hill et al. (1998) examined the effect of the virtual office on work/life balance issues. They used both qualitative and quantitative approaches to study a set of virtual (n = 157) and co-located (n = 89) workers at IBM. All of the workers studied would eventually become virtual workers, but the groups in this study were separated based on the lease expiration on their respective buildings. They found that *perceived* (i.e., self-reported) productivity was higher among virtual workers, especially among female virtual workers. Additionally, the virtual office had a positive influence on perceived flexibility, but no influence on teamwork, morale, or number of hours worked per week. As another illustration of an employee-only, self-report perspective, Raghuram et al. (2001) surveyed 756 virtual workers in a voluntary virtual work program in a single organization. They were interested in factors that contribute to virtual work adjustment. Results indicated that reported work independence, clarity of evaluation criteria, interpersonal trust, and organizational connectedness were all positively related to virtual work adjustment.

In Raghuram et al.'s (2001) study as in Hill et al.'s (1998) study, the virtual worker responded to items measuring both the independent and dependent variables. Many other studies in the virtual work literature have this common method issue (e.g., Wiesenfeld, et al., 2001; Belanger, 1999; Staples, Hulland, & Higgins, 1999) or have only relied on structured interviewing (Cooper & Kurland, 2002). Claims of productivity increases are especially unchecked in the literature. With only two known exceptions (DuBrin, 1991; Geiseler, 1985), productivity increases are based on self-report data.

As these studies suggest, virtual work is still a young field of study within organizational psychology, and there is much to learn as we build on previous self-report measures of the correlates and outcomes of virtual work. For example, measuring actual performance rather than perceived performance might be a useful first step. Further, there has been little mention of the leader's role in enhancing virtual worker outcomes, even though as an agent of the organization, the leader is usually the one responsible (*at least indirectly*) for subordinate outcomes such as productivity and satisfaction. In the present study, I propose and test a framework for understanding a leader's influence on subordinate outcomes of performance and satisfaction. In brief, I explore whether leadership can make a difference at a distance.

Thus, given the relative ambiguity in findings on the human side of virtual work, and the lack of a coherent framework for understanding it, perhaps what is required is a conceptual model that can be used to guide future work and integrate past findings. In what follows, I present a model of virtual leadership and its impact on subordinate outcomes (i.e., performance and satisfaction), which includes leadership variables from the transformational and transactional leadership literature (Bass & Avolio, 1994; Bass,

Avolio, & Atwater, 1996; Bass, 1985) and several variables suggested by the literature on substitutes for leadership (Kerr & Jermier, 1978; Podsakoff, MacKenzie, & Bommer, 1996a). Thus, I propose that the virtual work environment is an excellent situation in which to explore the role of leadership and leadership substitutes.

Toward Understanding the Role of Leadership in Virtual Work

There are three goals of the proposed thesis. The first goal is to conceptualize the role of leadership at a distance. By this, I mean, does/can distant leadership impact subordinate outcomes such as performance and satisfaction? By establishing the foundation – that leadership in fact can make a difference at a distance – research can then move to examining how it makes a difference and the contingency factors, if any. Secondly, I strive to understand if our typical conceptualizations of in-person leadership are also applicable at a distance. Specifically, do virtual workers perceive the differences between different leadership styles at a distance and do these perceptions lead to differences in performance and satisfaction? The last goal is to understand which of the numerous substitutes for leadership can impact subordinate outcomes such as productivity and satisfaction when the work is at a distance.

In what follows, I first review the existing literature on the role of leadership in virtual work. I show how the literature on leading virtual workers can be clarified using transactional and transformational leadership constructs. However, leadership is not the only process expected to influence the performance and satisfaction of virtual workers. Accordingly, I then review the literature on substitutes for leadership and show how those concepts may contribute significantly to the understanding of virtual worker productivity

and satisfaction. I conclude this section with a framework integrating these seemingly diverse literatures and propose a set of formal hypotheses.

Leadership and Virtual Workers

The role of leadership in virtual work or distant leadership includes a growing number of conceptual and empirical papers. However, this literature has no dominant framework for understanding the effects of distance on leadership and subsequently, the effects of distant leadership on virtual workers. Thus, I begin by describing one theory of leadership that has considerable support in the context of face-to-face interactions, and I apply it to the study of distant leadership by integrating the thinking and research on leadership of virtual workers. Finally, I will present some hypotheses.

Transactional and Transformational Leadership

Leadership is a key variable in many studies of worker outcomes. A popular theory of leadership that is arguably at the forefront of the field concerns transactional and transformational leadership (Bass, 1985; Bass & Avolio, 1994). Transactional leadership is basically an exchange relationship between leader and follower – the leader exchanges rewards for performance. Transformational leadership hypothetically takes the follower to a higher level of performance through mechanisms that are more motivating than a simple exchange relationship. Bass (1998) has argued that transformational leadership builds on transactional leadership – that it is best to have some components of each. Transformational leadership is generally related to higher follower performance and satisfaction (e.g., Avolio, Waldman, & Einstein, 1988; Bass, 1985; Bass, et al., 1996; Yammarino & Bass, 1990; Lowe, Kroeck, & Sivasubramaniam, 1996).

Transactional leadership implies an exchange relationship between leader and follower (Bass, 1999). There are three types of transactional leadership. *Contingent reward management* refers to the clarification of expectations so that the follower knows when he or she will be rewarded for meeting expectations. With *active management by exception*, the leader takes action only if the follower does not meet expectations, and with *passive management by exception*, the leader takes action only if large problems arise in the subordinate's performance. Transformational leadership moves the follower beyond immediate self-interests (Bass, 1999). The three sub-parts to transformational leadership describe how a leader can inspire the follower to high performance. *Idealized influence* and *inspirational leadership* sets high standards of performance and high expectations, while clearly articulating the desirable future that can be obtained through the follower's efforts. This is the charismatic element of transformational leadership—the leader is both confident and determined. *Intellectual stimulation* is the characteristic that encourages followers to question assumptions, think of the problem in new ways, and use creativity. Finally, *individualized consideration* refers to the leader's tendency to give personal attention to the specific developmental needs of each follower, to delegate work as appropriate to encourage growth, and to coach and mentor the development of each follower.

Integrating Transactional and Transformational Leadership with Virtual Work

There is a contingent of leadership theorists who believe that distant leadership is not fundamentally different than close leadership—distant leadership is just more difficult. Cascio (2000) contends that leadership is no different in a virtual setting than face-to-face; good leadership practices are just more important in a virtual setting because

the stakes are higher. Similarly, Avolio, Kahai, and Dodge (2001) believe that leadership processes do not differ in close versus distant relationships. They introduce the idea of e-leadership, which refers to leadership processes mediated by Advanced Information Technology (AIT; e.g., email, bulletin boards, group support systems, etc.). Fundamentally, they believe that our leadership theories are stable but that the expression of leadership through technology requires further examination.

Leaders who are more inspirational, caring, intellectually challenging, credible, honest, goal-oriented, and stable will be seen as more effective. The “behavior” that leads to being seen as more effective, however, will be in many cases mediated by AIT (Avolio, et al., 2001; p. 660).

Avolio and colleagues offer convincing arguments that though technology-mediated leadership has essentially been overlooked to this point, it is not because leadership is unimportant in a virtual environment. The interaction of leadership with AIT must receive more attention. “The question is not whether to study e-leadership, but where to start” (Avolio, et al., 2001, p. 663). In summary, theorists have written about distant leadership in a way that supports the popular leadership theories of transformational and transactional leadership.

Additional studies and conceptual pieces on distant leadership can be categorized into the transactional and transformational framework. In doing this, the literature clearly shows support for both the transactional and transformational leadership styles. For example, studies that give prescriptions for effective practices of virtual leaders like goal-setting, task-structuring, and a result-oriented style (Kurland & Bailey, 1999; Staples et al., 1999; Cascio, 1999) sound similar to transactional leadership. In fact, Sosik (1997)

makes a case for the use of a constructive transaction framework in distant leadership studies, which includes the best elements of transactional leadership: contingent reward management and goal setting.

Studies that argue for leaders creating a vision (Zaccaro, Ardison, & Orvis, forthcoming), coaching to empower subordinates (Wiesenfeld, Raghuram, & Garud, 1999), and inspiring and intellectually challenging subordinates (Avolio, et al., 2001) clearly fit into the transformational leadership category. Kahai, Sosik, and Avolio (1997) found effects for both participative and directive leadership depending on the structure of the problem.

Bass (1990) has argued that transformational and transactional leadership are both effective, and the studies just mentioned support the idea that either transactional or transformational leadership would be better than no leadership at all.

Hypothesis 1a: Transactional leadership will lead to higher performance and satisfaction of virtual workers compared to no leadership.

Hypothesis 1b: Transformational leadership will lead to higher performance and satisfaction of virtual workers compared to no leadership.

Additionally, a large number of lab studies comparing electronically-mediated transactional and transformational leadership found that transformational leadership was associated with group effects (Sosik, Avolio, & Kahai, 1997; Sosik, Avolio, Kahai, & Jung, 1998; Kelloway, Kelley, Gatién, & Barling, 2002) and individual effects (Sosik, Kahai, & Avolio, 1998; Kelloway et al., 2002) respectively. In contrast, in a study of banking managers and their employees, Howell and Hall-Merenda (1999) found that transformational leadership was associated with higher performance in close rather than

distant followers, which suggests that transformational leadership may have a lower impact when physical distances between leader and follower are larger. However, they also found that some elements of transactional leadership are more effective at high distances than low distances. Despite these findings, there is evidence in the larger literature that transformational leadership has effects over and above transactional leadership (Gellis, 2001; Judge & Bono, 2000). Accordingly, it appears reasonable to assume that as in prior research both on virtual and non-virtual workers transformational leadership would have stronger effects on performance and satisfaction. Thus, I propose the following comparative hypothesis:

Hypothesis 2: Transformational leadership will lead to higher performance and satisfaction of virtual workers than transactional leadership.

Altogether, there seems to be evidence that both transactional and transformational leadership can impact follower performance and satisfaction at a distance, but no one study has explicitly examined at the impact of these types of leadership on individual virtual workers working alone. Past studies have either been in a group setting (Kahai, et al., 1997; Sosik, 1997; Sosik, et al, 1997, Sosik, Avolio, et al., 1998; Sosik, Kahai, et al., 1998; Sosik, et al., 1999), have confounded face-to-face and electronically-mediated leadership behavior (Kahai, et al., 1997; Sosik, 1997; Sosik, et al, 1997, Sosik, Avolio, et al., 1998; Sosik, Kahai, et al., 1998; Sosik, et al, 1999), have only speculated on the role of distance in leadership (Zaccaro, forthcoming; Wiesenfeld, et al., 1999; Avolio, et al., 2001; Cascio 1999, 2000), or have not used the transformational leadership paradigm (Kahai, et al, 1997; Zaccaro, forthcoming; Wiesenfeld, et al., 1999; Kurland & Bailey, 1999; Staples, et al., 1999). Thus, one of the unique contributions of

this study is to hopefully clarify the existing literature by explicitly looking at the effects of transactional and transformational leadership on virtual followers, one follower at a time.

What is not clear at all in the research to date on virtual workers is what else they respond to that provides clues or cues about expected behavior. Thus, I raise the following question: Given that my manager only communicates with me virtually, what other sources of direction and inspiration exist that influence my performance and my satisfaction? The answer is that there is a possibility that cues and clues available to and used by organizations serve as substitutes for the presence of a manager and, indeed, serve as substitutes for managers or leaders who may not exist at all. I turn to the notion of substitutes for leadership next as a possible vehicle for furthering our understanding of the role of leadership and virtual work.

Substitutes for Leadership

Leadership in the form of a specific person so designated is not the only influence on subordinate outcomes. Kerr and Jermier's (1978) substitutes for leadership model had a major impact on the field of leadership studies (Podsakoff, et al., 1996a). Their basic hypothesis is that certain individual, task, and organizational variables can "substitute," neutralize, or enhance the effects of a leader's actions on subordinate job attitudes and performance.

This is a particularly useful framework for examining the conditions under which leadership can affect subordinate outcomes in a virtual setting. There is no implicit positive or negative connotation associated with the substitutes for leadership. In some

cases, it may be very appropriate for a substitute to replace the leader's influence, especially in a virtual environment.

Originally, researchers mainly studied the substitutes for leadership as moderators of leadership (Kerr & Jermier, 1978; Howell & Dorfman, 1981; Sheridan, Vredenburg, & Abelson, 1984; Podsakoff, Todor, Grover, & Huber, 1984; Howell & Dorfman, 1986; Pitner, 1986; Pitner & Charters, 1987-88; Vecchio, 1987; Farh, Podsakoff, & Cheng, 1987; Podsakoff, Niehoff, MacKenzie, & Williams, 1993; Podsakoff, MacKenzie, Ahearne, & Bommer, 1995; Podsakoff, MacKenzie, & Bommer, 1996b). Researchers believed that different levels of the substitutes variables would interact with leadership in predicting follower outcomes, such that given certain contingencies, leadership would be more or less effective.

Several meta-analyses and reviews of this "moderator hypothesis" have shown it to be unequivocally false and quite disappointing as it has been an assumption in the substitutes for leadership literature since the beginning (Podsakoff, et al., 1995; Podsakoff & MacKenzie, 1997; Podsakoff, et al., 1996a; Podsakoff, et al., 1996b; Podsakoff, et al., 1993; Podsakoff, et al., 1984). But, substitutes for leadership do have direct effects on outcome variables – in fact, they often explain just as much or more of the variance in outcome variables than leadership – and these are *main effects* (Podsakoff, et al., 1996a). Researchers have proposed these main effects of substitutes for leadership could be created in situations where leadership was impossible, ineffective, or merely inconvenient (Howell, Bowen, Dorfman, Kerr, & Podsakoff, 1997).

An example of a study that showed the main effects of leadership and substitutes for leadership on the performance and satisfaction of employees is Podsakoff et al.

(1993), in which the main effects were studied in three different samples: custodial employees in a university, employees in an insurance company, and managers in a gas transmission company. Employees rated their general satisfaction, and supervisors provided performance ratings. Using regression analysis, the researchers determined that some of the substitutes had a significant impact on satisfaction and performance. For example, the substitute *intrinsically satisfying tasks* had the greatest impact on satisfaction, with a regression coefficient of .25 ($p < .01$). Altogether, the substitute variables explained 42% of the variance in satisfaction. The main effects of the substitutes on performance were much weaker, with only *organizational formalization* significantly negatively related to performance.

In another study of the main effects of the substitutes for leadership variables, Podsakoff et al. (1996b) examined the effects of leader behaviors and substitutes for leadership on satisfaction and performance (among other criteria). Drawing from a multi-company sample of white-collar workers and their supervisors, employees completed satisfaction and substitutes for leadership items, and supervisors assessed their subordinates' in-role performance via survey measures. Similar to Podsakoff et al. (1993), *intrinsically satisfying tasks* had the greatest impact on general satisfaction, and 37% of the variance in satisfaction was accounted for by the group of substitutes for leadership. A small, but significant proportion of the variance in in-role performance was accounted for by the substitutes for leadership (3%). Results are generally supportive of the main effect of substitutes for leadership on important employee outcomes such as performance and satisfaction.

To summarize the main effects of substitutes for leadership, I describe Podsakoff et al.'s (1996a) meta-analysis of the relationship of the substitutes for leadership with job attitudes, role perceptions, and performance. They analyzed 36 separate samples and an incredible 435 relationships between substitutes for leadership, leader behaviors, and subordinate criterion variables. They found that with very few exceptions, substitutes for leadership had stronger relationships with employee criterion variables than did leader behaviors. These are the main effects discussed earlier. The substitutes for leadership explained 40% of the unique variance in employee satisfaction (compared to 17% explained by leader behaviors). For in-role performance, leader behavior accounted for more variance (7% versus 3%). They conclude that substitutes for leadership should be examined in their own right as main effects. Additionally, they suggest that future research conduct experimental research that manipulates both leader behaviors and substitutes for leadership to examine their effects on subordinate outcomes.

Thus, substitutes for leadership seem appropriate variables to study, especially where the leader and follower are separated by distance, almost necessarily making it more difficult to lead. Therefore, I seek to understand the predictors of satisfaction and performance for virtual workers by taking simultaneous advantage of both leadership and substitutes for leadership.

To this point, the substitutes for leadership have been categorized into individual, task, and organizational substitutes. Additionally, the list of substitutes in each of the categories has remained virtually unchanged since the inception of the model. Because it makes conceptual sense, I have added several other substitutes to the substitutes for leadership model that have been solidly documented to affect subordinate performance

and satisfaction. As this study is exploratory, I choose only one substitute from each of these three categories to examine in this study. The three substitutes chosen for this study make sense both in the context of virtual work, and they have also been solidly documented to affect performance and/or satisfaction. Refer to Table 1 for a description of each of the substitutes not used in the present study. In Table 1, I summarize their relationships to performance and satisfaction and the reasons each is not included in this study. The next section will describe each substitute category, suggest one substitute to study in each category, and then present hypotheses about each of the substitutes proposed for study.

