

Resistance and compliance: Employee reaction to bureaucratic control measures in autonomous work settings

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A thesis submitted to the
Faculty of the Graduate School of the
University of Colorado in partial fulfillment
of the requirement for the degree of
Doctor of Philosophy
Leeds School of Business

2012

This thesis entitled:
Resistance and compliance: Employee reaction to bureaucratic control measures in autonomous
work settings
written by Patrick E. Heflin
has been approved for the Leeds School of Business

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Date: June 13, 2012

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Organizational control is a fundamental management process but has consistently presented a dynamic challenge to leadership. As organizations have increased in size and complexity, however, control of processes and individual behavior has become progressively more difficult. Membership in a group or organization does not necessarily imply aligned goals and behaviors, which can lead to dysfunction and create the perception that even more control is necessary. In addition, technological progress in the design of electronic monitoring devices has made observation and data collection relatively cheap and easy. More and more organizations are choosing to gather data about employees in this manner, but this observation could have negative effects not readily seen. These tactics could threaten employees and leave them in a negative emotional state where they look to reestablish their freedom, either directly or indirectly. The seminal theorist Jack Brehm called this emotional state Psychological Reactance (1966). I predict this elevated level of Reactance will result in behavioral reactions which can be ultimately harmful to the organization. Other control strategies that attempt to create alignment between an individual's identity and the company might be useful in mitigating these behaviors, particularly in relatively autonomous job settings where control is somewhat limited.

This study tests the connection between how threatened an employee is by a control system, the psychological reactance experienced, and subsequent behaviors. The perceived organizational justification for a system and the strength of the individual identity with the company are theorized to moderate these relationships, as well.

My sample includes commercial airline pilots (N=217) who fly for a major U.S. airline. I chose this group because their work environment is highly monitored yet they maintain a relatively large amount of autonomy. The findings generally support the hypothesized relationships and suggest that organizations consider multiple courses of action as well as negative side effects when choosing control mechanisms.

CONTENTS

CHAPTER

I.	INTRODUCTION AND OVERVIEW	1
II.	LITERATURE REVIEW	6
III.	MODEL AND HYPOTHESES	28
IV.	RESEARCH METHODOLOGY AND MEASURES.....	39
V.	RESULTS	69
VI.	DISCUSSION, LIMITATIONS, AND IMPLICATIONS	83

REFERENCES

APPENDICES

A.	INTERVIEW GUIDE	107
B.	SURVEY	108
C.	WEB FORUM POSTING.....	125
D.	ADDITIONAL EMPIRICAL ANALYSES	127

TABLES

Table

1.	Summary of Hypotheses	38
2.	Demographic Comparison of Respondents to Population	58
3.	Dependent Variable Factor Analyses.....	62
4 A,B,C.	Means, Std Deviations, and Bivariate Correlations	70-72
5.	Independent Variable Factor Analyses	74
6 A,B,C.	Models Predicting State Reactance.....	75-76
7 A,B,C.	Models Predicting Dependent Variables	78-79
8.	Overall Model Factor Analysis	82
9.	Mediation Analysis	128
10 A,B,C.	Alternate Models Predicting State Reactance.....	131-132
11 A,B,C.	Alternate Models Predicting Dependent Variables.....	132-133

FIGURES

Figure

1.	Overall Model	29
2.	Perception of Safety Interaction.....	77
3.	Company ID Interaction (ACARS)	80
4.	Company ID Interaction (Black Boxes)	80
5.	Dependent Variable Scree Plot	129
6.	Overall Variable Scree Plot	129

Chapter One

Introduction and Overview

On October 21, 2009 Northwest Airlines flight 188 overflew Minneapolis-St. Paul airport by 150 miles. By the time the pilots realized their error and turned back, the national security infrastructure was on alert and fighter interceptors were being readied for launch. During the subsequent investigation, there have been multiple emotional calls for more monitoring of pilots through new and improved video capabilities. Pilots and pilot unions, however, remain equally adamant in their opposition. These opposing positions bring up an important question: Why would pilots, who are already under heavy surveillance, be so vehemently opposed to another form of monitoring? Is it possible they are equally as upset about current surveillance systems, but their frustration and anger manifest in different ways? These questions form the basis of my research investigating monitoring and behavioral reactions in autonomous job settings.

Organizational control is a fundamental management process but has consistently presented a dynamic challenge to leadership. Membership adherence to organizational policies is critical to process effectiveness (Ackroyd & Thompson, 1999; Tyler & Blader, 2005; Vardi & Weitz, 2004). As organizations have increased in size and complexity, however, control of these processes has become progressively more challenging. Membership in a group or organization does not necessarily imply aligned goals and behaviors, which can lead to dysfunction and create the perception that even more control is necessary. In 1791, Jeremy Bentham, an English philosopher and social theorist, addressed this problem of nonconforming behavior in a prison population. He proposed a design called the “panopticon” where a relatively small, centrally located core of guards could monitor the entire prisoner population (Bentham, from Lyon, 1993). Bentham’s model was based on geometrical configuration as well as a lighting and shutter design that created asymmetric inspection, allowing the guards to see the prison cells while the

prisoners could not see the guards. He asserted this aspect of the design, which allowed constant presumed inspection, was critical: "...the more constantly the persons to be inspected are under the eyes of the persons who should inspect them, the more perfectly will the purpose of the establishment be attained (Bentham, from Lyon, 1993: 657). The lighting and shutter design provided a subtle twist on ordinary surveillance. Prisoners were not sure if they were being monitored, but were under the assumption that they were. The innovation in the design, therefore, was the use of uncertainty in the observed as a means of subordination (Lyon, 1993: 657).

Bentham's model is often used as a metaphor of modern bureaucratic control systems (Foucault, 1977). As monitoring technology advances and costs decrease, management is tempted to implement these systems in an attempt to achieve increased awareness of employee behavior. And, just as in Bentham's design, if total awareness is not possible the threat of observation might be enough to alter behavioral patterns (Alder, 2001). The catalytic theorist was Foucault, who in 1977 wrote about the benefits of the panopticon and how monitoring could be an effective solution to the control problem. Foucault sparked a debate about the effects of monitoring along a diverse spectrum—from the "sharp end" of active observation to the "soft-end" of somewhat innocuous and passive data collection (Lyon, 2006). Organizational studies of monitoring have mainly centered on routinized job settings with relatively straightforward, discrete tasks (e.g. Alder & Ambrose, 2005; Stanton & Julian, 2002). Results have been ambivalent, with negative effects such as increased stress, decreased trust, and lower job satisfaction but also positive influence on perceived fairness when the information collected is used as a source for objective feedback or job evaluation (Stanton & Julian, 2002).