Individual Characteristics

Individual substitutes are characteristics of the individual employee that can substitute for leadership, increasing the likelihood that the employee will be satisfied and productive at a distance. From Kerr and Jermier's original model, these substitutes include (1) ability, experience, training, and knowledge, (2) professional orientation, (3) indifference to organizational rewards, and (4) subordinate need for independence. In addition, given the literature on personality correlates of satisfaction and performance that has emerged since the original formulation, I also add personality dimensions as possible substitutes for leadership. Specifically, I examine the personality facet *conscientiousness* as it has been the most consistent personality variable that correlates with performance.

Conscientiousness is a trait of someone who is organized and methodical in accomplishing goals. Conscientiousness is the best predictor of performance of the five personality factors (Barrick & Mount, 1991; Mount & Barrick, 1995; Hertz & Donovan,

2000). Barrick and Mount (1991) propose that conscientiousness will be related to performance because “it assesses personal characteristics such as persistent, planful, careful, responsible, and hardworking, which are important attributes for accomplishing work tasks in all jobs” (p. 5). In addition, a conscientious person is typically able to work without supervision and would thus be a good candidate for virtual work. This type of person would be hypothesized to be more trustworthy when unsupervised. Thus, I propose that a conscientious person would be more productive when performing virtual work than someone who is not conscientious.

Hypothesis 3: Conscientiousness will be positively associated with performance of virtual workers.

Task Characteristics

Certain task characteristics decrease the need to rely on others to get work done and should therefore be related to performance in a virtual setting. However, these task characteristics may not be unanimously associated with higher satisfaction. Task characteristics from the substitutes literature include (1) unambiguous, routine, methodologically invariant tasks, (2) task-provided feedback concerning accomplishment, and (3) intrinsically satisfying tasks. Additionally, other task characteristics that may affect performance and satisfaction in a virtual setting are Hackman and Oldham’s (1975) job characteristics: skill variety, task identity, task significance, autonomy, and feedback. These job characteristics have been consistently associated with performance and satisfaction of regular workers (Fried & Ferris, 1987). In this study, I have chosen to focus on task-provided feedback because feedback has shown a strong relationship to both performance and satisfaction in non-virtual workers,

and as it does not require the presence of others for it to occur, I assume this relationship will hold for virtual workers.

Task provided feedback concerning accomplishment should be a critical task substitute associated with increased productivity and satisfaction in a virtual work setting. As the name indicates, to the extent that workers need only rely on the task for critical performance information, not only should they be more productive, but they should also be more satisfied. In a virtual setting, reliance on the task for critical feedback also means that feedback from others, including leaders and coworkers, becomes unnecessary. Given the difficulty in monitoring performance at a distance, the feedback provided by the task should be a strong substitute for leadership. Thus, by decreasing reliance on others, this substitute for leadership should both increase satisfaction and performance². Podsakoff et al. (1996a) find significant positive correlations between feedback and these outcome variables.

This substitute is also related to Hackman and Oldham's feedback dimension. Dodd and Ganster (1996) manipulated three job characteristics (feedback, variety, and autonomy) in a laboratory setting to assess the interactive effects of these job characteristics. In addition to main effects of feedback on performance, they also found an interaction between feedback and autonomy such that feedback produced higher performance, but only when autonomy was high. This could be interpreted to mean that feedback can increase performance, but it has the greatest effects when the feedback recipient has the freedom to make decisions about how best to approach the task. Dodd

² Kluger and DeNisi (1996) reviewed the effects of feedback interventions on performance and proposed that the literature shows inconsistent effects of feedback on performance, including some cases when feedback could be detrimental to performance. However, their feedback definition explicitly excluded

and Ganster did not find any effects of feedback on satisfaction. In a review and meta-analysis of the job characteristics model, feedback was strongly associated with productivity and satisfaction (Fried & Ferris, 1987), and given its relationship with these outcomes in the substitutes for leadership literature as well, I propose that feedback will be equally important for virtual workers.

Hypothesis 4: Feedback will lead to higher performance and satisfaction of virtual workers as compared to no feedback.

Organizational Characteristics

This dimension includes characteristics of the organization that might affect the performance and satisfaction of virtual workers. The organizational characteristics in the substitutes world are (1) organizational formalization, (2) organizational inflexibility, (3) advisory and staff support, (4) closely-knit, cohesive, interdependent work groups, (5) organizational rewards not within the leader's control, and (6) spatial distance between superior and subordinate. Additionally, I introduce two new substitutes, climate for performance and climate for well-being, as they may subsume these other attributes in psychologically meaningful ways and might substitute for a leader's influence, especially at a distance. For the purposes of this thesis, I focus on climate for well-being due to its proposed relationship with employee satisfaction.

Organizational climate refers to “the atmosphere that employees perceive is created in their organizations by practices, procedures, and rewards” (Schneider, Gunnarson, & Niles-Jolly, 1994, p. 18). As early as 1975, Schneider proposed that climate must be a climate “for something” (e.g., climate for service, climate for

“task-generated feedback” (p. 255), and thus these results are inapplicable to the type of feedback used in this study.

innovation, etc.). That is, it is not enough just to measure organizational climate; it is more meaningful and more predictive to give climate an anchor. I propose that there is a particular type of climate that would affect satisfaction of virtual workers. Because a climate is made up of employees' perceptions of the organizational policies, practices, and rewards, a climate for well-being would emerge when employees especially perceive that the company is interested in their well-being. James and James (1989) describe this general factor that is "the degree to which the individual believes that membership in this work environment is personally beneficial versus personally detrimental to his or her organizational well-being" (p. 740). This higher-order factor is also examined in Burke, Borucki, and Hurley (1992) and can be conceptualized as a climate for well-being. Logically, a climate for well-being should be positively related to satisfaction.

Hypothesis 5: A high climate for well-being will lead to higher satisfaction of virtual workers than a low climate for well-being.

The Relative Role of Leadership and Substitutes for Leadership on Virtual Worker Outcomes

Thus far, this thesis has reviewed two rather distinct literatures – leadership in a virtual setting and substitutes for leadership. Further, I have proposed main effects for both of these areas, namely that leadership and substitutes for leadership will have main effects on the outcome variables performance and satisfaction of virtual workers. Finally, I have argued that the "moderator hypothesis" from the substitutes for leadership literature – that different levels of substitutes for leadership will affect leadership differentially – has not had much support in the literature. But, to date the substitutes have been studied in field setting only. Perhaps there is not enough variation in

substitutes for leadership in the field or enough controls to detect the effects of an interaction. Thus, a much more direct test should detect any moderator effects, if any exist. Given that this study creates a unique opportunity to manipulate both leadership and substitutes for leadership in a laboratory setting, as will be described below, I propose that there may be interaction effects between the leadership and the substitutes for leadership variables and among the substitutes for leadership variables themselves. This section focuses on these interaction effects.

There exists an opportunity to examine what will happen when these leadership variables are combined with substitutes for leadership. As an example, consider climate for well-being. In the transformational leadership condition, a climate for well-being probably will not make much of a difference, i.e., the satisfaction of virtual workers will not be significantly different when they have a transformational leader who is paired with a low climate for well-being or a high climate for well-being. This is because transformational leadership has a strong influence on performance and satisfaction. However, with transactional leadership, perhaps a high climate for well-being will elicit higher satisfaction from virtual workers as compared to a low climate for well-being. That is to say that a high climate for well-being can compensate for a leader who is not transformational. As a graph of this relationship might be easier to follow, please refer to Figure 1.

In fact, a laboratory study investigating the effects of charismatic leadership and task feedback on performance found this exact interaction pattern (Shea & Howell, 1999). In the feedback condition, charismatic and noncharismatic leadership produced similar performance levels. But, in the no feedback condition, charismatic leadership had

significantly higher levels of performance than the noncharismatic leadership condition. This indicates that feedback can compensate for a leader who is not charismatic.

I propose that in general, transformational leadership can compensate for a deficient substitute for leadership and vice versa. Thus, either strong leadership (i.e., transformational) or strong substitute for leadership (i.e., either high climate for well-being, task provided feedback, or conscientiousness) will be associated with higher performance and satisfaction of virtual workers. Given the relationship proposed in the previous sections, I present the following interaction hypotheses:

Hypothesis 6a: There will be an interaction between leadership and climate for well-being such that a high climate for well-being will be associated with greater satisfaction of virtual workers in all leadership conditions, but a low climate for well-being will be associated with greater satisfaction only in combination with transformational leadership.

Hypothesis 6b: There will be an interaction between leadership and conscientiousness such that high conscientiousness will result in higher performance in all leadership conditions, but low conscientiousness will result in higher performance only in combination with transformational leadership.

Hypothesis 6c: There will be an interaction between leadership and feedback such that feedback will result in high performance and satisfaction in all leadership conditions, but no feedback will result in higher performance and satisfaction only in combination with transformational leadership.

It is also possible that different substitutes for leadership may substitute for different types of leadership. For example, perhaps climate for well-being only

substitutes for transformational leadership whereas feedback and conscientiousness might more readily substitute for transactional leadership. We might expect this pattern of results because a climate for well-being may inspire employees or show employees a higher purpose for completing the work, which is similar to the effects of transformational leadership. Similarly, feedback is more similar to something that a transactional leadership would give or withhold, so perhaps feedback substitutes only for transactional leadership. These relationships will be explored in post-hoc analyses.

Beyond the two-way interactions, there could be three-way or four-way interactions among the independent variables. Practically speaking, I am not optimistic about finding three- and four-way interactions because I believe that having a combination of one leadership and one substitute for leadership should be sufficient to produce the highest levels of performance and satisfaction. Thus, I propose only the above interactions between leadership and substitutes for leadership.

Summary and Justification of Laboratory Experiment

Above, various levels of leadership and substitutes for leadership variables are hypothesized to influence a virtual worker's productivity and satisfaction. These leadership and substitutes for leadership variables were chosen on the basis of past research that shows strong relationships between these variables and the outcomes of interest in this study: performance and satisfaction. Additional substitutes from the literature were only briefly mentioned; readers may refer to Table 1 where all are listed. Obviously, including multiple levels of each of the substitutes and the leadership variables would require quite a large sample size, which is beyond the scope of the

proposed study. Thus, I have chosen four variables (1 leadership and 3 substitutes) to study in a laboratory setting.

As the study of virtual work is still in its infancy and many studies have been carried out in a field setting using survey methodology, a need exists for study with more control for the testing of specific hypotheses. Crossing the field of virtual work with leadership and substitutes for leadership calls for a carefully controlled laboratory study as a first investigative step. Although a much larger conceptual model could be imagined using each and all of the substitutes for leadership, in this study I will only be manipulating and testing the leadership variables (i.e., transactional leadership, transformational leadership, and no leadership) and some of the most promising substitutes for leadership, including both individual (i.e., conscientiousness), task-related (i.e., feedback) and organizational (i.e., climate for well-being) attributes. See Figure 2 for the proposed model.

Method

Sample

One hundred fifty-four students in twelve summer classes at the University of Maryland–College Park participated in return for extra credit points in their classes. Of these, seven participants' data were unusable, either due to experimenter procedural errors (e.g., missing directions) or participants' failure to follow instructions. The majority of participants were female (70.7%) and Caucasian (53.7%). The rest of the participants were Asian-American (14.3%), African-American (12.9%), International (6.1%), Biracial (3.4%), Hispanic (2.7%), or Other (6.8%). Most were upper-level students (57.1% seniors, 23.1% juniors), and exactly a third (33.3%) were psychology majors. The average age was 21.65 ($SD = 3.65$).

Design

The design for the study was a 3 (transactional, transformational, or no leadership) by 2 (task feedback or no task feedback) by 2 (high or low climate for well-being) completely randomized between subjects design. Additionally, individual participants' conscientiousness was assessed. Finally, ability served as a covariate in the performance hypotheses and was assessed as performance on a practice version of the task.

As conditions were randomly assigned to participants (as well as the usual vice versa), there were not equal numbers of participants in each condition. For leadership, 47 (32%) received the “no leadership” email, 48 (32.7%) received the “transactional” email, and 52 (35.4%) received the “transformational” email. For climate for well-being, 68 (46.3%) received the “low” climate for well-being letter and 79 (53.7%) received the

“high” climate for well-being letter. Finally, for feedback, 76 (51.7%) did not receive feedback, and 71 (48.3%) received feedback.

Task

In this study, the task was designed to be completed independently and was inspired by Kirkpatrick (1992). Kirkpatrick had participants complete a “simulated production task” (p. 50), which involved following specific instructions to insert pages into a binder. As in Kirkpatrick’s study, the production task developed for this experiment has both a quality and quantity component, with quality based on the number of errors and quantity based on the number of pages inserted. A practice trial of the task is included so as to control for any potential effects of ability differences on the obtained results. It could be argued that the task is somewhat boring; the reason for using a relatively low-skill task is that the effect of leadership should enhance motivation and thus enhance performance (S. A. Kirkpatrick, personal communication, March 20, 2003). Additionally, this task provided a completely objective measure of performance, which is an element that was missing from previous studies of leadership of virtual workers.

Procedure

Please see Appendix A for a complete description of the procedure. Participants were greeted in the hallway and given an informed consent form (see Appendix B) and the 50-item Goldberg (1999) personality scale (see Appendix C). Each participant was randomly assigned to one of the 12 conditions. After completing the informed consent form and the personality questionnaire, participants were brought into an individual room in the lab and were instructed to sit at a table with a computer. The experimenter told the participant a cover story about the background of the study, demonstrated how to use the

timer, and gave brief instructions on opening an email (see the procedure Appendix A).

The experimenter told the participant to read and follow the instruction sheet on the table, and then left the room.

The instruction sheet directed the participant to a series of numbered envelopes on the table in his/her room (see Appendix D). Envelope #1 contained instructions for the practice trial of the task, a binder with tabs, and pages to insert into the binder. The task was to assemble pages in a binder based on a set of written instructions. The participants had 12 minutes to complete the practice trial. See Appendix E for the task instructions and rules for inserting the pages.

Following the practice trial, the participant would open Envelope #2, which included the feedback manipulation (either feedback or no feedback). In the feedback condition, participants were given a self-scoring sheet that listed the correct order of pages for the practice trial binder. In the no feedback condition, participants did not self-score their performance but instead read an article from *The Monitor on Psychology* (Smith, 2002) which served as a distracter task. In both cases, the participant moved on to the next envelope after three minutes. See Appendix F for the feedback manipulation and Appendix G for the instructions accompanying the distracter article used in the no feedback condition.

After three minutes, the participant opened Envelope #3, which contained the climate for well-being manipulation (either high or low climate for well-being). Inside Envelope #3 was a letter from BDR Publishing, which included the climate for well-being manipulation and a cover sheet that encouraged a careful reading of the enclosed letter (see Appendix H). The letter described a partnership between the I/O Psychology

program at the University of Maryland and BDR Publishing whose purpose was to determine whether or not BDR Publishing should implement a telecommuting program. In the high climate for well-being condition, the company was described as a place that cares about employees, and it listed employee-centered reasons for having a virtual work setting (e.g., lower commute time, flexibility, etc.). In the low climate for well-being condition, the company was described as a place where costs are the main concern, and it lists cost-centered reasons for having a telecommuting setting (e.g., reduced costs of leasing office space, etc.). See Appendices I and J for the low and high climate for well-being letters, respectively.

Next, participants opened Envelope #4, which instructed them to check the email account on the computer in the room (see Appendix K). An email containing the leadership manipulation was in the inbox of the Groupwise email package. The email was from the CEO of BDR Publishing and exhibited either a transformational, transactional, or no leadership style. The no leadership condition was adapted from Kirkpatrick and Locke's (1996) study and described the process of making paper. The transactional leadership email described the task and carefully laid out expectations and how performance would be evaluated. It reiterated the extra credit that would be given for completing the task. Finally, the leader said that he would be satisfied with the participant if he/she worked carefully and performed well on the task. The transformational leadership email expressed confidence in the follower. It described some important consequences of the task. The transformational leader also described a vision for BDR Publishing and reiterated the company's commitment to quality. See Appendix L through N for the leadership manipulation.

Then, participants opened Envelope #5, which contained the trial version of the binder assembly task. The instructions mirror those from the practice binder task. Additionally, rules for inserting the pages into the binders are stapled to the instructions. The participant read the instructions, set his/her timer for 12 minutes, and began the task. See Appendix O for the trial instructions and rules.

Envelope #6 contained a second round of feedback, this time for the trial binder task (see Appendix P). Participants in the feedback condition received feedback both on the practice version and the trial version, while participants in the no feedback condition read a distracter article in both cases (Greengrass, 2003). Three minutes were given for this part of the experiment.

Finally, Envelope #7 contained the post-questionnaire (see Appendix Q). The post measures contained questions on satisfaction (See Appendix R), manipulation checks (see Appendix S), and demographics. Participants were instructed to open their doors when they finished the post-questionnaire. At this point, the experimenter entered the room, talked briefly with participants, and described the email debriefing procedure that they would receive at the end of the semester (see Appendix T for the debriefing email). The study took no longer than one hour and fifteen minutes to complete.

Measures

Manipulation Checks

Believability of the telecommuting setting. In order for the simulation to make sense, the participants needed to believe that they are actually working away from the main office. A sample item was “In this experiment, I was working away from the main

office.” The three-item scale used ratings from 1 to 7 (1= strongly disagree, 7 = strongly agree). The reliability of this new scale was .64.

Climate for well-being. As participants read the climate for well-being manipulation rather than experiencing it in person, it was important that the participants understood the manipulation. An example question from this scale was “The number one priority of BDR Publishing is its employees.” The ten items like this one were rated on a scale of 1 (strongly disagree) to 7 (strongly agree). The reliability of this scale was $\alpha = .92$.

Leadership. Manipulation checks for leadership style were based on a combination of transactional and transformational leadership scales from Podsakoff, MacKenzie, Moorman, and Fetter’s (1990) Leader Behavior Scale, Sosik’s (1997) modified MLQ items, and some new items. The transactional leadership scale consisted of eight items and had a Cronback alpha of .82. The transformational leadership scale consisted of eighteen items and also had acceptable reliability ($\alpha = .90$). Each item was rated on a seven-point scale from 1 (strongly disagree) to 7 (strongly agree).

Feedback. The three items from the feedback subscale of the substitutes for leadership measure were used to determine whether the feedback manipulation was received. The items were modified to start with “The task” instead of “My job” and were changed to past tense. An example item was “The task provided me with feedback on how well I was doing.” Each of the three items was rated on a 7-point Likert (1 = strongly disagree, 7 = strongly agree). The reliability for this scale was $\alpha = .90$.

Independent Variables

Conscientiousness. Conscientiousness was the only independent variable that was not manipulated. Conscientiousness was measured using the 10-item conscientiousness subscale of the Goldberg five-factor personality scale (Goldberg, 1999). Participants rated each statement from 1-5 (1 = very inaccurate, 5 = very accurate). The ten item conscientiousness scale had acceptable reliability ($\alpha = .77$), and an example item was “Pay attention to details.”

Dependent Variables

Satisfaction. Satisfaction with the task was rated using Kirkpatrick’s (1992) four-item measure. An example item was, “In general, I was satisfied when doing the task,” and it was rated on a 7-point scale (1 = strongly disagree, 7 = strongly agree). The reliability for the task satisfaction scale was $\alpha = .88$.

Performance. As in Kirkpatrick’s (1992) study, performance was objectively measured on two dimensions: quality (i.e., a count of the number of correctly inserted pages) and quantity (i.e., a count of the total number of inserted pages). Additionally, as a control for ability, performance on the practice trial was entered as a covariate during the analyses of performance. The four performance variables used in the study were: “Practice Right” (quantity covariate), “Practice Wrong” (quality covariate), “Trial Right” (quantity), and “Trial Wrong” (quality).

Results

Power Analyses

In computing a power analysis based on the equation suggested by Cohen and Cohen (1983), at $\alpha = .05$, power = .90, 4 independent variables, and a population R^2 as low as .10, the number of participants needed was $n = 144$.

Pilot Studies

To ensure that the manipulations were received as planned, I conducted two pilot studies using 21 undergraduate students. The focus was on ensuring the manipulations were working properly. Participants went through the exact study procedure, and they were asked for their suggestions in improving the experiment, with a specific focus on the power of the manipulations. If the manipulations were perceived as intended, the study could proceed.

Pilot Study 1

The first pilot study used 14 students from the introductory psychology classes who participated in return for course credit. The pilot procedure followed the basic structure of the method described above for the real study. Differences included the time on the task (10 minutes, not 12 minutes), a letter from Human Resources (HR) rather than a letter from the company, a longer explanation of the purpose of the experiment, an added incentive for trying hard (i.e., a lottery that pays real money, with increased chance of winning for more pages inserted), and that the email was supposedly sent directly from the “Manager of the Virtual Work Program” rather than a forwarded email from the CEO. Critical changes were made for the second pilot based on participant comments. For example, participants suggested that the time to complete the task increase and the

length of the task decrease. They did not remember the information from the “HR Memo” because it was too long, and participants were unsure why a letter would be sent from HR. Participants thought the experiment was studying the effects of incentives (i.e., money) on motivation, and each declared that he/she was not affected by this incentive; thus the lottery statement was taken out of subsequent materials. To increase the believability of the company, participants suggested adding a business card to the materials and changing the headings on the papers to look more like company letterhead.

Basic analyses of the manipulation check data revealed that most transformational leadership items were working in the right direction, i.e., those participants in the transformational leadership condition were rating the transformational leadership items higher than participants in the transactional leadership condition. However, some transformational leadership items did not seem to apply to this experiment. In particular, items tapping into the transformational leadership dimensions of providing an appropriate model, idealized influence, and individualized support showed no differences between conditions. It makes sense that modeling behavior and providing individual support was difficult to do when the leadership manipulation comes via a single email. Items tapping the articulating a vision dimension also were not rated much differently between the transactional and transformational conditions. In the subsequent pilot, the transformational leadership email was changed to provide a stronger vision statement.

Transactional leadership items were also not working in the intended directions in the first pilot study. These items were rated higher by participants in the transformational condition than participants in the transactional condition. This may have been because the items are “constructive” transaction items, i.e., they reflected a positive connotation

for transactional leadership, such as providing goals and clarifying expectations. New items were added to the next pilot to reflect more of a focus on the task.

Finally, the climate for well-being manipulation appeared to be working, based on both the measures and on participants' comments. One participant in the low climate for well-being condition said, "You can tell the company doesn't care about its employees."

Pilot Study 2

Seven participants from a summer class participated in the second pilot study, and they received extra credit in their class in return for their participation. Based on feedback from Pilot Study 1, changes for Pilot Study 2 included: a shortened letter from the company (formerly the HR Memo), the explanation given by the experimenter was shortened and the purpose of the study was removed, the length of the task itself was shortened and the time given to complete it was lengthened, and the leadership emails were modified to reflect a greater vision (for transformational leadership) and greater task focus (for transactional leadership). Participants reacted favorably to the changes. They felt that the timing of the experiment was good, that the instructions were very clear, that a forwarded email coming from the CEO (rather than from the Manager of the Virtual Work Program) made sense, and that the company seemed realistic. Overall, I felt confident enough with the results from Pilot Study 2 to move forward with the experiment.

Preliminary Analyses

Descriptive Statistics

Table 3 lists the means, standard deviations, internal consistency reliabilities, and intercorrelations among the scales. The means and standard deviations for the dependent

variables broken down by condition are listed on separate tables: leadership condition (Table 3), climate for well-being condition (Table 4), and feedback condition (Table 5).

Manipulation Checks

Believability of Telecommuting Setting. It is important for the participants to believe they are working at a distance from the leader in order to make the claim that the leadership manipulations are *virtual* leadership manipulations. The average score for the distance scale is greater than 4 ($M = 5.84$, $SD = 0.91$); thus participants felt they were working at a distance from the leader.

Climate for Well-Being. A high score on the climate for well-being scale indicates that the company cares about the well-being of employees. The climate for well-being manipulation was effective. There are significant differences between the low climate for well-being group ($M = 3.94$, $SD = 1.08$) and the high climate for well-being group ($M = 5.04$, $SD = 1.02$), $t(145) = -6.38$, $p < .001$.

Leadership. This manipulation check is especially important because the leadership manipulation comes via email, the central focus of the study. It is important to know if participants correctly perceived the leadership styles contained in the email message. Participants in the transactional leadership condition ($M = 5.17$, $SD = .96$) had higher ratings on the transactional leadership scale than participants in the other two leadership conditions ($M_{TF} = 4.66$, $SD_{TF} = 1.06$; $M_{NL} = 4.01$, $SD_{NL} = 1.06$), $F(2, 144) = 14.93$, $p < .001$. However, post hoc tests reveals that participants in the transformational leadership condition ($M = 4.50$, $SD = 0.99$) had higher ratings on the transformational leadership scale than participants in the no leadership condition ($M = 3.81$, $SD = 0.87$), but not than those in the transactional leadership condition ($M = 4.40$, $SD = 0.88$).

Feedback. The feedback manipulation was effective, with high feedback condition participants rating feedback higher ($M = 5.10$, $SD = 1.67$) than those participants in the low feedback condition ($M = 2.85$, $SD = 1.42$), $t(145) = -8.771$, $p < .001$.

Condition Equivalence at Practice Trial

I tested to ensure that the groups were not significantly different on the practice trial of the task, i.e., before they received any of the manipulations. Results support condition equivalence. There are no significant differences between the leadership conditions on either of the practice performance variables: Practice Correct (Quantity), $F(2, 144) = 2.05$, $p > .05$; Practice Wrong (Quality), $F(2, 144) = 0.34$, $p > .05$. There were also no differences between the climate for well-being conditions: Practice Correct (Quantity), $t(145) = -1.40$, $p > .05$; Practice Wrong (Quality), $t(145) = 0.24$, $p > .05$. Finally, there were no differences between the feedback conditions on the practice trial performance variables: Practice Correct (Quantity), $t(145) = 0.89$, $p > .05$; Practice Wrong (Quality), $t(145) = -0.78$, $p > .05$. Performance does not differ in the practice trials for any of the conditions.

Hypothesis Tests

Hypotheses were tested using the SPSS Univariate procedure and specifying the hypothesized interaction terms³. This procedure gives equivalent results to a multiple regression. Performance variable tests are conducted on quantity (i.e., number correct) and quality (i.e., number incorrect). Recall that the variables hypothesized to affect performance were leadership, feedback, conscientiousness, the interaction between

leadership and feedback, and the interaction between leadership and conscientiousness. The variables hypothesized to affect satisfaction were leadership, feedback, climate for well-being, the interaction between leadership and feedback, and the interaction between leadership and climate for well-being. Source tables are presented for each of the performance variables (see Tables 6 – 7) and satisfaction (see Table 8). Some of the hypothesis tests that follow are based on results from these source tables. Practice trial performance was included as a covariate for all performance analyses⁴.

Main Effects of Leadership

Hypothesis 1a, 1b, and 2 made predictions about the effects of leadership on performance and satisfaction. From Table 6, the effect of leadership condition on performance quantity is significant: $F(2, 137) = 4.9, p < .01$. Post hoc analyses revealed that the only significant difference was between the transformational and transactional conditions, such that performance quantity was significantly greater in the transactional condition ($M = 25.68, SD = 0.62$) than in the transformational condition ($M = 24.47, SD = 0.60$)⁵. Thus, the first part of Hypothesis 1a—that transactional leadership would lead to higher performance than no leadership—is not supported for performance quantity ($M_{TA} = 25.68, SD_{TA} = 0.62; M_{NL} = 25.46, SD_{NL} = 0.62$). Additionally, the first part of Hypothesis 1b—that transformational leadership would lead to higher performance than no leadership—was not supported for performance quantity ($M_{TF} = 24.47, SD_{TF} = 0.60$;

³ Results are presented by specifying the interaction terms rather than using the full ANOVA model. However, when the full ANOVA models are run with all possible interactions, allowing for the full power of the ANOVA procedure, the results do not change.

⁴ When these analyses were conducted without practice trial performance as a covariate, the significance levels drop off. For example, without including practice trial performance for the quantity performance analysis, the r^2 value drops from .695 to .078. Thus, it is important to include practice trial performance in these analyses.

⁵ The means reported here and elsewhere with regard to performance represent the means adjusted for the effects of the covariates, practice trial performance and conscientiousness.

$M_{NL} = 25.46$, $SD_{NL} = 0.62$). Finally, the first part of Hypothesis 2—that transformational leadership would lead to higher performance than transactional leadership—was also not supported. In fact, this effect was in the opposite direction from that predicted.

Leadership did not affect performance quality $F(2, 137) = 2.0$, $p > .05$. Thus, there is no support for Hypothesis 1a, 1b, or 2 with regards to performance quality ($M_{TF} = 1.25$, $SD_{TF} = 0.27$; $M_{TA} = 1.49$, $SD_{TF} = 0.28$; $M_{NL} = 1.02$, $SD_{NL} = 0.29$). Leadership's effect on satisfaction was significant but not at the conventional .05 level: $F(2, 138) = 2.5$, $p < .10$. Post hoc tests revealed that this effect on satisfaction can be attributed to a difference between the transactional condition ($M = 4.94$, $SD = 1.21$) and the no leadership condition ($M = 4.26$, $SD = 1.54$), $p < .10$ ($M_{TF} = 4.49$, $SD_{TF} = 1.65$). This shows minor support for Hypothesis 1a. There was no support for the satisfaction components of Hypothesis 1b or Hypothesis 2.

Main Effects of Substitutes for Leadership

Hypothesis 3 predicted that conscientiousness would be positively associated with performance. Conscientiousness is significantly related to quantity on both the practice trial ($r = .19$, $p < .05$) and the real trial ($r = .15$, $p < .05$) of the task. Conscientiousness is not significantly related to performance quality on either the practice trial ($r = -.04$, $p > .05$) or the real trial ($r = .00$, $p > .05$). However, once the effect of practice trial performance was included, there is no significant effect of conscientiousness on performance quantity or performance quality: $F_{\text{quantity}}(1, 137) = 0.16$, $p > .05$; $F_{\text{quality}}(1, 137) = 0.13$, $p > .05$. Overall, there is minor support for Hypothesis 3.

Hypothesis 4 predicted that feedback would lead to higher performance and satisfaction as compared to no feedback. There were no main effects for feedback for

either performance or satisfaction: $F_{\text{quantity}}(1, 137) = 2.28, p > .05$; $F_{\text{quality}}(1, 137) = 0.14, p > .05$; $F_{\text{satisfaction}}(1, 138) = .06, p > .05$. Means for quantity were $M_F = 25.74, SD_F = 0.51$ and $M_{NF} = 24.67, SD_{NF} = 0.49$. Means for quality were $M_F = 1.19, SD_F = 0.23$ and $M_{NF} = 1.31, SD_{NF} = 0.23$. Means for satisfaction were $M_F = 4.53, SD_F = 0.18$ and $M_{NF} = 4.59, SD_{NF} = 1.7$. Thus, there is no support for Hypothesis 4.

Hypothesis 5 predicted that a high climate for well-being would lead to higher satisfaction than a low climate for well-being. The effect of climate for well-being on satisfaction was not significant: $F(1, 138) = 0.13, p > .05$ ($M_H = 4.51, SD_H = 0.17$; $M_L = 4.60, SD_L = 0.18$). Thus, there is no support for Hypothesis 5.

Hypothesis 6a predicted an interaction between leadership and climate for well-being such that high climate for well-being would lead to higher satisfaction in all leadership conditions but low climate for well-being would lead to higher satisfaction only in combination with transformational leadership. There was no support for an interaction between leadership and climate for well-being: $F(2, 138) = 0.33, p > .05$. Hypothesis 6a was not supported.

Hypothesis 6b predicted an interaction between leadership and conscientiousness such that high conscientiousness would lead to higher performance in all leadership conditions but low conscientiousness would lead to higher performance only in combination with transformational leadership. There was no significant interaction between leadership and conscientiousness on quality of performance: $F(2, 137) = 0.43, p > .05$. There was a significant interaction between leadership and conscientiousness on quantity of performance: $F(2, 137) = 4.23, p < .05$. High conscientiousness leads to higher performance in all leadership conditions except for transactional leadership. Low

conscientiousness leads to higher performance only in combination with transactional leadership, which is not as predicted. The hypothesis that low conscientiousness would lead to higher performance only in combination with transformational leadership is not supported. See Figure 3 for an illustration of this interaction. Thus, there was no support for Hypothesis 6b.

Hypothesis 6c predicted an interaction between leadership and feedback such that feedback would lead to higher performance and satisfaction in all leadership conditions, but no feedback would lead to higher performance only in combination with transformational leadership. There was no significant interaction between leadership and feedback with regards to satisfaction: $F(2, 138) = 1.19, p > .05$. Hypothesis 6c was not supported with regards to satisfaction. There was a significant interaction between leadership and feedback with regards to performance quantity: $F(2, 137) = 3.28, p < .05$. The only condition where feedback is associated with higher performance is in combination with transactional leadership. See Figure 4 for a plot of this interaction. Thus, hypothesis 6c is partially supported with regards to performance quantity, though the relationships are not in the expected directions. There was a significant interaction between leadership and feedback with performance quality as the dependent variable: $F(2, 137) = 3.10, p < .05$. Participants made the same amount of errors regardless of feedback in the transformational leadership condition. In the no leadership condition, participants made more errors when they received feedback than when they did not receive feedback. Only participants in the transactional leadership had fewer errors when they received feedback than when they did not receive feedback. See Figure 5 for a plot of this interaction.

Discussion

Overview of Findings

The purpose of this study was to examine leadership at a distance—to conceptualize and study how distant leadership might be reflected in the performance and satisfaction of “virtual workers.” The virtual workers studied were undergraduate students working alone on a task. Additionally, this research developed and tested some hypotheses with regard to substitutes for leadership and their impact on the performance and satisfaction of virtual workers.