These controls implemented by organizational stakeholders with power advantages are an attempt to guide overall organizational direction. Power differentials are revealed most obviously in situations of ownership and control, but also in other relationships resulting from organizational function and design. In this context, some theorists have characterized organizational control as contested relations of power (e.g. Knights & Vrudubakis, 1994). The individual exertion of power in response to control measures is resistance. But it has also been alternatively framed as “control directed upward” reflecting an active, agentic view of employee behavior (Mumby, 2005). Past research on resistance was initially focused on organized, formal resistance practices such as worker protests, strikes, grievances, etc., that seemed to imply it was necessary for individuals to have group support or leadership prodding to be led down the path of resistant behavior (Prasad & Prasad, 2000: 388). More recently, resistance has been theorized as a more subjective, spontaneous, and natural individualized response to the control exertions of an organization (Mumby, 2005; Scott, 1985). The view of workers and employees as passive cogs in the production process has evolved to seeing them as active participants in power relationships (Mumby, 2005). This idea of resistance as an everyday, endemic part of organizational behavior is reflected in the thoughts of some classic theorists. Freud, for example, said that humans are the natural enemy of organized society, where a compromise exists between human wishes and repression (2002). Weber’s “iron cage” described the bureaucratic institution as the most efficient organizational model to manage complexity, but is also in itself a source of power, creating a struggle with the individual by limiting autonomy and creativity (from Barker, 1993).

One theory to help explain these individually unique resistant reactions is Psychological Reactance Theory. It says individuals who are used to certain freedoms will exhibit reactionary behaviors if those freedoms are threatened (Brehm, 1966; 1972). The Reactance literature

explores many different behaviors, and emphasizes their idiosyncratic nature. A fundamental question in this research project is if strong perceived organizational controls relate to specific resistance behaviors. In particular, I include a new construct in my model of resistant behavior: malicious compliance, where employees withhold discretionary behavior and work to the letter of the contract to intentionally harm the organization.

Anecdotal evidence from popular literature seems to indicate some organizations' employees are less likely to have conflicting individual behavior which might reduce the perceived need for more intrusive control practices. One explanation might be the extent to which an individual's identity is aligned with the organization. Both Identity Theory (e.g. Stryker & Burke, 2000) and Social Identity Theory (e.g. Tajfel & Turner, 1985; Hogg & Terry, 2000) address the degree to which an individual identifies with a group's norms, standards, and values, and this alignment might help explain behavioral variance. By contributing to positive self-esteem and belongingness, identification has been shown to relate to a range of positive organizational behaviors, but may also affect employee resistance behaviors in the presence of perceived organizational control (Ashforth & Mael, 1989; Hogg & Terry, 2000). As I will further discuss, socialization of employees can be another method of control (e.g. Ouchi, 1980) and many theorists see identity and alignment of norms and values as the mechanism through which socialization functions (Fleming & Spicer, 2007).

This project contributes to the research on individual resistance by investigating the antecedents of resistant behavior using Reactance Theory and more fully developing the idea of resistance disguised as compliance via the concept of "Malicious Compliance" or work-to-rule. It also adds to the monitoring literature by using a highly autonomous work setting, which has not been fully explored.

The dissertation is organized as follows. Chapter two will review the literature on control theory, individual reactions to control, psychological reactance, and identity theory. Following the literature review, Chapter three presents arguments for how and why individuals react to perceived organizational controls, with a set of hypotheses addressing the research questions of this study. In Chapter four I present the data sources and sampling strategy, operationalization of variables, and the justification for the statistical analysis that will be used to examine the hypotheses. Chapter five is the presentation of the data and the findings relative to the hypotheses. Finally, I summarize this program and recommend further areas for research.

Chapter Two

Literature Review

In this literature review, I begin by discussing organizational control theory, which is devoted to finding the most effective and cost-efficient methods to gain employee adherence to rules, procedures and expectations in order to reduce behavioral uncertainty (Barker, 1993; Tyler & Blader, 2005). This rule-following behavior is thought to improve organizational efficiency and effectiveness. Alternatively, theories on organizational resistance have evolved from analysis of large-scale labor “movements” to more micro-level reactions to control that are thought to be somewhat automatic behavioral responses to perceived loss of freedoms. Next, I review the literature on behavioral control specifically through employee monitoring. Additionally, I review research findings on individual reactions to monitoring that finds both positive and negative outcomes. Reactance theory has been used as an explanation for behaviors in many contexts, including consumer choice, failure of rehabilitation programs (a so called “boomerang effect”), and studies of persuasion (Quick & Stephenson, 2007). Its use in organizational settings is somewhat limited, and is reviewed below. The proposed behavioral model also includes identity salience as a moderating factor in employee behavioral reactions. I review identity theories, particularly focusing on research that links identity and behavior.

Organizational Control Mechanisms

Organizational researchers have long investigated the relationship between the organization and the individuals who form its membership. Weber in describing bureaucracy articulated a dominant control system, with both positive and negative effects (1958). On the positive side, modern bureaucracies provide the structure and processes necessary for efficient large-scale operations. On the negative side, individuals nestled in the folds of the organization have uniquely individual goals and desires, inevitably different from those of the emergent

organization, that can lead to divergent and possibly undesirable behaviors (Fleming & Spicer, 2007). These partially overlapping goals and their associated problems have been described as the fundamental problem of organizational effectiveness (e.g. Barnard, 1968). Organizational controls are therefore enacted in an attempt to converge these individual activities and behaviors in order to operate the system in the most efficient manner. In this context, control is an exercise in power to reduce behavioral uncertainty—in effect a new version of Taylor’s classic Scientific Management applied across the entire organization (Clegg, Courpasson, & Phillips, 2006).

At its most basic form, organizational control can be reduced to two main strategies: control based on assessment of process actions (behavior control) and control based on the measurement of process outcomes (output control) (Ouchi & Maguire, 1975: 559). Output controls are effective in that both the principal and agent can observe outcomes, and evaluative criteria are relatively easy to define. Behavior controls are designed to ensure the agent’s effort and processes also meet the principal’s expectations, but it requires more involvement from principals (Ouchi, 1980). The panopticon design is an example of primarily behavioral control.