The laboratory experiment used for data collection was designed to simulate a virtual workplace, where employees are working alone without any interaction with or from the main office, except through written and email communication. With this methodology, the leadership manipulation was absolutely distant; the leader and follower had no previous interaction, and did not meet face-to-face. The only information participants received from or about the leader was through a single email from the leader.

Unfortunately, support for the hypotheses was meager. Transformational leadership at a distance had no effect on either performance or satisfaction. Transactional leadership had some effect on performance but no effect on satisfaction at conventional levels of significance. There were also no main effects of substitutes for leadership on performance or satisfaction. However, post-hoc analyses revealed several interesting interactions which suggest that combinations of the substitutes for leadership with transactional leadership differentially affected performance. For example, one of the substitutes for leadership studied concerned individual Conscientiousness as measured via the FFM; results indicated there was an interaction between Conscientiousness and

leadership. The interaction indicated that higher Conscientiousness was associated with higher performance in the no leadership and transformational leadership conditions but was associated with lower performance when paired with transactional leadership.

Another example of the interactions concerned feedback to the virtual workers; there was an interaction between leadership and feedback such that feedback was only effective at increasing performance and decreasing errors when it was combined with transactional leadership.

Summary of Major Findings

Hypotheses 1a, 1b, and 3 predicted that transformational leadership would have the largest effect on performance and satisfaction, followed by transactional leadership, then no leadership. However, only transactional leadership increased performance and to a smaller extent, satisfaction. Transactional leadership was associated with greater performance quantity (i.e., the number of pages inserted correctly) but not performance quality (i.e., the number of pages inserted incorrectly). However, this increase in performance quantity for the transactional leadership condition was not significantly different from the no leadership condition. Transactional leadership's effect on satisfaction was not significant at conventional levels (i.e., it was significant at $p < .10$).

The tests of hypotheses with regard to the substitutes for leadership also revealed meager support. Conscientiousness (H3) was correlated with performance quantity on both the practice trial and the real trial of the task, but it did not have an effect after controlling for performance on the practice trial. This may, of course, have been due to the fact that Conscientiousness was reflected in performance on the trial so removing trial performance also removed the effect of Conscientiousness. The two other substitutes for

leadership studied, Feedback (H4) and climate for well-being (H5), did not have main effects on performance or satisfaction.

Hypothesis 6a, 6b, and 6c predicted interactions between leadership and the substitutes for leadership such that when substitutes for leadership were high, performance or satisfaction would be high, but when substitutes for leadership were low, higher performance and satisfaction would result only when those substitutes were combined with transformational leadership. None of these specific hypothesized interactions were supported. Though manipulations were always given in the same order, given the paucity of results, this was not a likely explanation for significant findings.

Interactions Between Leadership and Substitutes for Leadership

Interactions between leadership and substitutes for leadership that were not predicted emerged in post-hoc analyses. First, there was an interaction between leadership and Conscientiousness with regards to performance quantity. High Conscientiousness participants had greater performance quantity than low Conscientiousness participants in all leadership conditions except transactional leadership. In fact, low Conscientiousness paired with transactional leadership had superior performance quantity to all other combinations of Conscientiousness and leadership. This suggests that in the absence of a natural inclination to help (i.e., high Conscientiousness), a participant can be induced to perform by transactional leaders (e.g., who promise future rewards).

At first glance, it is surprising that high Conscientiousness people would have lower performance quantity when paired with a transactional leader (see Figure 3). However, this finding makes sense if the participant views transactional leadership as

unnecessary. By the leader focusing on what is expected to be rewarded and specifying how to do the task in detail, highly Conscientious participants might feel that this is excessive—that the leader is not necessary in helping to effectively perform the task. Indeed, perhaps transactional leadership undermines intrinsic motivation to do well on the task, and thus the change in performance quantity is much smaller than any other pairing of conscientiousness and leadership.

This interaction between leadership and Conscientiousness may be an important finding because it signals an interaction between leadership style and follower individual differences. Transformational leadership may be consistent with high Conscientiousness, but transactional leadership appears to be most consistent with low Conscientiousness. If this hypothesis is supported in additional studies, it might explain differences in findings when research has been accomplished on intrinsic motivation (e.g., Deci, 1975). In research on intrinsic motivation sometimes the findings support the idea that extrinsic rewards can depress performance but in other studies extrinsic rewards increase performance (Deci & Ryan, 1980). Perhaps the participants in these different studies differed in their levels of Conscientiousness. Future research on intrinsic motivation is expected to examine dispositional tendencies and personality traits (Kanfer, 1990).

Another interaction that was significant was between leadership and feedback with regards to performance quantity. In this case, feedback had no effect when paired with transformational leadership. Feedback was associated with lower performance in the no leadership condition. Only when paired with transactional leadership did feedback increase performance quantity, which suggests that feedback and transactional leadership are complimentary and mutually reinforcing. See Figure 4.

Finally, there was an interaction between leadership and feedback with regards to performance quality (i.e., the number of errors). Figure 5 shows that the no leadership condition had more errors when given feedback than when there was no feedback. The transformational leadership condition had approximately the same number of errors regardless of feedback. The transactional condition had fewer errors when given feedback than when there was no feedback. In the absence of leadership, feedback actually led to more errors on the task. However, when paired with transactional leadership, feedback decreased the number of errors on the task. Again, transactional leadership and feedback appear to be complimentary.

These findings for the interactions between feedback and leadership on quality and quantity of performance fit nicely with Shea and Howell's (1999) results. In their laboratory study of the interactive effects of leadership and task feedback, Shea and Howell found exactly the same pattern of results. Participants in the noncharismatic leadership condition had differential performance depending on whether they received feedback or not. In contrast, participants in the charismatic leadership condition had the same performance regardless of whether they received feedback or not. This suggests that feedback is only necessary when paired with noncharismatic leadership. The take-away from the discussion of the interactions between leadership and feedback on performance is that transactional leadership should be paired with task feedback if effects of leadership are going to be found, though feedback is not relevant when the leadership is of the transformational (or charismatic) sort.

Interpretation of Results

In brief, there was an apparent failure of the manipulations to behave as hoped and as revealed in the extensive pilot-testing of the procedures. First, the transformational leadership manipulation was essentially equivalent to the transactional leadership manipulation despite the broad pilot-testing that was done to attempt to ensure differences. It would seem that in distance leadership studies the manipulations must be very strong to have the intended effects. There is some support for this notion in the literature. In their laboratory study of the content and delivery of a charismatic leadership message, Awamleh and Gardner (1999) found that the delivery was more important than the content of the message. Holladay and Coombs (1994) had similar findings—that a strong delivery paired with a weak message led to greater ratings of charisma than a strong message paired with a weak delivery.

Another related thought is that in the absence of face-to-face meetings and/or a strong message, participants use their implicit theory of leadership (Lord & Emrich, 2001) as a basis for making the ratings of leadership. There is also some support for this idea in the literature. That is, Shamir (1995) found that distant leaders were seen as more prototypical compared to close leaders, which suggests that information about distant leader is “inevitably vague and general” (Yagil, 1998, p. 164). Thus, because CEOs are expected to be transformational, participants in both leadership conditions rated the leaders as transformational.

It is also surprising that there were no main effects for the substitutes for leadership variables, especially given the fact that they were specifically chosen to be the most powerful substitutes of their category (individual, task, and organizational substitutes). While the hypothesized interactions may not have emerged due to the

problems with the leadership manipulations, there were some potentially interesting interactions nevertheless, as discussed earlier. These may be fruitful arenas for additional research but as they were not hypothesized here, additional conceptual work is obviously required.

With regard to the feedback substitute, it may have been a poor choice to have provided only task feedback on participants' own performance rather than normative (i.e., comparative) feedback. In fact, participants in the pilot studies expressed a desire for normative feedback. In piloting, approximately 20% of participants said that they wanted a comparison for their performance, when asked what they thought of the feedback. I decided to keep the feedback non-comparative because of the idea that when working at a distance, teleworkers no longer have co-workers with whom to compare their performance. Salaff (2002) writes that:

Telework has raised the ante. Now that the norm is working more hours from home, they feel their careers will suffer if they cannot increase their workload from home. (p. 483)

This escalates work-related stress when telecommuting and would imply lower satisfaction in general with telework. Based on Salaff's comments, teleworkers seem to work harder and harder because they have no idea how hard others are working. In the current study, participants really wanted feedback on the quality and quantity of other participants' work rather than just task feedback, which may reflect this teleworking phenomenon. Perhaps task feedback at the office and task feedback during telework operate differently.

Why was there no main effect for climate for well-being? The climate for well-being manipulation was effective, but it had no effect on satisfaction. There are several possible explanations for the lack of results for this substitute for leadership. First, perhaps inducing a climate or talking about a climate is a weaker manipulation than actually experiencing it. Thus, though participants could identify what the company could be like regarding one's well-being, by not actually experiencing it firsthand, it was not likely to actually affect their performance or satisfaction. This argument is similar to one made in Awamleh and Gardner (1999) with regard to their organizational performance manipulation: "*reading* a scenario depicting high or low levels of organizational performance is much different from *working* in a thriving or struggling firm" (p. 362, emphasis in original). Perhaps climate for well-being did not matter for the students who were serving as the sample; they were not actually going to be employees of the company at any point, and there was no reason to expect that their reactions to the company's climate actually mattered in any way.

Finally, it is disappointing that no variables had an effect on satisfaction in the study. Potential explanations for the paucity of results could be that the task itself was not satisfying. Given that the task was inserting pages into a binder, it is perhaps not surprising that there were not higher ratings of satisfaction. Perhaps the nature of the task suppressed any effects that could have resulted from the leadership and substitutes for leadership variables.

Additionally, it could be the case that an effective manipulation of transformational leadership would have resulted in higher satisfaction for those in the transformational condition. Though transactional leadership is important for

performance, transformational leadership, when properly manipulated, might be important for satisfaction and even the desire to remain a virtual worker. Thus, perhaps a combination of transactional and transformational leadership is necessary for performance and satisfaction in virtual workers. Unfortunately, this study can only speculate about those possibilities. Perhaps there are other outcome variables of importance that could have been affected by transformational leadership (e.g., OCBs, desire to work with the leader in the future).

Practical Implications and Directions for Future Research

These findings are consistent with the popular literature on managing virtual workers, i.e., to keep employees focused on the task, transactional leadership is necessary. This popular literature also encourages frequent communication and feedback. Future research on this topic looks like it will have to need to manipulate comparative feedback from the leader.

Industrial/Organizational psychology needs to examine and better understand how distant leadership affects people working away from the main office. This study attempted to have a larger variance in the qualities of the people working virtually because there is evidence in the studies of real virtual workers that people self-select into these positions. Future research could examine the types of people who are likely to telecommute and therefore the type of leadership that may be the most effective for those types of people.

Findings imply that it would be tough to lead a virtual team that does not meet face-to-face initially or never meets face-to-face at all. A leader receives very little feedback as to how people are receiving and interpreting information that is sent via

email. Likewise, the follower may misinterpret the leader's email due to lack of cues and information regarding tone. Future research should examine how leaders can best utilize distant leadership to inspire virtual teams.

Attributions of conversations via email have much greater variance than attributions of face-to-face interactions. For example, email gives fewer cues regarding tone than an in-person interaction would. Future research could extend perceptions of leadership to other types of interaction along that continuum (that spans from email to face-to-face), by including real-time chat and phone. Phone and online chat are likely to be utilized by virtual workers, virtual teams, and their distant leaders. In fact, with the increasing popularity and use of instant messaging programs, virtual workers are more likely to stay instantly connected to the workplace and have much greater interaction with leaders and coworkers than ever before.

Type of task should also be manipulated in future research. This study focused on a relatively boring and repetitive task, with the hope that transformational leadership would inspire distant followers to higher performance and satisfaction. Future research should manipulate the type of task to include more intellectual skills, such as brainstorming and problem-solving. Along with this, future research should also manipulate close versus distant leadership. This study looked only at distant leadership. Future studies could compare distant and face-to-face leadership in a controlled laboratory setting.

Additional Limitations

As with all research, this experiment has a set of limitations. In looking at the nature of the study and how it was conducted, a set of boundary conditions might hold.

For example, this study is applicable to a routine task, where leader and follower never meet in person, with no interaction from the leader (only a one-way communication from leader to follower), in a relatively short time period, when working alone. Additionally, the effect sizes are relatively small. External validity is a concern in this study. In a contrived laboratory setting, how similar are participants to telecommuters interacting at a distance from their leaders? Given the evidence that telecommuters are not representative of the population of employees in the workplace and instead have specific characteristics, can this study be generalizable to those telecommuters already working from home? However, there was some evidence in participant comments that they at least felt the company was real. Comments asking for additional information about jobs, comments that they would like to work for the company in the future, and the fact that some participants took the fake business cards with them indicate that at least some of the participants felt that they were working for a real company.

Another concern in this study is the nature of the task. In the comments of participants, approximately ten mentioned that the task was boring, menial, repetitive, or monotonous. Perhaps the generalizability of the study is also limited to a relatively routine and uninteresting task. A better design of the study could have been to manipulate the type of task, with half of the participants doing a somewhat boring task such as constructing binders with the other half of participants doing a more engaging, intellectual task like brainstorming. Previous studies of transformational and transactional leadership in electronic groups had participants working on a brainstorming task (e.g., Sosik, 1997). Though those studies are confounded with face-to-face leadership in addition to distant leadership, it suggests that the impact of transformational

and transactional leadership might be affected by the type of task. Shamir, House, and Arthur (1993) posit that the effect of charismatic leadership on performance is more likely when the task is more ambiguous and the goals cannot be precisely articulated. Future research should manipulate the type of task to see if there are differential effects for leadership style based on task type.

These issues, combined with the failure to achieve the intended leadership effects through the experimental manipulations, suggest that the most appropriate conclusion regarding the present research effort is to use caution when interpreting the significant effects that were uncovered.

Conclusions

To summarize, this study had three overarching goals. First, can distant leadership impact subordinate outcomes such as performance and satisfaction? The results from this study are supportive of the idea that distant transactional leadership can affect performance. Secondly, are our typical conceptualizations of leadership applicable at a distance? To this question, I can only speculate that transactional leadership can be displayed at a distance. This study was not able to determine whether transformational leadership had relevance at a distance. Finally, which substitutes for leadership affect performance and satisfaction at a distance? There is evidence that Conscientiousness and feedback, when paired with transactional leadership, can affect performance quantity and in some cases quality at a distance. This study takes initial steps in understanding the effects of distant transactional and transformational leadership and substitutes for leadership on objective performance of individual virtual workers.

Table 1. Description of substitutes for leadership not used in this study, their relationships to performance and satisfaction, and the reasons they are not used in this study

Substitute	Description	Relationship to Performance	Relationship to Satisfaction	Why Not Used in This Study
Individual Attributes				
Ability, experience, training, and knowledge	KSAs for the job based on experience or training	+	Uncorrelated	Always leads to higher performance; uninteresting Also, controlled for in this study
Professional orientation	The tendency to associate oneself with others in the field and to be guided by standards of the field	Unrelated	Small (-)	This study assumes non-professional workers, given the nature of the task
Indifference to organizational rewards	The unwillingness of an individual to be swayed by the rewards or opportunities provided by the company	-	-	Not interested in looking at rewards in this study
Subordinate need for independence	The desire for the employee to work on tasks independently and without the help of co-workers	Unrelated	Unrelated	No support that this is related to performance or satisfaction
Extraversion	The extent to which a person seeks out opportunities to interact with others. An extravert enjoys being around	Unrelated	Unrelated	Strongest support of the Big 5 factors is for conscientiousness

people				
Agreeableness	Characteristic of a person who is conforming, trusting, and friendly; takes well to directions and cooperates well with others	Unrelated	Unrelated	Strongest support of the Big 5 factors is for conscientiousness
Emotional stability	Associated with someone who is relaxed and has relatively even emotions	Small +	Unrelated	Strongest support of the Big 5 factors is for conscientiousness
Openness to experience	Refers to someone with an interest in culture, art, and other experiences	+ in some jobs	Unrelated	Strongest support of the Big 5 factors is for conscientiousness
Unambiguous, routine, methodologically invariant tasks	Refers to tasks that are boring and repetitive	-	-	This is controlled for across the conditions by using the same task
Skill variety	The extent the job necessitates the use of a wide range of skills to carry out a large variety of job tasks	Unrelated	+	Task feedback has the strongest relationship with both performance and satisfaction
Task significance	Refers to the potential impact the tasks have on others either internal or external to the organization	Unrelated	+	Task feedback has the strongest relationship with both performance and satisfaction
Task identity	Focuses on the completion of a whole task from start to finish	+ (strongest)	+	Unable to be manipulated, given the task used in this study

Task autonomy	When the task allows the employee significant discretion in deciding how to do the work	Unrelated	+	Task feedback has the strongest relationship with both performance and satisfaction
Intrinsically satisfying tasks	When no extra incentives are needed to get the job done.	+	+	There is no way to manipulate this in the lab
Organizational formalization	The extent to which the organization has clearly documented job duties, responsibilities, and work specifications in writing	Unrelated	+	Not relevant to a the context of this study
Organizational inflexibility	The extent the organization requires that rules, policies, and procedures be followed explicitly	Unrelated	Unrelated	Not relevant to a the context of this study
Advisory and staff support	The extent that the employee must rely on people outside of his or her department to get things done in a timely manner	Unrelated	Unrelated	Not relevant to a the context of this study
Closely-knit, cohesive, interdependent work groups	Refers to groups that are work together very closely on tasks and have close personal relationships	Unrelated	Unrelated	Cannot manipulate in a lab setting
Organizational rewards not in	Refers to the case when the	Unrelated	Unrelated	Cannot manipulate in a

the leader's control	leader is not directly responsible for the compensation and other organizational rewards of the subordinate			lab setting
Spatial distance	Refers to the physical distance separating leaders from subordinates	-	-	This is being controlled in this study
Climate for performance	Emphasizes hard work and would reward success	Predicted +	Unrelated	Climate for well-being has more empirical support

Table 2. Means, standard deviations, and correlations of all variables

Measures	M	SD	1	2	3	4	5	6
Independent Variables								
1. Conscientiousness	3.76	0.60	(0.77)					
2. Leadership	1.03	0.82	-0.13	(1.00)				
3. Feedback	0.48	0.50	-0.05	0.03	(1.00)			
4. Climate for Well-Being	0.54	0.50	0.02	0.02	0.00	(1.00)		
Manipulation Checks								
5. Transformational Leadership	4.25	0.96	0.02	0.29	-0.05	-0.01	(0.90)	
6. Transactional Leadership	4.62	1.12	0.04	0.23	-0.14	-0.09	0.74	(0.82)
7. Feedback	3.94	1.92	-0.07	0.11	0.59	-0.07	0.38	0.23
8. Well-Being	4.53	1.18	0.17	0.08	0.09	0.47	0.44	0.22
9. Distance	5.84	0.91	0.19	-0.04	0.00	0.12	0.10	0.17
Dependent Variables								
10. Practice Trial Quantity	20.27	6.71	0.19	-0.07	-0.07	0.12	0.00	0.03
11. Practice Trial Quality	1.59	1.90	-0.04	0.04	0.06	-0.02	-0.04	-0.01
12. Real Trial Quantity	25.06	7.40	0.15	-0.13	0.01	0.06	0.02	0.03
13. Real Trial Quality	1.24	2.10	0.00	0.05	-0.01	0.11	0.05	0.02
14. Satisfaction	4.57	1.50	0.21	0.06	-0.02	-0.02	0.33	0.22

Note: N = 147. Correlations in bold type are significant at $p < .05$.

(continued on next page)

Measures	8	9	10	11	12	13	14
Independent Variables							
1. Conscientiousness							
2. Leadership							
3. Feedback							
4. Climate for Well-Being							
Manipulation Checks							
5. Transformational Leadership							
6. Transactional Leadership							
7. Feedback							
8. Well-Being	(0.92)						
9. Distance	0.18	(0.64)					
Dependent Variables							
10. Practice Trial Quantity	0.03	0.13	(1.00)				
11. Practice Trial Quality	0.00	-0.02	-0.37	(1.00)			
12. Real Trial Quantity	0.06	0.15	0.81	-0.22	(1.00)		
13. Real Trial Quality	0.06	-0.03	-0.27	0.40	-0.29	(1.00)	
14. Satisfaction	0.35	0.18	0.17	-0.10	0.26	-0.01	(0.88)

Table 3. Means and standard deviations for performance and satisfaction variables by leadership condition.

Dependent Variables	No leadership	Transactional	Transformational
Practice Trial Quantity	20.15 (6.57)	21.73 (6.02)	19.04 (7.29)
Practice Trial Quality	1.57 (1.81)	1.44 (1.99)	1.75 (1.93)
Real Trial Quantity	25.36 (7.38)	26.79 (6.98)	23.19 (7.51)
Real Trial Quality	1.00 (2.31)	1.44 (2.01)	1.27 (2.00)
Satisfaction	4.26 (1.54)	4.94 (1.21)	4.49 (1.65)

Table 4. Means and standard deviations for performance and satisfaction variables by feedback condition.

Dependent Variables	No feedback	Feedback
Practice Trial Quantity	20.75 (6.44)	19.76 (7.01)
Practice Trial Quality	1.47 (1.87)	1.72 (1.95)
Real Trial Quantity	25.00 (7.30)	25.13 (7.57)
Real Trial Quality	1.25 (1.82)	1.23 (2.38)
Satisfaction	4.59 (1.52)	4.54 (1.48)

Table 5. Means and standard deviations for performance and satisfaction variables by climate for well-being condition.

Dependent Variables	Low Climate for Well-Being	High Climate for Well-Being
Practice Trial Quantity	19.44 (6.09)	20.99 (7.17)
Practice Trial Quality	1.63 (1.83)	1.56 (1.98)
Real Trial Quantity	24.56 (7.51)	25.49 (7.33)
Real Trial Quality	0.99 (1.71)	1.46 (2.38)
Satisfaction	4.60 (1.48)	4.54 (1.52)

Table 6. Analysis of Variance for performance quantity

Source	<i>df</i>	<i>F</i>	<i>p</i>
Practice Trial Quantity (P)	1	276.66**	.00
Leadership (L)	2	4.87**	.01
Feedback (F)	1	2.28	.13
Conscientiousness (C)	1	0.16	.69
L X F	2	3.28*	.04
L X C	2	4.23*	.02
Error	137	(17.84)	

$R^2 = .695$ (Adjusted $R^2 = .675$)⁶

Note. Values enclosed in parentheses represent mean square errors.

* $p < .05$. ** $p < .01$

⁶ The practice trial $R^2 = .650$ (Adjusted $R^2 = .648$)

Table 7. Analysis of Variance for performance quality

Source	<i>df</i>	<i>F</i>	<i>p</i>
Practice Trial Quality (P)	1	23.37**	.00
Leadership (L)	2	0.53	.59
Feedback (F)	1	0.14	.71
Conscientiousness (C)	1	0.13	.72
L X F	2	3.10*	.05
L X C	2	0.43	.65
Error	137	(3.72)	

$R^2 = .210$ (Adjusted $R^2 = .158$)⁷

Note. Values enclosed in parentheses represent mean square errors.

* $p < .05$. ** $p < .01$

⁷ The practice trial $R^2 = .158$ (Adjusted $R^2 = .152$)

Table 8. Analysis of variance for satisfaction

Source	<i>df</i>	<i>F</i>	<i>p</i>
Leadership (L)	2	2.54	.08
Feedback (F)	1	.06	.81
Climate for Well-Being (W)	1	.13	.72
L X F	2	1.19	.31
L X W	2	.33	.72
Error	138	(2.24)	

$R^2 = .057$ (Adjusted $R^2 = .003$)

Note. Values enclosed in parentheses represent mean square errors.

* $p < .05$. ** $p < .01$

Figure 1. Proposed interaction between leadership and climate for well-being.

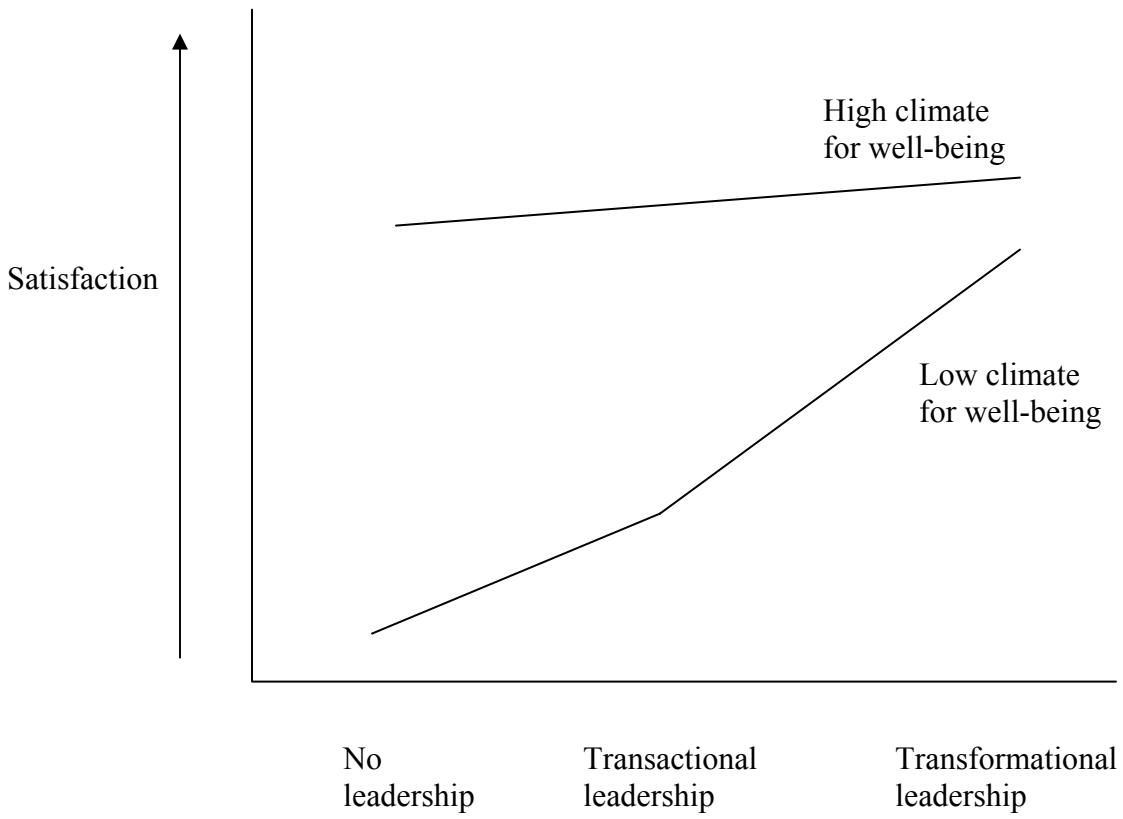


Figure 2. Proposed conceptual model

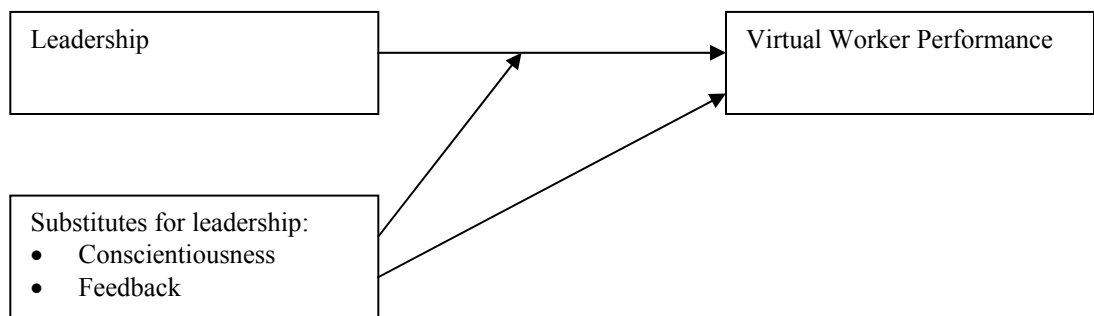
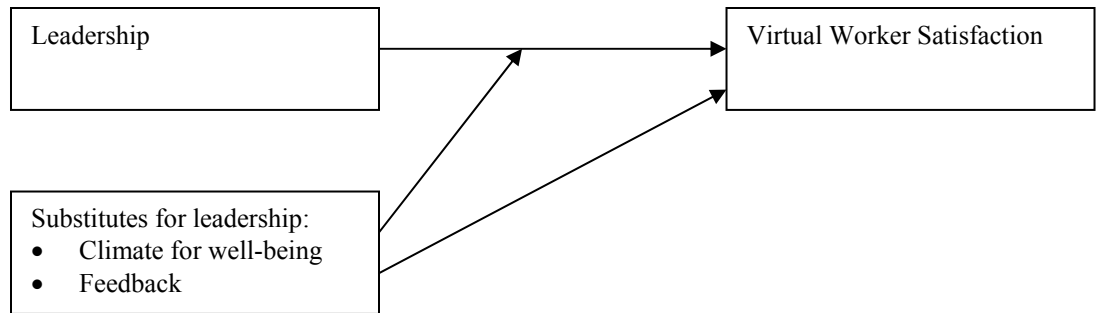


Figure 3. Interaction between leadership and conscientiousness for performance quantity

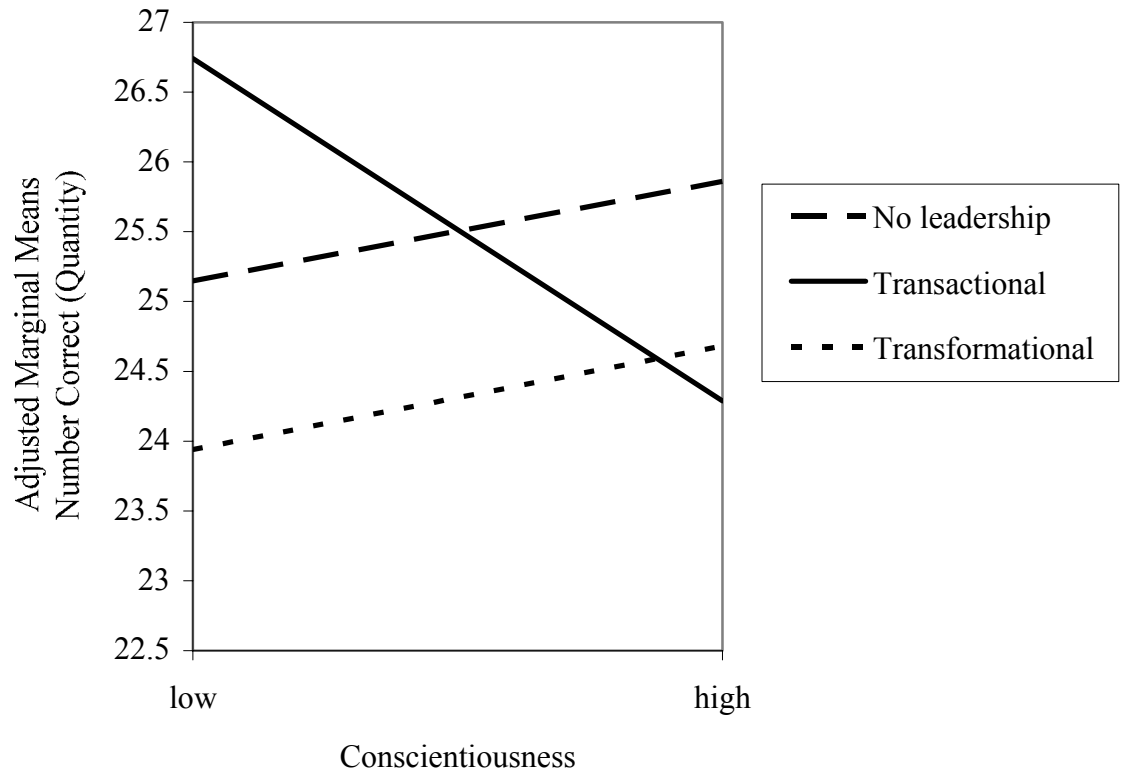


Figure 4. Interaction between leadership and feedback for performance quantity.