Output control, based on end-state employee production, has been theorized to be a suitable substitute for behavioral control (Ouchi & Maguire, 1975: 559). In other words, an effective observation program of system outputs might render behavioral controls unnecessary, since production is meeting contractual expectations. This idea is compelling as it has historically been more difficult to audit behavior than output and a dual system of control, assuming a certain level of redundancy, would waste resources. Output controls alone, however, may not capture incongruent behaviors or processes that result in correct products by chance or destiny. Given this consideration, therefore, the two control types are

not substitutable, and are best implemented under different circumstances (Ouchi & Maguire, 1975).

The determining factor for the optimum control solution is the level of information about the management process that is known to the principal (Eisenhardt, 1989). In the case of complete information, a behavioral contract is the most efficient. An outcome-based contract would needlessly transfer risk to the agent, as process outcomes could be flawed for reasons beyond the agent's control. In the case of incomplete information, an analysis is required between the costs of monitoring the agent versus the cost of measuring outcomes and transferring risk to the agent, which would presumably require a higher salary (Eisenhardt, 1989: 61). Emerging technologies have facilitated new monitoring techniques that lower the cost, thereby tipping the scale toward behavioral monitoring in choosing a means of control (Stanton & Julian, 2002).

Different theorists have outlined various mechanisms to enact output or behavioral control. Widely considered the seminal theorist on the subject, Weber used the term "legitimate domination" to describe organizational authority and control, of which he theorized three "pure types" (1958). Rational grounds are those which rest on a belief in the legality of rules and the legal right of those appointed to authority under such rules to issue commands. Traditional grounds are based on established belief in traditions and rituals and those exercising authority in their spirit. Finally, charismatic grounds depend on personal devotion to the exemplary character associated with the person who occupies the authority position.

Taking Weber a step further in an important work on organizational control, William Ouchi assessed organizational relationships with a transaction costs perspective, describing

three different mechanisms that might be employed to mediate these transactions: Market, Bureaucracy, and Clan (1980). These different mechanisms are how transactions are mediated, or “controlled”, between parties. The mechanisms of control internal to the firm, bureaucratic and clan, are the most applicable to this research and will be the focus. Bureaucratic systems have generally emerged when markets do not provide enough information (price ambiguity) or there are few alternatives (small numbers of competitors) (Ouchi, 1980). These situations result in increased transaction costs, which can be diminished by mediating the transaction within a bureaucratic system (Williamson, 1975). The bureaucracy provides structure and performance guidelines that can be less costly to enforce than market contracts. Even within a bureaucracy, however, contracts and agreements are necessarily incomplete due to cognitive limitations (e.g. bounded rationality) and future-state uncertainty, leaving some aspects of performance to be continually negotiated (Williamson, 1975). These contractual gray areas create spaces where there can be variation of employee effort and performance. These areas of ambiguity and behavioral discretion are where clan control might be most effective, and was Ouchi’s main theoretical contribution. It is dependent on members who maintain relatively congruent goals and objectives, and apply pressure to other members who appear to be drifting (Ouchi, 1980). One way to achieve this type of control is through the socialization of new individuals, which entails exposure and acquisition of the group norms and values (Feldman, 1981). Direct control through bureaucratic mechanisms then becomes less important as the employees’ “instinctual” (through effective socialization) inclination is to do what is in the best interest of the firm (Ouchi, 1980: 132).

More recent organizational studies have included socialization as a key normative

ingredient to effective and efficient controls (Gabriel, 1999). The “excellence” literature of the 1980s and 1990s emphasized a new range of ideological and cultural controls to increase efficiency and effectiveness. For example, Peters and Waterman used the term “loose-tight” to describe this move toward culture as control. “Loose” control minimizes traditional bureaucratic rigidity, but only to be augmented by “tight” self-regulation through the internalization of a strong culture (1982). The idea of culture as a management tool has gained strong support among organizational theorists and practitioners alike (Ray, 1986). Barker’s classic article explores “concertive control” as a value based system that changes the locus of authority from the bureaucratic structure to the individual worker (1993). Workers are able to establish behavioral norms by cultivating agreed-upon values and ideals held by the organization, not just management.

Culture has also been shown to be related to several employee outcomes (e.g. Barney, 1986). Even those organizations, however, which espouse strong socialization and individual devotion, still rely on bureaucratic mechanisms of control (Fleming & Spicer, 2007). In this environment, organizations can be seen to use a strong culture, or clan control, to augment, instead of replace, bureaucratic mechanisms of control. This combination is mostly associated with attempts to control day-to-day employee attitudes and actions, or behavioral control, as opposed to a strictly production-oriented output control.

Individual Resistance to Control

How do people react to these organizational efforts to control and align behavior? In many cases, employees comply with organizational rules and restrictions. Adherence is commonplace, as the organization is generally designed to function within the design guidelines, and organizations reinforce compliant behavior with incentives and rewards (Tyler & Blader,

2005). Also, people are generally inclined to do what they are told, especially if the source is an authority figure (Blair & Stout, 2001). Ackroyd & Thompson note, however, “Control can never be absolute and in the space provided by the indeterminacy of labour, employees will *constantly* find ways of evading and subverting managerial organization and direction of work. This tendency is a major source of the dynamism in the workplace” (italics added for emphasis) (1999: 47).

The focus of this research is this resistance behavior that has recently been theorized to be as omnipresent as adherence (e.g. Ackroyd & Thompson, 1999; Prasad & Prasad, 2000; Scott, 1985). Resistance and adherence are now seen not as opposite ends of a behavioral continuum, but instead somewhat orthogonal and even occurring simultaneously in the same employee (Jermier, Knights, & Nord, 1994; Spitzmuller & Stanton, 2006). In fact, one of the main propositions of this paper is that in certain situations, adherence to organizational obligations can actually be a resistance behavior.