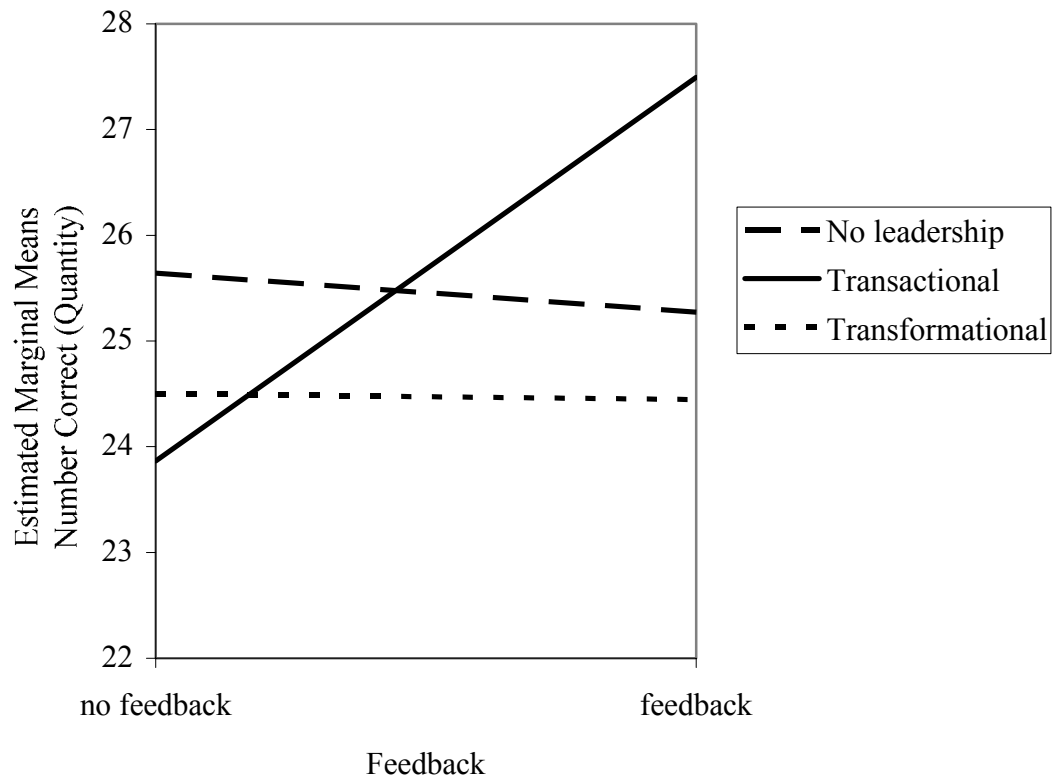
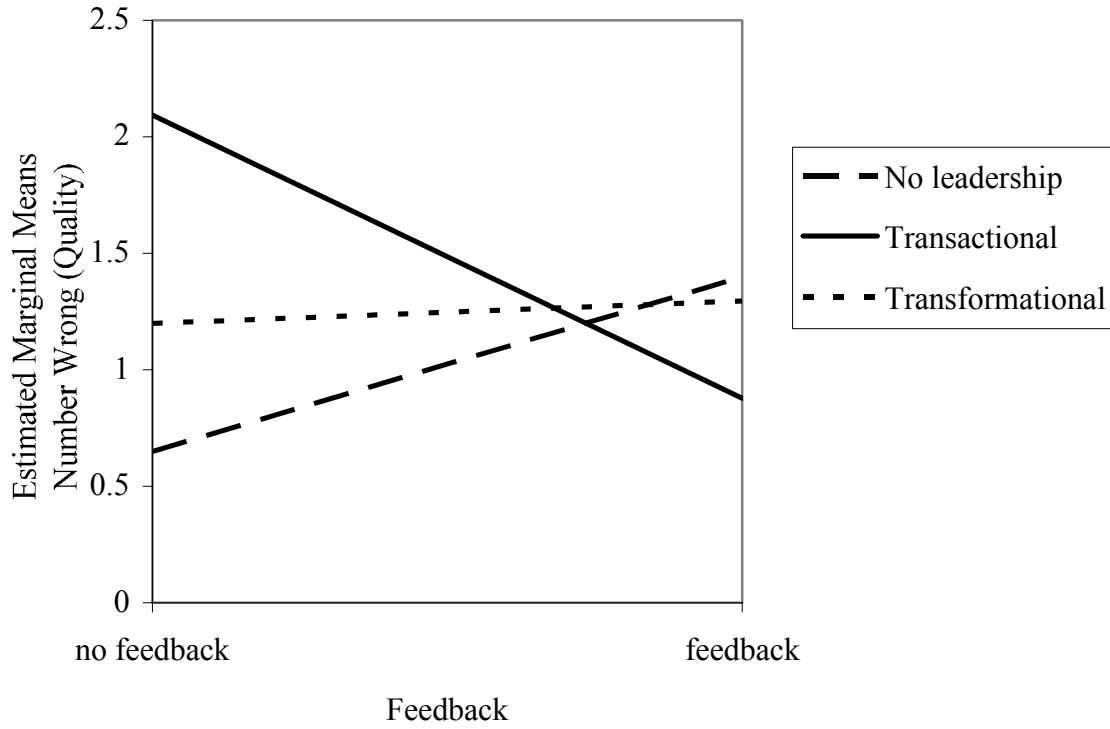


Figure 5. Interaction between leadership and feedback for performance quality.



Appendix A: Procedure

VIRTUAL WORK STUDY PROTOCOL**I. THE LAB SET UP:**

Below is a picture of the lab in room 0144 Biology-Psychology. All rooms have a computer and a desk in them. In addition, they each contain a pad of paper and a container of pens and pencils.

Back Room

Room A		Room B
Room C		Room D
Room E		Room F

Door to Hallway

There are chairs across from the main lab door where participants should sit after they arrive, before going into the lab. Please tape a sheet to the lab door, which includes the experiment number, name, and instructions to knock and then wait outside.

II. SETTING UP BEFORE THE HOUR:

1. There should be an “Experiment Tracking Sheet” for each hour we run. This sheet has a map of the lab (like shown above). It also has space for us to fill in which participants are in which rooms, and in what conditions (leadership, climate, and feedback). Anything about the session that is out of the ordinary should *always* be listed on the back of the sheet. This sheet should be kept attached to a clipboard so that it can be referred to during the experiment.
2. Before the hour starts, the experimenter must make some important decisions:
 - A) Give each person a participant number (e.g., 001).

- B) Randomly assign participants to conditions by picking a condition slip out of the envelope labeled male or female.
- C) Assign each person to a particular room in the laboratory (e.g, A, C, D, E, or F).

All of these decisions should be written on the “**Experiment Tracking Sheet.**”

- 3. Before each hour, the experimenter should be getting the materials ready for the experiment.

A) Prepare a set of the following items for each participant scheduled:

1. **The Informed Consent Form**

2. **The Self-Descriptive Questionnaire (Goldberg)**

3. **The 7 packets of materials**

- The first instruction sheet “READ ME”**
- Packet # 1: The Practice Binder Materials** (which includes the instructions and rules, an empty red binder with 10 tabs, and the pages to insert)
- Packet #2: Feedback or Distracter Task (feedback manipulation)**
- Packet #3: The Letter from BDR Publishing (climate manipulation)**
- Packet #4: Note to check email**
- Packet #5: The Trial Binder Materials** (which includes the instructions and rules, an empty black binder with 10 tabs, and the pages to insert)
- Packet #6: Feedback or Distracter Task (feedback manipulation)**
- Packet #7: The Post Questionnaire**

These materials should be placed face up, in order, on the corner of the table, with Packet #1 on top.

4. **The Timer** – make sure an egg timer is in each room.

- B) All computers should be on and the GroupWise account should be open.
 - a. Be sure that the GroupWise “Notify” is turned off (right click on the globe in the bottom right of the screen and click on “exit”)
 - b. Open up a negot# account and be sure to write it on the Experiment Tracking Sheet so you know which email account is open in each

room. *The negot1 account should always be the one that the experimenter uses to send the emails.

c. Be sure the “from” column is removed.

C) There should be a manila envelope outside the door of each participant’s room to put the completed materials in. Make sure to mark the outside of each envelope (upper right hand corner in small writing) with the: participant number, date, time, 6 digit ss#, condition (leadership, CFWB, feedback), and negot# from email.

D) There should be additional materials on the experimenter's table:

Extra envelopes, pens, pencils, and materials

A note pad to make any observations for each session.

List with names of expected participants.

III. RUNNING THE ACTUAL EXPERIMENT

The experimenter should greet participants outside the lab and should check students in.

A) Have a clipboard with the “Experiment Tracking Sheet” with you, as well as a list with the expected participants’ names. Say:

“Hi, are you here for the experiment? Thanks for coming. May I have your name?”

B) Check them off on the list that you have, and give them a clipboard with (1) an informed consent form, (2) a personality questionnaire, and (3) a pen, and say:

“This is an informed consent form for you to review and sign. Please read through and sign at the bottom if you agree. On the second page is a self-descriptive questionnaire. You can fill that out—out here—and I will be back to check on you and bring you into the lab. Please let me know if you have any questions.”

C) Assign people to conditions and rooms and note these decisions on the “Experiment Tracking Sheet” for that day/hour.

D) After each participant completes his/her informed consent and personality questionnaire, begin to bring people to their rooms individually. Say:

“[Name]? Please follow me. This is where you’ll be today. You can place your things in the corner and have a seat. You’ll be here for about an hour, so please make your self comfortable.”

“Just as some background on the study... I’m an I/O psychology student. I/O psychology stands for Industrial/Organizational Psychology. We study work and work settings. Sometimes we partner with companies to study phenomena of mutual interest. In this study, we are partnering with a company called BDR Publishing. For reasons that will be revealed to you as you go through the study, you will be working today completely on your own, without any further interaction from me. All you need to do is follow the written instructions—they will tell you exactly what to do next. For example, [point to the instruction sheet on the table] the instructions may say, Open Packet #1, so you open the packet labeled one.” [Point to the pile of packets.]

“There are a few things you should know before you get started.

“The first is how to use the timer. You will be self-timing today. Be sure that when you set the timer, you first turn the dial past 15 minutes and then back to the number of minutes instructed. This will ensure that it rings when the time is up.” [Demo this behavior with the timer.]

“Another thing you should know is that we have set up an email account for you on this computer. You will receive an email during the course of the study. Don’t worry – the instructions will let you know when to check the email account.”

“Finally, after you go through a packet, you don’t need to put the contents back into the envelope. You can stack the contents on one side of the desk or on the floor.”

“Do you have any questions before you get started?”

“Ok, thanks. And, good luck.” [Leave the room.]

- E) Repeat this for each individual participant until all are housed in their rooms.
- F) Go back to the experimenter room, and set up the leadership emails. You can set them up to send in 10 minutes or you can go ahead and send them immediately.

**If you want to set them to send in 10 minutes, open up a blank email, then go to File→Properties. Click on “Delay Delivery,” then set the time to 5-10 minutes from the current time listed in the bottom right of the computer screen.

**Be sure that the subject line is filled in correctly. Always double check that you are sending the correct email to the intended email account.

No leadership subject line: Process of Making Paper

Transactional subject line: Task Expectations

Transformational subject line: Partnering for Progress

- G) You can walk by the rooms to see how participants are doing on their own. Don't stand directly outside of the door and stare – they can see usually through the 1-way mirror.
- H) After awhile, go to the “Sent Items” and right click on each email and go to “Properties.” That will let you know whether or not they have viewed the email.

IV. FINAL STUFF

- A) When they are finished, go into each room, and say:

“Here’s my card. [Hand them a business card.] Please let me know if you have any trouble getting extra credit for this experiment, and I will straighten it out with your professor. I will be sending professors a list of everyone who participated in the study at the end of the semester. Also, we’d like to tell you the kinds of questions we are asking in this study, but because we are still conducting the experiment for a few more weeks and many of you are in the same classes, we don’t want to tell you about what the study is about until all of the participants have gone through. We will email you a debriefing form at the end of Summer Session I that will tell you about the study, and if you have any questions at that point, I’d be happy to discuss them with you. Thanks again for coming!”

If the participant still has questions at this point, you can answer them and explain the reasoning for various parts of the experiment. If you do this, be sure to ask him/her not to discuss the experiment with anyone in the class until after the end of the semester. Be sure that the participant leaves the study relatively satisfied with his/her experience.

- B) After individuals have left, make sure that all of their materials are in the manila envelope, including the informed consent form, the personality questionnaire, and the post questionnaire. Sort through their completed binder materials. If you have time, you can go through the binders and check off the number of pages inserted correctly, incorrectly, etc. You can do this directly

on their feedback form. If they were in the “no feedback” condition, grab a feedback form and score their binder on that sheet. Be sure to write “No feedback condition” at the top of this sheet. If there is no time before the next group of subjects, stack the binders with the manila envelope and score while the next group of participants is going through the experiment.

- C) Note any peculiar things about the people, or anything that you think needs to be discussed about the session on the back of the Experiment Tracking Sheet.

Appendix B: Informed Consent Form

Informed Consent Form

Project Title: Managing virtual worker performance and satisfaction

The purpose of this research is to better understand the determinants of virtual worker performance and satisfaction. As part of this research, I will be asked to complete an assembly task and to answer some questions about my personality and my attitudes.

1. I am willing to participate in this research activity being conducted by Julie Lyon under the direction of Dr. Benjamin Schneider at the Graduate School, University of Maryland College Park, Department of Psychology.
2. My responses will be kept confidential. All data will be secured in a locked office, and the researchers will be the only ones with access to it.
3. There are no known risks to my participation in this research. I understand that the research is not designed to help me personally, but the investigator hopes to learn more about the factors that will help a virtual worker be more successful.
4. I understand that I can ask questions at any time and that there are no penalties for asking questions.
5. I am at least 18 years of age.
6. I understand that I can withdraw my participation at any time without penalty. I can also withdraw my data without penalty following the debriefing.
7. If I have any questions about the study, I can contact the principal investigator at:
Julie Lyon
Department of Psychology
University of Maryland
College Park, MD 20742
(301) 405-5934
jlyon@psyc.umd.edu
8. If I have any questions regarding my rights as a research participant, I can contact the Chair of the Human Subjects Committee, Dr. Harold Sigall, at (301) 405-5920.
9. My signature below may be taken as affirmation of all of the above prior to participation.

Signature _____

Print Name _____

Social Security # _____

Date _____

The approval period of this project is from 5/1/03 to 5/30/04.

Appendix C: Goldberg Personality Scale

Last 6 Digits of your social security number: _____ - _____

Questionnaire

This sheet contains 50 statements describing people's behaviors. Please use the rating scale below to describe how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age.

- | 1-----2-----3-----4-----5 | | | | |
|---------------------------|--|-------------------------|---|------------------|
| very
inaccurate | moderately
inaccurate | neither
nor accurate | moderately
accurate | very
accurate |
| 1. _____ | Am the life of the party. | 27. _____ | Have a soft heart. | |
| 2. _____ | Feel little concern for others. | 28. _____ | Often forget to put things back
in their proper place. | |
| 3. _____ | Am always prepared. | 29. _____ | Get upset easily. | |
| 4. _____ | Get stressed out easily. | 30. _____ | Do not have a good
imagination. | |
| 5. _____ | Have a rich vocabulary. | 31. _____ | Talk to a lot of different people
at parties. | |
| 6. _____ | Don't talk a lot. | 32. _____ | Am not really interested in
others. | |
| 7. _____ | Am interested in people. | 33. _____ | Like order. | |
| 8. _____ | Leave my belongings around. | 34. _____ | Change my mood a lot. | |
| 9. _____ | Am relaxed most of the time. | 35. _____ | Am quick to understand things. | |
| 10. _____ | Have difficulty understanding
abstract ideas. | 36. _____ | Don't like to draw attention to
myself. | |
| 11. _____ | Feel comfortable around people. | 37. _____ | Take time out for others. | |
| 12. _____ | Insult people. | 38. _____ | Shirk my duties. | |
| 13. _____ | Pay attention to details. | 39. _____ | Have frequent mood swings. | |
| 14. _____ | Worry about things. | 40. _____ | Use difficult words. | |
| 15. _____ | Have a vivid imagination. | 41. _____ | Don't mind being the center of
attention. | |
| 16. _____ | Keep in the background. | 42. _____ | Feel others' emotions. | |
| 17. _____ | Sympathize with others'
feelings. | 43. _____ | Follow a schedule. | |
| 18. _____ | Make a mess of things. | 44. _____ | Get irritated easily. | |
| 19. _____ | Seldom feel blue. | 45. _____ | Spend time reflecting on things. | |
| 20. _____ | Am not interested in abstract
ideas. | 46. _____ | Am quiet around strangers. | |
| 21. _____ | Start conversations. | 47. _____ | Make people feel at ease. | |
| 22. _____ | Am not interested in other
people's problems. | 48. _____ | Am exacting in my work. | |
| 23. _____ | Get chores done right away. | 49. _____ | Often feel blue. | |
| 24. _____ | Am easily disturbed. | 50. _____ | Am full of ideas. | |
| 25. _____ | Have excellent ideas. | | | |
| 26. _____ | Have little to say. | | | |

Appendix D: Instructions on the Table

READ ME

On your table is a box that is filled with numbered packets.

Inside these packets are tasks and instructions for what you will do today. You will complete two trials of the task, the first of which is a practice trial.

Please read through all the materials and follow the instructions carefully. It will be clear when to open each packet.

Please open **PACKET #1** now.

Appendix E: Instructions and Rules for Practice Binder

Instructions for Practice Binder

Your task today is to insert pages into a binder according to a set of *rules*. The rules are stapled to this page.

In Packet #1 is a set of paper-clipped pages. These pages are grouped according to *topic area* (e.g., English, Algebra, etc.).

At the top of each page is a *title*. Each rule will reference a *title* and the *topic area*. For example, for the page titled “Writing linear equations” within the topic area of Algebra, an example rule might be the following:

- Insert **Writing linear equations (Algebra)** directly behind Tab # 3.

This means, place the page titled “Writing linear equations”—which you can find in the “Algebra” topic area—into the binder behind the divider tab labeled “3.”

Your performance on this task is based on the number of pages inserted minus the number of errors you make.

You will have 12 minutes to complete this task. When the timer goes off, stop working on the task and open Packet #2.

Please set the timer on your desk to 12 minutes.