Research on resistance spans a broad spectrum of behavior, from organized, purposeful actions in response to specific instances of organizational control to more innocuous, individual-level actions that are unplanned and somewhat routine (Prasad & Prasad, 2000). Early industrial sociologists were eager to view large-scale labor actions in the context of the wider social order (Ackroyd & Thompson, 1999). These theorists, mainly inspired by Marxist class-struggle ideology, viewed resistance as a somewhat romanticized, collectively organized action based on class and power differential (Mumby, 2005). Organizations from the industrial revolution through the 1970s and 1980s provided a rich backdrop for these visions of exploited workers uniting to overthrow the powerful capitalist leadership. Reactions to control regimes were seen as homogenous across individuals, with very little difference in

interpretation or attitudes and behavior (Matusik & Mickel, 2011). The focus on this type of resistance was unsatisfying because workers were viewed as “apprentice revolutionaries whose behavior and attitudes are evaluated against an a priori and unrealistic model of social agency and change” (Ackroyd & Thompson, 1999). That particular research stream had very little focus on the everyday struggle of organizational life and the unique ways members actively engage in the dynamic interplay between management and worker. A more nuanced view of the dialectic nature between control and resistance would lead to the inclusion of a wider spectrum of individual behavior.

Labor Process Theory (LPT), following the pioneering work of Braverman (1974), focuses on the dynamics of labor *processes*, which narrows the typical Marxist class struggle but also provides a broader view of the simple wage-effort agreement of industrial sociologists (Ackroyd & Thompson, 1999). LPT views resistance as individual reactions to the structure imposed by management, as opposed to an orchestrated prelude to revolution. This transition to a stronger view of individual worker agency is a fundamental aspect of LPT and is a clear move away from the neo-Marxist attitude that workers are passive cogs in the production process (P. Prasad & Prasad, 2000). LPT also takes a more subjective and micro analytic view of the power struggle between authority and employee. As Andrew Friedman writes, “It is important to examine how the capitalist mode of production has accommodated itself to worker resistance, rather than simply how the capitalist mode of production might be overthrown through worker resistance” (1977: 48). In other words, the production process has evolved in relation to worker resistance, just as resistance evolves to process controls instituted by management. Management adapts labor processes in an attempt to minimize and contain workplace resistance, but out of these evolving processes

come new opportunities for workers to evade, disrupt, and push back in a reinforcing cycle (Edwards, 1979). This is the essential principal emerging in the organizational resistance literature: resistance as *inevitability* and a part of the social fabric of organizational life, which goes hand-in-hand with organizational processes in many ways designed to control it (Ball, 2005).

Most contemporary organizational resistance studies retain and extend the fundamental tenets of LPT, focusing on behaviors of agentic workers that are generally routine, subdued, or covert (Ashcraft, 2005; Ball, 2005; Mumby, 2005; Murphy, 1998; A. Prasad & Prasad, 1998; P. Prasad & Prasad, 2000). Some forms of resistance continue to be organized, openly hostile actions toward management, but much of the research observes more subtle behaviors that fill the void of ambiguous expectations with regard to organizational practices (Mumby, 2005). These behaviors represent an active, creative worker who is able to undermine managerial control and create unforeseen consequences that often require even more managerial attention.

While LPT diverged from the traditional Marxist view by espousing a calculative, purposive, and deliberate worker, more recent organizational theorists view resistance across a spectrum of behaviors, some highly conscious and intentional and others more subconscious and routine (Ball, 2005). Resistance is seen as a “configuration of emotional responses, patterned behavior, intellectual assumptions, and reasoned decisions—related to specific worker subjectivities” (P. Prasad & Prasad, 2001: 110).

Routine forms of resistance have become the focus and central component in the struggle over workplace control. These routine, also called informal, behaviors are generally unplanned and spontaneous and can also be covert (Nord & Jermier, 1994; Scott, 1985). It is

a difficult, and most likely fruitless, task to try and develop a list of behaviors that might be considered “routine resistance”. This is because of the subjective, ever-changing nature of the interplay between control and resistance. What is resistance to one employee might be an unintentional oversight to another (Spitzmuller & Stanton, 2006). A resistant behavior at one time might evolve into a habitual behavior in the same employee that no longer carries the meaning “resistance”. This difficulty led A. Prasad & Prasad to categorize different resistant behaviors found in the literature into four general groupings (1998): (a) open confrontations to supervisors and clients (b) subtle subversions of control systems through the use of gossip and horseplay (c) employee withdrawal and disengagement and (d) ambiguous accommodations to authority (A. Prasad & Prasad, 1998). This typology, with fairly general categories, is still not comprehensive enough to cover all possible resistant behaviors. The level of intentionality would also be an important variable to distinguish levels of resistance in individual behaviors.

Organizational members develop these types of routine resistances discursively in a very subjective and context-specific manner (P. Prasad & Prasad, 2001). The “central problematic” in this research, therefore, has become how to define, observe, and analyze resistant behaviors other than well-defined, collective action (Ball, 2005). One problem is that these behaviors tend to be in the domain of the “informal organization” which is less visible and more ambiguous than the observable aspects of the formal organization. In field research and experimental settings, it may be difficult for the researcher to detect resistant behavior that the subject intends to hide. Other obvious behaviors the researcher assumes is resistant may in fact be an error by the subject with no resistant intent. For example, in the airline industry, the pilot hat is a symbol of professionalism that has been part of the uniform

for many years. Recently, pilots have been “forgetting” to wear the hat as a sign of displeasure with management, in effect a very public display of resistant behavior. Some pilots, however, used the occasion to leave the hat home simply because they do not like it, not as the result of any resistant intentions to certain controls. It would be difficult in this case, if not impossible, to determine accurate resistance intentions by mere observation. Holding true to evolving processes, management responded by making the hat an optional part of the uniform.

Behavioral Control Through Employee Monitoring

In Sociology, control and conflict between the ruling class and proletariat is a strong and recurring theme. Attewell (1987) asserted that performance monitoring has been in use as long as there has been industry and production. Bureaucratic control has been characterized as a movement away from societies that base their intersocial exchanges on trust and primary relations, or *Gemeinschaft* toward contractual societies, or *Gesellschaft* (Toennies, 1940 from Ouchi & Johnson, 1978: 310). These ideas embodied in recent organizational theories, such as Agency Theory, can be associated with the continued emergence of this contractual society. Under Agency Theory, characterization of owner-employee relationships is based on the presumption that employees (or “agents”) do not have aligned objectives with owners (or “principals”). Principals attempt to force the agent’s objectives into alignment using several strategies, including monitoring, auditing, formal control systems, budget restrictions, and the establishment of incentive compensation systems (Jensen and Meckling, 1976: 323). With tangible costs decreasing and technological capabilities increasing, monitoring is becoming a more attractive option in an

attempt to increase principal-agent goal congruence, across multiple employment relationships (Holman, Chissick, & Totterdell, 2002: 58).

Employee performance monitoring includes observation, examination, and recording of work actions and behaviors (Stanton, 2000). In general, research on monitoring has labeled two types, “traditional” and “electronic” (also known as Electronic Performance Monitoring, or EPM) (e.g. Holman, et al, 2002; Stanton, 2000; Stanton & Julian, 2002). Traditional monitoring includes actions involving human-to-human interaction, such as direct observation, listening to calls or conversations, work sampling, and self-reporting (Stanton, 2000). Recent technological developments have facilitated new techniques for monitoring and make up the category “electronic monitoring”. These techniques include automatic and remote monitoring of behavior, using audio and video recording, keystroke analysis, and event duration evaluation (Stanton & Julian, 2002). EPM, relatively independent from direct human involvement, lends itself more readily to continuous monitoring of employee behavior (Holman, et al, 2002).

Three main features characterize monitoring: content, purpose, and employee “monitoring cognitions” (Holman, et al, 2002). The content of performance monitoring includes objective qualities, such as frequency, feedback, performance criteria, source, and target. The purpose of performance monitoring is derived from how managers will use the data (e.g. developmentally, punitively, or informatively) (Holman, et al, 2002). Monitoring cognitions refer to the perceptions and attitudes of employees about the monitoring. Specific factors that affect perception include assessments of its fairness, whether or not the monitoring system is trusted, and the perceived intensity of the monitoring (Stanton & Julian, 2002).

Early monitoring research focused primarily on the content and purpose of the systems. Recently, monitoring cognitions have been investigated, particularly the perceived fairness of the system by employees. Moorman & Wells (2003) found significant relationships between perceived fairness and job satisfaction variables, but did not find any relationship to task performance. Alder & Ambrose (2005) propose a relationship between fairness judgments and behavioral outcomes, integrating feedback, justice, and monitoring research.

Individual Reactions to Monitoring. Research on how individuals react under surveillance is well established and spans multiple disciplines. A large body of research in Psychology has investigated the phenomenon generally known as reactivity, and more specifically labeled “researcher-expectancy effect”, “subject-expectancy effect”, “pygmalion effect”, etc., depending on the context. These all describe the situation that occurs when individuals are aware of being observed or measured and subsequently modify their behavior from what would have been “normal”. More recent system designs, however, place employees under nearly constant observation, making it important to determine the nature of behavioral reactions under these conditions. Recent EPM research is an effort to do so, and has arguably taken on a larger relevance because of its emerging prevalence in organizations (Alder & Ambrose, 2005).

From an individual perspective, research on monitoring has found relationships with both negative and positive outcomes for employees. Generally, monitoring techniques (traditional and electronic) create positive reactions in that they can provide a social cue of what the employer considers important, and how the process should be carried out (Kidwell & Bennet, 1994; Stanton & Julian, 2002). Also, when used in specific, usually prearranged

ways, such as a source for feedback, monitoring has been shown to have positive effects on well-being and job satisfaction (Alder & Ambrose, 2005; Holman, et al., 2002: 61; Stanton & Julian, 2002). For example, a manager might use data collected from an EPM program that provides highly accurate, objective data in evaluating employee performance.

A large portion of EPM literature, however, describes negative reactions. These reactions can be organized into two general categories, internal and external (behavioral) (Botan, 1996). Internal effects describe issues as stress, uncertainty, boredom, depression, anxiety, anger, feelings of vulnerability, or a loss of privacy. Numerous studies have corroborated the notion that monitored employees have higher levels of these internal effects (e.g. Aiello & Kolb, 1995; Henderson, Mahar, Saliba, Deane, & Napier, 1998; Holman, et al., 2002; SynderSmith & Cacioppo, 1992).

External effects manifest in the behaviors the employee adopts in response to monitoring, including resistance, performance, and productivity. Research on performance and productivity shows mixed results. Two studies apply the Social Facilitation Framework, which says that work in the presence of another person will tend to result in increased performance on simple tasks and decreased performance on complex tasks (Zajonc, 1965). Electronic monitoring was thought to be a valid substitute for the “other person”, and in general these predictions were supported (Aiello & Svec, 1993; Griffith, 1993). A study excluding task type, however, showed that EPM may be detrimental to performance by inducing workers to focus on the metric being measured causing a drop in product quality (Grant, Higgins, & Irving, 1988). Stanton & Barnes-Farrell used perceptions of control as a mechanism leading to individual performance, showing that the use of EPM related to lower perceptions of control, and subsequently lower levels of performance (1996).

Other research has shown a positive relationship at lower hierarchical levels of the organization, where means-ends relationships are usually well defined and tasks are relatively simple (Ouchi & Maguire, 1975). Aiello & Kolb (1995), in a study of keystroke entry, found highly skilled monitored participants had higher performance than those who were not monitored. A series of experiments by Nebeker & Tatum (1993), using goal setting as the theoretical basis, found enforcement of lower standards through monitoring was related to higher job performance and job satisfaction than the enforcement of more difficult standards (1993). These studies offer additional support for the idea that EPM effectiveness on performance is somewhat task-dependent.

Research on resistant behavior as a reaction to performance monitoring has mostly investigated individual micro-practices that subvert the functioning of the control system (Vorvoreanu & Botan, 2001). These behaviors are wide-ranging, as previously noted, and include vandalism, unwarranted absenteeism, theft (Lawrence & Robinson, 2007), sabotage (Gottfried, 1994; LaNuez & Jermier, 1994), stories (Ewick & Silbey, 1995), and humor (Collinson, 1988).

These types of behaviors are generally observable to a manager or researcher, but other behaviors that are below the surface have not been thoroughly explored in the literature. In fact, the majority of empirical studies are conducted using laboratory experiments or job settings with relatively low-level, simple tasks, with recent exceptions (Ashcraft, 2005; Tyler & Blader, 2005). This highlights two gaps in this research. First, the laboratory as research setting has the potential to introduce subject-expectancy effects that impact the validity of any findings. While an experiment may be well suited for surveillance-performance data, it seems particularly difficult to discover the routine, below the surface resistance behaviors that

might be present in the individual. Ethnological methods and survey response might help uncover these hidden attitudes and behaviors. Second, the tasks observed in nearly all EPM studies are fairly simple, repetitive assignments that are usually found at the lower end of the organizational hierarchy. There is a great need, as more capable monitoring is deployed across the employment spectrum, of determining the effects on relatively autonomous employees who accomplish complex and difficult tasks in the execution of their duties. Variance in behavioral reactions in this realm might be explained by other factors, including feelings of reactance and identity salience, which are discussed below.