**Once you have set the timer,
turn to the next page, and begin the task.**

Rules for Inserting Pages into the Binder

- Insert **Writing linear equations (Algebra)** directly behind Tab # 3
- **Human lifespan (Science)** should go right before Tab # 10
- Behind Tab # 5, put **Gregor Mendel (Science)**
- **Moldova (Geography)** should come directly before **Human lifespan (Science)**
- **World population density (Geography)** should go directly behind Tab # 8
- The page right before Tab # 6 should be **Tanzania (Geography)**
- **Verbals and verbal phrases (Writing)** should go directly behind **World population density (Geography)**
- **Dependent and independent events (Algebra)** should go directly behind **Gregor Mendel (Science)**
- The first two pages behind Tab # 9 should be **In general, why wage rates differ (Economics)** and **Box-and-whiskers plots (Algebra)**
- **The Baltic Republics (Geography)** is the first page behind Tab # 6
- The middle page between Tab # 9 and Tab # 10 is **Pronoun usage (Writing)**
- The third page behind Tab # 5 is **Irregular verbs that change in other ways (Writing)**
- The second page behind Tab # 6 is **Consider your audience's taste (Writing)**
- The page directly before Tab # 2 is **Using formatting (Writing)**
- The fourth page behind the tab starting with **Gregor Mendel (Science)** should be **Understanding your consumer rights (Economics)**
- The page behind **Consider your audience's taste (Writing)** is **Associative property of addition (Algebra)**
- The page directly after Tab # 2 is **Writing a topic sentence (Writing)**
- The first page behind Tab # 10 are **Harmful consequences of radiation (Science)**

- **Analyzing primary sources (Economics)** comes after **Writing a topic sentence (Writing)**
- **Free trade and movement, or not? (Economics)** comes directly before Tab # 7
- **Specific heat (Science)** is the third page behind Tab # 2
- **Southern Europe: Land use and resources (Geography)** is right before **Using formatting (Writing)**
- The last page in the binder is **GDP replaces GNP (Economics)**
- **Why don't more people recycle? (Economics)** comes directly after Tab # 7
- The second page behind Tab # 10 is **Human/environment interaction (Geography)**
- The first page in the binder—behind Tab # 1—is **Geologic time scale (Science)**
- The fourth page behind the tab starting with **Writing a topic sentence (Writing)** is **Zimbabwe (Geography)**
- After Tab # 8, **Sea-floor spreading (Science)** is the third page, followed by **Reginald F. Lewis (Economics)**
- **Commas (Writing)** is the second to last page in the binder
- The page after **Why don't more people recycle? (Economics)** is **Reference Atlas (Geography)**
- **Integers on the number line (Algebra)** and **Consumers union and product testing (Economics)** are the second and third pages behind Tab # 1
- The last page in Tab # 7 is **Graphing inequalities: $y < mx + b$, $y > mx + b$ (Algebra)**
- **Use library resources (Writing)** goes directly behind Tab # 4
- **Building geography skills (Geography)** goes right behind **Writing linear equations (Algebra)**
- **Associative property of addition (Algebra)** comes before **Energy relationships (Science)** which comes before **Free trade and movement, or not? Economics**
- **What about a savings account? Is it money? (Economics)** is the second page behind Tab # 4

- The page before **Graphing inequalities: $y < mx + b$, $y > mx + b$ (Algebra)** is **Revising your sentences (Writing)**
- The third page in Tab # 3 is **Publishing and presenting (Writing)** while the third page in Tab # 4 is **Uruguay and Paraguay (Geography)**
- The page before Tab # 5 is **Genetic variation (Science)**
- **Solving using the quadratic formula (Algebra)** comes directly after **Zimbabwe (Geography)**
- The page before **Genetic variation (Science)** is **Organizing data (Algebra)**
- The fourth page behind Tab # 3 is **Fossil correlation (Science)**
- The page after **Reference Atlas (Geography)** is **Expansion of the universe (Science)**
- **Range, mean, median, and mode (Algebra)** is the page just before Tab # 9
- **Trigonometric ratios (Algebra)** comes between **Human/environment interaction (Geography)** and **Commas (Writing)**
- **Trade restrictions: Tariffs and quotas (Economics)** comes right before Tab # 4.

**Remember, when the timer goes off,
stop working on the task, and open PACKET # 2.**

Appendix F: Feedback for Practice Task

Feedback

This sheet will give you some feedback on how you did. You can score your performance based on the following list. The correct order of the pages is listed. Pages not only have to be behind the correct tab, they must also be in the order listed to be correct. You can place check marks on this sheet next to the pages that you inserted correctly. Your score is based on the number of pages inserted, minus the number of pages inserted incorrectly. Pages that are not inserted do not factor into your score. This sheet is for your own purposes, so that you have some idea about your performance.

Set your timer for **3 minutes**.

Note: Pages listed under each tab are the pages that should be behind each tab.

Tab 1
<input type="checkbox"/> Geologic time scale
<input type="checkbox"/> Human/Environment interaction
<input type="checkbox"/> Bisecting segments and angles
<input type="checkbox"/> Advantages over selective breeding
<input type="checkbox"/> Using formatting
Tab 2
<input type="checkbox"/> Writing a topic sentence
<input type="checkbox"/> Coordinates in three dimensions
<input type="checkbox"/> Specific heat
<input type="checkbox"/> Soil preparation
<input type="checkbox"/> Reference atlas: South Asia
Tab 3
<input type="checkbox"/> Moldova
<input type="checkbox"/> Cells
<input type="checkbox"/> Publishing and presenting
<input type="checkbox"/> Fossil correlation
<input type="checkbox"/> Areas and volumes of similar figures
Tab 4
<input type="checkbox"/> Use library resources
<input type="checkbox"/> Conditions for special parallelograms
<input type="checkbox"/> Role of water in plants
<input type="checkbox"/> Bisecting segments and angles
<input type="checkbox"/> Genetic variation
Tab 5
<input type="checkbox"/> Gregor Mendel
<input type="checkbox"/> The Baltic Republics
<input type="checkbox"/> Irregular verbs that change in other ways

_____	Segments and their measures
_____	Strawberry
Tab 6	
_____	Potato
_____	Consider your audience's taste
_____	World population density
_____	Energy relationships
_____	Special right triangles
Tab 7	
_____	Volumes of similar solids
_____	Irrigation
_____	Expansion of the universe
_____	Revising your sentences
_____	Tanzania
Tab 8	
_____	Primary and secondary growth
_____	Verbals and verbal phrases
_____	Sea-floor spreading
_____	Classifying triangles
_____	Building geography skills
Tab 9	
_____	Transformations and symmetry
_____	Southern Europe: Land use and resources
_____	Pronoun usage
_____	Weed management in forages
_____	Human lifespan
Tab 10	
_____	Harmful consequences of radiation
_____	Plan of the entire plant
_____	Zimbabwe
_____	Commas
_____	Parallelograms

Once you are done checking your performance, or once the 3 minutes are up, **OPEN PACKET # 3.**

Appendix G: Letter Accompanying No Feedback Distracter Article

Inside this packet is an article from one of the American Psychological Association's publications, the *Monitor on Psychology*.

Set your timer for **3 minutes**.

Read through the article for 3 minutes. Once the three minutes are up, OPEN PACKET # 3.

Appendix H: Cover Sheet for Letter From BDR Publishing

Please read the enclosed letter carefully. BDR Publishing wanted to send you a letter giving you some background on the company and this project.

After you read the memo, please **Open Packet #4.**

Appendix I: Low Climate for Well-Being Letter



BDR Publishing

Professional publications and binding since 1964

955 L'Enfant Plaza, S.W. Suite 7000, Washington, DC 20024

June, 2003

Dear study participant,

As some background on our company, BDR Publishing does a lot of outsourcing work for law firms, typically putting together briefs and other legal documents for upcoming legal proceedings. Law firms outsource tasks like these for two main reasons: (1) it is cheaper to outsource than to complete the work in-house, and (2) outsourcing firms have developed techniques to do these types of tasks more efficiently and effectively than the firms could do themselves. When the filing day for a brief nears, the responsibility for preparing a brief for a favorable review by the court becomes a pressing issue. Occasionally, the cost of this aspect of the case is a significant consideration. Firms must work with a printer upon whom they can depend to carry the work through to a timely and cost effective finish.

We're interested in knowing whether we should establish a telecommuting program—where employees would work away from the main office—for BDR Publishing. We have become interested in establishing this program because it has become very costly to rent office space in the downtown Washington, DC area to complete these low-skill kinds of tasks. The work can be done off-site for a much lower cost to us.

At BDR Publishing, our #1 priority is to maintain quality while minimizing costs. Due to this priority, we are continually looking for ways to improve performance while reducing overhead. One option that we've heard about is instituting a telecommuting program, where employees work from home, completing the same tasks they typically completed in the office. We are working with the I/O Psychologists at the University of Maryland because they have some experience with designing telecommuting programs.

We would like to implement this telecommuting program to ensure that we are using our resources in the most efficient manner. We really hope that this program will be a success. The cost savings alone are phenomenal.

Thank you for your participation today.

-BDR Publishing

Appendix J: High Climate for Well-Being Letter



BDR Publishing

Professional publications and binding since 1964

955 L'Enfant Plaza, S.W. Suite 7000, Washington, DC 20024

June, 2003

Dear study participant,

BDR publishing is a full-service printing and graphic design company, delivering all aspects of the printing process from digital prepress and design through manufacturing and distribution. Customer dedication has been the cornerstone of our success for more than 38 years. We make significant ongoing investments in our equipment and training of our employees in order to provide our clients with the greatest benefits of technology. Our investment in quality employees, staffing multiple shifts, and the most efficient equipment enable us to meet the needs of our clients.

We're interested in knowing whether we should establish a telecommuting program for BDR's employees, where they could work away from the main office. We are particularly interested in whether these tasks can be done remotely because we would like to give our employees the option of working from home.

Because our employees are our # 1 priority, we are continually looking for ways to improve their quality of life. We've talked in depth with our employees about their needs. One consistent theme that emerged from these conversations was that employees would like the option of working from home a few days a week. We'd like to give employees the option of working from home if they choose to do so, but we have no experience with telecommuting. Therefore, we turned to the I/O Psychologists at the University of Maryland, who have helped us before in designing our employee satisfaction survey.

We would like to institute a telecommuting program so that employees will have the flexibility to work during their personal peak hours and so that they can avoid the traffic and long commute time to our office, which is located in the heart of Washington, DC.

We really care about each and every one of our employees – and that extends to you!

Thank you for your participation today.

-The BDR Publishing Team

Appendix K: Instructions to Check Email

Please check the email account on the computer in the room. An email account has been set up for you for use in this study.

The experimenters should have forwarded you an email from Pat Podsakoff by now. Pat is currently the CEO at BDR Publishing.

After you've read the email, please **Open Packet #5.**

Appendix L: Transformational Leadership Email

Subject: Partnering for Progress

Hello, my name is Pat Podsakoff, and I am the CEO of BDR Publishing. I am the primary contact from BDR Publishing with the University of Maryland I/O program, and I wanted to email you to personally thank you for participating in this study today.

I'm excited about having you on our team - even though it is for a short period of time. I know that with your help, we will be successful in making the right decision about whether the types of tasks that our employees typically do (i.e., those involving attention to detail, concentration, etc.) can be done away from the office.

The binders that our employees put together often have very important consequences. For example, many of our clients are legal firms, so the materials we assemble are used in real trials. The work that we do impacts the lives of real people. If we institute a telecommuting program, we need to make sure that quality is not compromised.

You also have a chance to receive course credit for your participation, but there are other reasons to try hard today. It may seem like a routine task, but your hard work here will help us to make an informed decision about telecommuting. I'm confident that you'll find a way to do this task effectively!

BDR is growing fast to become one of the best printing and publishing company in our area. Our success is based on our commitment to quality, and the work you do today will help us make very important decisions about our organization. Thank you for helping us today!

Best of luck,
Pat Podsakoff

Appendix M: Transactional Leadership Email

Subject: Task expectations

Hello, my name is Pat Podsakoff, and I am the CEO of BDR Publishing. I am the primary contact from BDR Publishing with the University of Maryland I/O program, and I have asked them to help us decide whether we should institute a telecommuting program.

I want to be very clear about what is expected of you today.

Your task today is to put together binders based on a set of written instructions. The list of "rules" instructs you to place individual pages into a certain place in the binders.

There are ten pages in each set of five topics areas. You will find these sets of pages in the front of each binder. Each binder includes a set of 10 tabs, and your job is to put the pages behind each tab in the correct order. You will have 12 minutes each to complete the practice trial and the real trial of the binder assembly task.

Today's goal is to insert as many pages as possible while minimizing quality errors. A quality error is when you insert a page in the wrong order or behind the wrong tab. Your score will be a count of the number of pages inserted minus the number of errors.

Finally, you will be completing a questionnaire at the end of the study. After you complete the questionnaire, you will be finished with the study. In return for completing this study, you are receiving extra credit for your psychology class.

I will be very pleased if you take care while completing this task and do the task well. Thank you for your participation today.

Best regards,
Pat Podsakoff

Appendix N: No Leadership Email

Subject: Process of Making Paper

About 80% of our jobs are printed on high-grade machine coated paper while the remainder are printed on high-grade, long-grain paper that is similar to what most people use in copy machines. Because our business revolves around paper, I would like to tell you a little bit about the process of making paper.

The process begins with trees. After the bark is removed, the logs are fed into a "chipper" which cuts the logs into wood chips. These chips are ground up and softened into what is called mechanical pulp.

Next, the pulp undergoes mild chemical treatment, called the "cooking liquor." The pulp is cooked in the liquor under high temperatures and pressures. The cooking process eliminates the non-cellulose fibers from the wood components.

Next, the pulp is bleached to produce white fibers. The type of bleaching operation depends on several factors: the type of wood used to make the pulp, the pulping process, the degree of whiteness desired, and the purpose for which the paper will be used. After the bleaching is complete, the pulp fibers are washed to remove chemicals and impurities. Then, the fibers travel through a machine to drain the water. The result is a wet web of paper that is carried on a conveyer belt to a pressing machine that smoothes and dries the paper.

By now, the paper is over 20 feet wide and on large rolls. If desired, coating materials are added which produce a smooth or special surface. It is ready to be cut to the size. The rolls are trimmed, sorted, counted, and packaged. The paper is then transported to the customer, in this case, BDR Publishing.

Pat Podsakoff

Appendix O: Instructions and Rules for Trial Binder

Instructions for Binder

This task is just like the one you completed on the practice binder. The task is to insert pages into a binder according to a set of rules. The rules are stapled to this page.

In Packet #5 is a set of paper-clipped pages. These pages are grouped according to topic area (e.g., Plants, History, etc.).

At the top of each page is a title. The title is the bold heading at the top of each page. Each rule will reference a title and the topic area. An example rule is the following:

- Insert **One day in history (History)** directly behind Tab #3.

This means, place the page titled “One day in history” – which you can find in the “History” topic area – into the binder behind the divider tab labeled “3.”

Your performance on this task is based on the number of pages inserted minus the number of errors you make.

You will have 12 minutes to complete this task. When the timer goes off, stop working on the task and open Packet #6.

Please set the timer on your desk to 12 minutes.

**Once you have set the timer,
turn to the next page, and begin the task.**

Rules for Inserting Pages into the Binder

- Insert **One day in history (History)** directly behind Tab # 3
- **Evaluating sources (English)** should go right before Tab # 10
- Behind Tab # 5, put **Writing in the workplace (English)**
- **Conditions for special parallelograms (Geometry)** should come directly before **Evaluating sources (English)**
- **Segments and their measures (Geometry)** should go directly behind Tab # 8
- The page right before Tab # 6 should be **Areas and volumes of similar figures (Geometry)**
- **Potato (Plants)** should go directly behind **Segments and their measures (Geometry)**
- **The challenge of change (History)** should go directly behind **Writing in the workplace (English)**
- The first two pages behind Tab # 9 should be **Reproduction and inheritance (Biology)** and **The Red scare (History)**
- **Coordinates in three dimensions (Geometry)** is the first page behind Tab # 6
- The middle page between Tab # 9 and Tab # 10 is **Strawberry (Plants)**
- The third page behind Tab # 5 is **Weed management in forages (Plants)**
- The second page behind Tab # 6 is **Primary and secondary growth (Plants)**
- The page directly before Tab # 2 is **Irrigation (Plants)**
- The fourth page behind the tab starting with **Writing in the workplace (English)** should be **Diffusion across membranes (Biology)**
- The page behind **Primary and secondary growth (Plants)** is **Populism and protest (History)**
- The page directly after Tab # 2 is **Plan of the entire plant (Plants)**

- The first page behind Tab # 10 are **Choosing a subject (English)**
- **Growth curves (Biology)** comes after **Plan of the entire plant (Plants)**
- **Morphology (Biology)** comes directly before Tab # 7
- **Process of writing a persuasive essay (English)** is the third page behind Tab # 2
- **Parallelograms (Geometry)** is right before **Irrigation (Plants)**
- The last page in the binder is **Endocrine glands (Biology)**
- **Respiratory systems (Biology)** comes directly after Tab # 7
- The second page behind Tab # 10 is **Transformations and symmetry (Geometry)**
- The first page in the binder—behind Tab # 1—is **Simple subjects and predicates (English)**
- The fourth page behind the tab starting with **Plan of the entire plant (Plants)** is **Special right triangles (Geometry)**
- After Tab # 8, **Functions of a relative pronoun (English)** is the third page, followed by **Nervous systems (Biology)**
- **Soil preparation (Plants)** is the second to last page in the binder
- The page after **Respiratory systems (Biology)** is **Volumes of similar solids (Geometry)**
- **Expanding frontiers (History)** and **Multiple-allele traits (Biology)** are the second and third pages behind Tab # 1
- The last page in Tab # 7 is **Recent Hispanic American history (History)**
- **Role of water in plants (Plants)** goes directly behind Tab # 4
- **Classifying triangles (Geometry)** goes right behind **One day in history (History)**

- Populism and protest (History) comes before Drafting the body (English) which comes before Morphology Biology
- Genetic drift (Biology) is the second page behind Tab # 4
- The page before Recent Hispanic American history (History) is Cells (Plants)
- The third page in Tab # 3 is Advantages over selective breeding (Plants) while the third page in Tab # 4 is Bisecting segments and angles (Geometry)
- The page before Tab # 5 is Order letters (English)
- A broad new coalition (History) comes directly after Special right triangles (Geometry)
- The page before Order letters (English) is Becoming a world power (History)
- The fourth page behind Tab # 3 is Developing public speaking and presentation skills (English)
- The page after Volumes of similar solids (Geometry) is Writing different kinds of paragraphs (English)
- Points for peace (History) is the page just before Tab # 9
- Counterculture and the mainstream (History) comes between Transformations and symmetry (Geometry) and Soil preparation (Plants)
- pH and living systems (Biology) comes right before Tab # 4.