Psychological Reactance Theory

Psychological reactance theory, also called reactance theory, says that an aversive reaction occurs in individuals in response to controls that inhibit freedom of behavior and autonomy (Brehm, 1966). A perceived threat to established freedoms is the catalyst for an emotional state known as psychological reactance. This state elicits behaviors intended to restore the level of freedom previously in place. The theory predicts a wide range of behaviors, from directly challenging the threat to indirectly attempting to establish greater autonomy in other areas (Brehm & Brehm, 1981). In fact, reactance can often result in individuals acting in the opposite manner of which they were encouraged by the control measure to act (Brehm & Brehm, 1981). The nature of the relationship between direct and indirect behaviors, such as a progression from direct to indirect reactions, is not theorized in the reactance literature. In the employment context, however, it may be more likely for an employee to tend toward indirect behaviors in order to preserve employment status.

Reactance Theory has been used in fields that analyze reactions to persuasion, like counseling for substance abuse or marketing (Lessne & Venkatesan, 1989). The argument in

these contexts is that individuals perceive a “loss of behavioral choice” and react in an attempt to compensate for this loss (Brehm & Brehm, 1981). There are also several examples of reactance theory in Organizational Behavior, particularly to help explain behaviors that appear to deviate from the norm. Two studies used reactance theory as a possible theoretical basis for decisions by employees to withhold Organizational Citizenship Behaviors, in an attempt to regain a measure of control (Niehoff & Moorman, 1993; Zellars, Teppar, & Duffy, 2002). From Niehoff & Moorman:

If people have a need to feel competent and self-determining, managerial behaviors that limit their freedom, such as observing them at work or keeping tabs on their work progress, could elicit “psychological reactance” (Brehm, 1972). Such “reactance” could take the form of poor job attitudes, minimum levels of effort, or both. An employee having such reactions would be unlikely to exhibit discretionary behaviors reflecting efforts above and beyond the norm (1993: 530).

Other studies have theorized reactance as a mechanism for exhibiting certain behaviors in new employment situations (Ashforth, 1989) and to explain whistle blowing (Dozier & Miceli, 1985). Lawrence & Robinson use reactance theory in a qualitative piece to explain deviant behavior as manifestations of resistance to episodes of organizational exertion of power (2007).

Organizational applications of reactance theory have almost exclusively been theoretical in nature. Reactance scholars say the limited application of the construct in empirical studies lies in its ephemeral nature, but this has changed over the last decade with the operationalization and development of a scale for both trait (Hong, 1992; Hong & Faedda, 1996) and state (Dillard & Shen, 2005) reactance measures. Research using these measures has primarily been in psychology under the persuasive communication literature (Burgoon, Alvaro, Grandpre, & Vouladakis, 2002; Quick & Bates, 2010). One way an

organization might temper a negative reaction to control might be to foster strong identification within the individual, a concept more discussed more fully below.

Identity Theories

Organizational control that is centered on the socialization of the individual often does so by increasing the congruence of the individual's norms and values with other members as well as with the organization as a whole (Ouchi, 1980). A difficulty, however, is that modern organizations can create a multitude of identities, each with their own set of values. Many associations now challenge the traditional, somewhat monolithic "firm" that in many ways was the mainstay of the individual identity (Foreman & Whetten, 2002). As noted by Albert & Whetten in their seminal work on multiple organizational identities:

In both everyday language as well as in more formal scientific discourse, we tend to treat most organizations as if they were either one type of another, for example, church or state, profit or nonprofit. This taxonomic tradition assumes that most organizations have a single and sovereign identity. The alternative assumption is that many, if not most, organizations are hybrids composed of multiple types (1985: 270).

Adding to the complexity, companies and employees in today's economy are experiencing rapid change, mergers and acquisitions, and frequent layoffs and job transfers. Many members of modern organizations have affiliations with multiple entities internal and external to the organization, resulting in individual members that can identify, with varying intensity, with many different aspects of professional life (Foreman & Whetten, 2002).

This situation is echoed in much of the identity literature, describing processes that are convoluted by the presence of dual or multiple identity claims on an individual (McCall & Simmons, 1978; Ashforth & Mael, 1989; Cheney, 1991; Foreman & Whetten,

2002). Identity salience is the self-concept that is most central to the individual in the given situational conditions (Stryker & Burke, 2000). The rise of professions and members who closely identify with the services they provide leads to a lower degree of identity with specific companies, particularly in those with a relatively weak socialization program (Whetten, Lewis, & Mischel, 1992). The identity salience in this hybrid environment is thought to affect behavioral reactions to control, such that those employees whose most salient work identity is aligned with the company will display fewer resistance behaviors.

Identity-Behavior Relationship. Cognitive identity can affect a person's well-being and behavior because individuals either assume attributes of the group or they assume others infer certain attributes about them due to their group membership (Dutton, Dukerich, & Harquail, 1994: 240). Stryker & Burke theorize that the higher the salience of an identity relative to other identities incorporated into the self, the greater the probability of behavioral choices in accord with expectations attached to that identity (2000: 286). Tajfel, et al, from the Social Identity Theory literature, explored the pervasiveness of social categorization and identification and its potential effect on behavior:

An important cognitive consequence of this pervasiveness is that the articulation of an individual's social world in terms of its categorization into groups becomes a guide for his conduct in situations to which some criteria of intergroup division can be meaningfully applied. ('Meaningful' need not be 'rational'.) An undifferentiated social environment makes very little sense and provides no guidelines for action (Tajfel, Billig, Bundy, & Flament, 1971)

A person's identities are not necessarily separate, but instead woven into a complex system, or a cumulative identity. Yet there remains a hierarchy in which these identities are loosely

arranged, and this hierarchy in large part is determined by what we see as our “ideal self”, from which our behavioral norms and self-esteem is derived (McCall & Simmons, 1966).

Summary

Control in a society, and more narrowly in an organization, can be generalized as managing the tension between the natural human tendency of individual creativity and the need to maintain functionality in our socially embedded processes. “Control” has been alternatively derided and embraced, depending on the relative position of the perspective-holder (Barker, 2005). Organizations are designed to create value, and leaders and managers are entrusted to ensure that value is maintained. More control is conventionally seen by managers as a benefit to this effort, but variance in employee reaction to these measures make further research an important step in identifying optimal control strategies (Tyler & Blader, 2005).

Theories of organizational control and employee resistance originally assumed a somewhat passive, uninterested individual employee who would be motivated to resist only in large-scale, coordinated job actions. Control theories have evolved to emphasize the role of the individual more, through socialization programs and group membership effects such as peer standard setting and enforcement (e.g. Barker, 1993; Ouchi, 1980). Resistance theories have evolved, as well, envisioning resistance as a somewhat innate individual behavior defying the impersonal will of the system through a variety of means, mostly routine and unique to the individual situation (Prasad & Prasad, 2000).

Interest in control and resistance theories has seen resurgence in recent decades due to a revolution of sorts in monitoring techniques and capabilities. New technology makes monitoring less intrusive, and possibly more importantly, more cost efficient, which provides incentive for managers to try to implement these control strategies. EPM techniques in the workplace

include automatic and remote monitoring of behavior, primarily using video recording but also audio recording, keystroke analysis, and event duration evaluation (Stanton & Julian, 2002). The critical distinction between EPM and traditional surveillance is that EPM can be conducted without human interface, and without the direct knowledge of the employee. Evidence from the field indicates a rapid increase in the use of EPM, which requires a more thorough understanding of the effects on employees (Alder & Ambrose, 2005).

Initial EPM research focused on characteristics of the system itself, with individual outcomes primarily focused on performance and job satisfaction (Stanton, 2000). Aspects such as frequency (Niehoff & Moorman, 1993), controllability (Stanton & Barnes-Farrell, 1996), and source expertise (Stanton, 2000) were found to have some positive relationship to these outcomes. Other systemic characteristics, such as using the data as a source for feedback, have also been shown to have positive effects on well-being and job satisfaction (Alder & Ambrose, 2005; Holman, et al., 2002; Stanton & Julian, 2002). EPM systems that provide accurate, objective data in evaluating employee performance might be seen as a positive, especially if the employee is afforded the opportunity to provide developmental input beforehand (Stanton, 2000).

Monitoring research on negative outcomes has focused primarily on adverse physiological reactions, including elevated heart rate and blood pressure, changes in skin conductance, increased fatigue and other factors generally associated with increased levels of stress. While some may argue that increased stress to a certain degree leads to higher job performance, other outcomes such as increased job turnover, withdrawal, or depression might indicate the longer-term effects of monitoring need to be considered against short-term gains in performance (Stanton, 2000).

In general, researchers as well as practitioners assume that there is homogeneity when considering individual reception and reaction to monitoring programs: On the positive side, performance and job satisfaction will improve if the system is done right, while on the negative side, physiological issues might arise that would make the employee somewhat more uncomfortable. Little has been done to integrate the view that resistance is commonplace with the rapid expansion of control through monitoring. It is important to determine what variance exists in resistant reactions, and the reasons for this variance. Reactance, which is both a trait and state construct, has been shown to have varying levels across individuals, and in different situations (Brehm & Brehm, 1981). Modern society also influences individuals by creating situations where they have competing self-concepts. These multiple identities can compete against each other, often determining behavioral outcomes (Dutton, et al., 1994; Mael & Ashforth, 1992).

Another gap in this literature is that very little research has been accomplished in situations where jobs are autonomous and task relationships are ill-defined and dynamic. In these cases, monitoring will provide information but the evaluator may be limited by a lack of situational, contextual, or process knowledge. This may also lead to employee attitudes and behaviors that vary considerably and is a contextual variation that warrants more robust examination.

An additional limitation of the monitoring research is that the setting has been primarily experimental, with a few exceptions (Moorman & Wells, 2003; Niehoff & Moorman, 1993; Tyler & Blader, 2005). As noted, this creates an artificial environment where only the most salient reactions might be observed, such as improved task performance or physiological changes. To understand the full range of behavioral

implications caused by the introduction of EPM systems, research should consider the employee in the work environment. These well-established literature streams all seem to have a common feature of moving from a broad, somewhat monochromatic impression of organizations and their members to a more nuanced, multi-faceted view of unique individual perceptions and reactions to their personal organizational experience. While laboratory experiments are useful in establishing relationships, it is also important to study these events in their true settings, as will be discussed in the development of the model and research design in the following chapters.

Chapter Three **Model and Hypotheses**

The main themes of this research are that organizations have high perceived return on gathering data about their employees, individuals have unique reactions to these organizational exertions of power, and this employee resistance will be moderated by the strength and locus of their social identity. Employee surveillance, particularly Electronic Performance Monitoring, has been increasingly used as a management tool and technology has made the systems more pervasive (Stanton, 2000). Research on this resurgence has generally focused on the physiological and performance effects on individuals in experimental settings with fairly simple tasks to accomplish. Autonomous workers studied in the field would presumably have different and possibly more extreme reactions to this type of control due to the freedom normally associated with their job. This gap in the monitoring literature is an important genesis for a model of EPM and resistant behavior.