**Remember, when the timer goes off,
stop working on the task, and open PACKET # 6.**

Appendix P: Feedback for Trial Binder

Feedback

This sheet will give you some feedback on how you did. You can score your performance based on the following list. The correct order of the pages is listed. Pages not only have to be behind the correct tab, they must also be in the order listed to be correct. You can place check marks on this sheet next to the pages that you inserted correctly. Your score is based on the number of pages inserted, minus the number of pages inserted incorrectly. Pages that are not inserted do not factor into your score. This sheet is for your own purposes, so that you have some idea about your performance.

Set your timer for **3 minutes**.

Note: Pages listed under each tab are the pages that should be behind each tab.

Tab 1	
_____	Trigonometric ratios
_____	Reproduction and inheritance
_____	Process of writing a persuasive essay
_____	Why don't more people recycle?
_____	A broad new coalition
Tab 2	
_____	Expanding frontiers
_____	Evaluating sources
_____	Organizing data
_____	Free trade and movement, or not?
_____	Growth curves
Tab 3	
_____	Respiratory systems
_____	Understanding your consumer rights
_____	The Red scare
_____	Graphing inequalities
_____	Developing public speaking and presentation skills
Tab 4	
_____	Becoming a world power
_____	Order letters
_____	In general, why wage rates differ
_____	Diffusion across membranes
_____	Writing linear equations
Tab 5	
_____	Box-and-whiskers plots
_____	Morphology

- _____ One day in history
- _____ Drafting the body
- _____ Trade restrictions: Tariffs and quotas

Tab 6

- _____ What about a savings account? Is it money?
- _____ Populism and protest
- _____ Laboratory: pH and living systems
- _____ Associative property of addition
- _____ Simple subjects and predicates

Tab 7

- _____ Functions of a relative pronoun
- _____ Consumers union and product testing
- _____ Integers on the number line
- _____ Points for peace
- _____ Nervous systems

Tab 8

- _____ Analyzing primary sources
- _____ The challenge of change
- _____ Solving using the quadratic formula
- _____ Choosing a subject
- _____ Multiple-allele traits

Tab 9

- _____ Writing different kinds of paragraphs
- _____ Genetic drift
- _____ Recent Hispanic American history
- _____ GDP replaces GNP
- _____ Dependent and independent events

Tab 10

- _____ Range, mean, median, and mode
- _____ Reginald F. Lewis
- _____ Endocrine glands
- _____ Counterculture and the mainstream
- _____ Writing in the workplace

Once you are done checking your performance, or once the 3 minutes are up, **OPEN PACKET # 7.**

Appendix Q: Post-Questionnaire

POST QUESTIONNAIRE

Last six digits of your social security number: ____ - ____ - ____

INTRUCTIONS: Below are a series of statements that describe the activities in which you were just involved. For each item, please indicate the extent to which the item describes your experiences in these activities by using the scale below. Circle the number that best corresponds to your opinion. There are no right or wrong answers. Please make your best judgments based on the information you were given today.

Note: The CEO refers to Pat Podsakff, who emailed you.

	1 Strongly Disagree	2 Moderately Disagree	3 Slightly Disagree	4 Neither Agree Nor Disagree	5 Slightly Agree	6 Moderately Agree	7 Strongly Agree
1. In general, I was satisfied when doing the task.	1	2	3	4	5	6	7
2. I was physically distant from the CEO.	1	2	3	4	5	6	7
3. BDR Publishing really cares about the well-being of its employees.	1	2	3	4	5	6	7
4. BDR Publishing would grant a reasonable request for a change in working conditions.	1	2	3	4	5	6	7
5. The task provided me with feedback on how well I was doing.	1	2	3	4	5	6	7
5. I felt satisfied when assembling the binders.	1	2	3	4	5	6	7
7. I prefer to solve my work problems by myself.	1	2	3	4	5	6	7
8. The experiment was designed to simulate working away from the main office.	1	2	3	4	5	6	7
9. BDR is interested in the working from home program in order to benefit its employees.	1	2	3	4	5	6	7
10. BDR Publishing cares about my general satisfaction when doing the task.	1	2	3	4	5	6	7
11. It is important for me to be able to feel that I can do tasks without depending on others.	1	2	3	4	5	6	7
12. The task provided me with the feeling that I know whether I am performing well or poorly.	1	2	3	4	5	6	7
13. I am generally satisfied when doing the task.	1	2	3	4	5	6	7
14. In this experiment, I was working away from the main office.	1	2	3	4	5	6	7
15. The tasks in this experiment were personally very rewarding.	1	2	3	4	5	6	7
16. The number one priority at BDR Publishing is its employees.	1	2	3	4	5	6	7
17. BDR Publishing cares about the opinions of their employees.	1	2	3	4	5	6	7
18. The task provided me with the opportunity to find out how well I was performing.	1	2	3	4	5	6	7
19. I did not feel satisfied during the task.	1	2	3	4	5	6	7
20. When people telecommute, that means they work off-site.	1	2	3	4	5	6	7
21. BDR Publishing really cares about my well-being.	1	2	3	4	5	6	7
22. BDR Publishing cares more about making a profit than about their employees.	1	2	3	4	5	6	7
23. The CEO was communicating from a distance.	1	2	3	4	5	6	7
24. When I have a problem I like to think it through myself without help from others.	1	2	3	4	5	6	7
25. I get a great deal of personal satisfaction from the task in this experiment.	1	2	3	4	5	6	7
26. BDR Publishing values my contribution to its well-being.	1	2	3	4	5	6	7
27. BDR Publishing shows very little concern for its employees.	1	2	3	4	5	6	7
28. I liked the tasks that I performed today.	1	2	3	4	5	6	7

Please turn the page

INSTRUCTIONS: Below are a series of statements that describe **the CEO** (i.e., Pat Podsakoff, the person who emailed you) for the activities in which you were just involved. For each item, please indicate the extent to which the item describes your experiences of the leader by using the scale below. Circle the number that best corresponds to your opinion. There are no right or wrong answers. Make your best judgments based on the information you were given today.

1 Strongly Disagree	2 Moderately Disagree	3 Slightly Disagree	4 Neither Agree Nor Disagree	5 Slightly Agree	6 Moderately Agree	7 Strongly Agree
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The CEO:

1. Specified the way the task would be scored.	1	2	3	4	5	6	7
2. Has a clear understanding of where we are going.	1	2	3	4	5	6	7
3. Is able to get others committed to his/her dream.	1	2	3	4	5	6	7
4. Shows me that he/she expects a lot from me.	1	2	3	4	5	6	7
5. Is very task-focused.	1	2	3	4	5	6	7
5. Indicated the broader implications for this study.	1	2	3	4	5	6	7
7. Motivated me to try harder.	1	2	3	4	5	6	7
8. Clarified the purpose of the task.	1	2	3	4	5	6	7
9. Is always seeking new opportunities for the organization.	1	2	3	4	5	6	7
10. Encouraged me to look forward to new possibilities.	1	2	3	4	5	6	7
11. Told me what his/her expectations were.	1	2	3	4	5	6	7
12. Inspires others with his/her plans for the future.	1	2	3	4	5	6	7
13. Will not settle for second best.	1	2	3	4	5	6	7
14. Specified the importance of this study.	1	2	3	4	5	6	7
15. Pointed out what my goal was.	1	2	3	4	5	6	7
16. Provides a good model for me to follow.	1	2	3	4	5	6	7
17. Expressed confidence in my ability to achieve my objective.	1	2	3	4	5	6	7
18. Expressed his/her satisfaction when I did a good job.	1	2	3	4	5	6	7
19. Paints an interesting picture of the future for our group.	1	2	3	4	5	6	7
20. Got me to produce more than I expected.	1	2	3	4	5	6	7
21. Made it very clear what needed to get done.	1	2	3	4	5	6	7
22. Set high standards for performance.	1	2	3	4	5	6	7
23. Insists only on the best performance.	1	2	3	4	5	6	7
24. Leads by “doing” rather than simply by “telling.”	1	2	3	4	5	6	7
25. Made clear what he/she expected of me.	1	2	3	4	5	6	7
26. Acts without considering my feelings.	1	2	3	4	5	6	7

Please turn the page

1. Do you think BDR Publishing should institute a telecommuting program? Yes No

2. Why or why not?

3. Do you know anyone who is a telecommuter, who works at home, or who works away from the main office?

Yes No

4. If yes, what is this person's relationship with you (e.g., mom, best friend, etc.)?

5. If you had a choice to be a telecommuter (i.e., someone who works away from the main office, would you choose to do it? (circle one number)

1	2	3	4	5
No,	No,	Not sure	Yes,	Yes,
Definitely not	Probably not		Probably	Definitely

6. Please write any comments for BDR Publishing below:

We would like to ask you some additional questions about yourself and your background. Please do your best to give demographic information which you feel **BEST** describes you. Remember that all information is strictly confidential.

1. Which of the following **BEST** describes your ethnic or racial background? Please circle only **ONE** response. If none of the choices fit you, please write your ethnicity under "other". If more than one describes you, circle the one that fits best. If there is no "best fit" write the combination under "other".

- | | |
|--|---|
| 1. <input type="checkbox"/> African American | 6. International (please specify) _____ |
| 2. <input type="checkbox"/> Asian American | 7. Biracial _____ |
| 3. <input type="checkbox"/> Caucasian | 8. Other _____ |
| 4. <input type="checkbox"/> Hispanic | |
| 5. <input type="checkbox"/> Native-American | |

2. How old are you? _____ years

3. What is your gender? (Please circle) FEMALE MALE

4. To the best of your knowledge, what is your current cumulative GPA? _____

5. What is your major (or anticipated major) _____

6. What year will you be this Fall: Freshman Sophomore Junior Senior Other: _____

Please open the door when you are finished. Thank you.

Appendix R: Satisfaction Questions

In general, I was satisfied when doing the task.
I felt satisfied when assembling the binders.
I am generally satisfied when doing the task.
I did not feel satisfied during the task. (R)

Appendix S: Manipulation Check Items

Distance:

I was physically distant from the CEO.
The experiment was designed to simulate working away from the main office.
In this experiment, I was working away from the main office.
When people telecommute, that means they work off-site.
The CEO was communicating from a distance.

Climate for Well-Being:

BDR Publishing really cares about the well-being of its employees.
BDR Publishing would grant a reasonable request for a change in working conditions.
BDR is interested in the working from home program in order to benefit its employees.
BDR Publishing cares about my general satisfaction when doing the task.
The number one priority at BDR Publishing is its employees.
BDR Publishing cares about the opinions of their employees.
BDR Publishing really cares about my well-being.
BDR Publishing cares more about making a profit than about their employees. (R)
BDR Publishing values my contribution to its well-being.
BDR Publishing shows very little concern for its employees. (R)

Transactional Leadership:

The CEO:
Specified the way the task would be scored.
Is very task-focused.
Clarified the purpose of the task.
Told me what his/her expectations were.
Pointed out what my goal was.
Expressed his/her satisfaction when I did a good job.
Made it very clear what needed to get done.
Made clear what he/she expected of me.

Transformational Leadership:

The CEO:
Has a clear understanding of where we are going.
Is able to get others committed to his/her dream.
Shows me that he/she expects a lot from me.
Indicated the broader implications for this study.
Motivated me to try harder.
Is always seeking new opportunities for the organization.

Encouraged me to look forward to new possibilities.
Inspires others with his/her plans for the future.
Will not settle for second best.
Specified the importance of this study.
Provides a good model for me to follow.
Expressed confidence in my ability to achieve my objective.
Paints an interesting picture of the future for our group.
Got me to produce more than I expected.
Set high standards for performance.
Insists only on the best performance.
Leads by “doing” rather than simply by “telling.”
Acts without considering my feelings.

Feedback:

The task provided me with feedback on how well I was doing.
The task provided me with the feeling that I know whether I am performing well or poorly.
The task provided me with the opportunity to find out how well I was performing.

Appendix T: Debriefing Email

Dear [Participant first name],

Thank you very much for your participation in the I/O psychology experiment in 0144 Bio-Psyc in exchange for extra credit in your [Participant's class] class. With your help, we were able to get 150 participants during the first summer session. I sincerely appreciate your help!

In this experiment, you were asked to complete a personality test, 2 binder assembly tasks, and some questionnaire items. In addition, you were given some information about a company called BDR Publishing and the reasons they were considering a virtual work program. Below, I will provide a “debriefing” of the study, which basically means I will tell you what the study is about.

As you may have guessed, BDR Publishing is not a real company. However, it is true that Industrial/Organizational psychologists often partner with companies to study phenomenon of mutual interest. We use deception in this experiment to try to make the study more realistic. Additionally, we try to minimize the experimenter's interaction with you so that we can try to create an environment where it feels like you're working away from the company. This makes it similar to what a telecommuter's experience might be like, but in condensed time and relatively free of distractions.

The purpose of the study was to examine the factors that influence a telecommuter's performance and satisfaction. Performance is measured by the number of pages inserted correctly in the trial binder. The factors we examine in this study are leadership (transformational, transactional, and no leadership) and what are called substitutes for leadership. In this study, feedback on the task (either feedback or no feedback) and the climate of the company (high or low climate for well-being) are the substitutes for leadership.

You received a certain combination of the leadership and substitute for leadership variables. You were in the following conditions:

[Participant's leadership condition]

[Participant's feedback condition]

[Participant's climate for well-being condition]

Some participants received an email from a transformational leader, who was very dynamic and enthusiastic. Others received an email from a transactional leader, who detailed what was expected and clarified the task. A final group received an email about the process of making paper – this is the no leadership condition.

These leadership emails were paired with other factors, called substitutes for leadership. All participants received a letter from BDR Publishing that described their reasons for thinking about starting a telecommuting program. The letter either described

employee-centered reasons (e.g., lower commute time, work at personal peak hours, etc.) or employer-centered reasons (e.g., reducing costs of renting office space, etc.). Those are the high and low climate for well-being manipulations, respectively.

We hypothesized that certain combinations of leadership and substitutes for leadership would lead to higher performance on and satisfaction with the task. Your participation today has really helped to clarify the factors that might lead to success in telecommuters.

This research is important because there are a growing number of people who telecommute. These people who work away from the main office have limited contact with their leader and with coworkers. Thus, it is important to study the factors that will help them to be successful in their jobs. Finally, we were interested to know whether a leadership manipulation that came through via email would be effective in motivating participants to be more productive or more satisfied. If we can establish that certain types of leadership are effective at a distance, companies who employ telecommuters will have a better idea of how to train their managers to work at a distance effectively.

Please be assured that your responses are completely confidential. We will under no circumstances release the information to anyone. The data will be kept by Julie Lyon and Dr. Benjamin Schneider, and they will be the only ones with access to the data.

Finally, you as a participant in the study have the right to withdraw your responses now that you are fully aware of the purpose of the study. If you should decide that you would not like your data to be included, please let us know immediately, and we will destroy your data as instructed.

Again, thank you very much for your participation. If there is anything I can help you with in the future, please let me know.

Sincerely,

Julie Lyon
Industrial/Organizational Psychology

jlyon@psyc.umd.edu
(301) 325-8823 (cell)
(301) 405-5934 (school)
Office: 3150C Biology-Psychology Bldg.

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