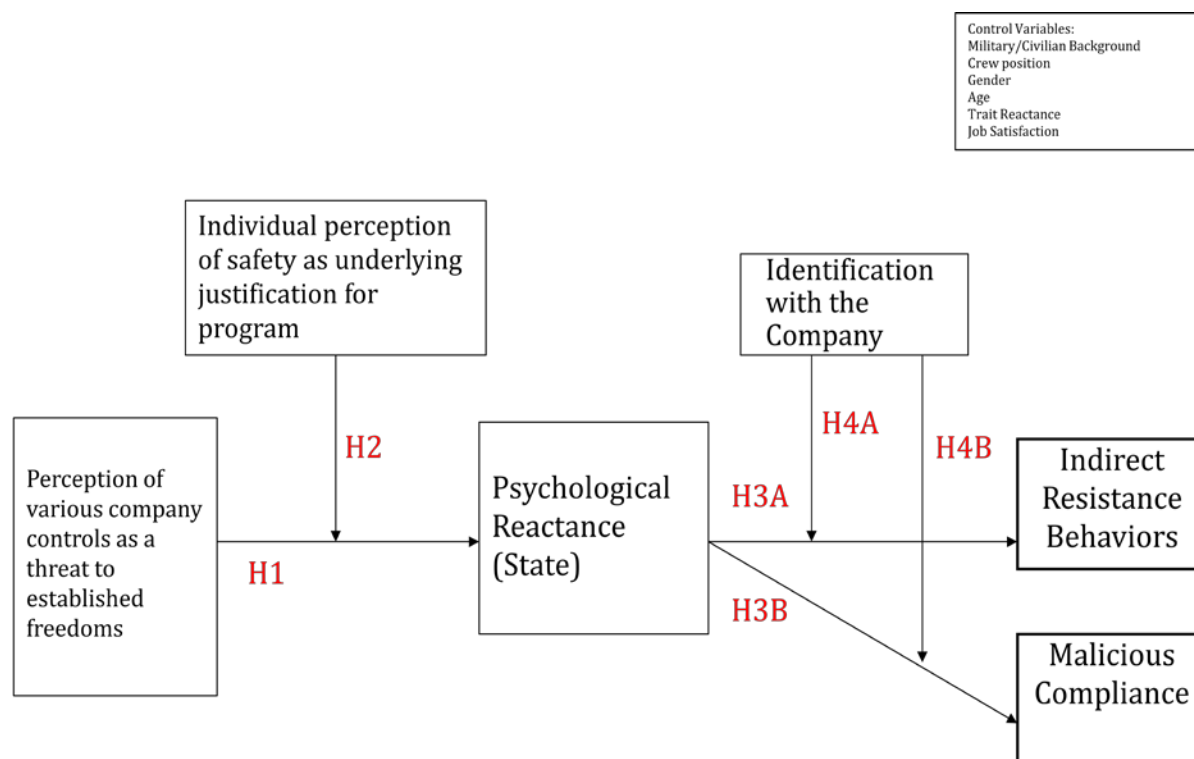
Both Identity Theory from sociology and Social Identity Theory from social psychology predict behavioral outcomes based on the strength of individual identification with a group. Recent research on employee conduct has included this general idea of employee-organization alignment in different ways. Tyler & Blader (2005) address a perceived “moral value congruence” as a mechanism for a self-regulatory control system. Lawrence & Robinson (2007) say that the *loss* of identity at the hands of increased organizational power is the mechanism for frustration and resistance. I argue that resistance behaviors are ubiquitous and a natural outcome of organizing, but they are moderated by the level of congruence between the individual identity and the organization.

Individuals have been shown to vary in their need for autonomy, and it is critical for those in whom it is high because it is only through this ability to make decisions and choose

actions that they can maximize their satisfaction (Brehm, 1966). An underlying assumption of reactance theory is that human beings have an inherent right to autonomy, and cherish their ability to choose among alternatives (Brehm, 1966). Although reactance theory has been used in many disciplines to explain different behaviors, I have not discovered research that uses reactance to explain the link between control and resistance. It seems appropriate, therefore, that a study of resistance in autonomous settings use reactance theory as the mechanism to explain behavioral reactions.

The following model graphically displays the conceptual relationships between the constructs.

Figure 1



Hypotheses

The initial step in this model is to determine the extent an employee perceives a threat to an established behavioral freedom. An important distinction in reactance theory is that freedoms are considered to be concrete behavioral realities by the individual, not just hoped for or desired (Brehm & Brehm, 1981). Any force that makes it more difficult for the individual to exercise this freedom is theorized to result in reactance (Brehm, 1966). In this study, I argue organizational controls that attempt to dictate or modify previously established behaviors are thought to constitute a threat to the employee. The controls may specifically target the threatened freedom. On the other hand, the control might threaten a behavior that is collateral to the intended behavioral effect of the program.

Reactance literature theorizes two important aspects of the perception of a threat and subsequent reactance (Dillard & Shen, 2005). First is the strength of the threat to freedom and the second is the trait reactance proneness. Some disciplines have used indicators such as “intent to persuade” and “language intensity” to measure the strength of an attempted influence (Dillard & Shen, 2005; Hong & Faedda, 1996). A large portion of the reactance research is done by communication and persuasion scholars, who find the theory useful in studying “message effects” and their relation to a multitude of behaviors such as binge drinking, flossing, drug use, sun protection, etc. (Quick & Stephenson, 2007b). Studies have supported the notion that messages using strong, intense, or forceful language that are perceived to threaten freedom of choice result in reactance (e.g. Dillard & Shen, 2005; Henriksen, Dauphinese, Wang, & Fortman, 2004). Other studies have focused on message structure and the use of inductive or deductive

reasoning, with varying results (Dillard & Shen, 2005). Threat-to-choice language has been found to have the largest impact on subsequent individual reactance.

While acknowledging the apparent validity of the observer-calculated threat strengths, I argue the perception of the individual is what ultimately determines the magnitude of a threat. Two different employees might have alternate interpretations of a strongly worded directive. Therefore, I argue that subjective individual threat perception, rather than “objective” threat strength, is salient in driving psychological reactance.

Reactance proneness is also referred to in the literature as “trait reactance”, and is a person’s inclination to distrust authority and resist persuasion (Dillard & Shen, 2005). In this particular model, however, the emotion of interest is an employees’ reactance to specific monitoring programs, over and above their general inclination, which describes state reactance. Trait reactance is included in this model as a control variable and discussed more fully in Chapter Five.

This study focuses on freedom of behavioral choice *in the workplace*, which makes for an interesting contrast to reactance studies in the fields of psychology or marketing. Those contexts have generally studied people making decisions as individuals, with societal expectations being more or less the only limiting factor on behavioral choice. In the context of an organization, despite the comparatively more structured environment, I assume the perceived freedom each individual has under the employment contract to be quite different. I expect this to be true particularly in an autonomous work setting, where a higher number of tasks are accomplished more or less at the individual’s discretion, making them more prone to perceive perceived threats to behavioral freedom.

Therefore, I expect there to also be a range of reactance to different control measures. Some individuals may believe them to be just part of the job, while others may perceive a significant impact to personal freedoms, albeit at work. This leads to the first hypothesis, which tests the relationship between elevated threat perception and a “reactance motivational state”:

H1: Levels of threat perception of organizational control measures will be positively related to state reactance.

Plainly, reactance theory incorporates a large amount of individual subjectivity with regard to the perceived threat. Beyond language, however, Brehm’s theory also suggests legitimacy and justification as two important variables that an individual will assess that might affect the level of reactance (1966). In the fields of communication and marketing, the legitimacy of the message source might be an important variable to consider. Individuals are generally studied in contexts with high behavioral choice and threats might come from a variety of sources with varying legitimacy. With regard to organizational control practices, however, a certain level of authoritative legitimacy is presumed. Possibly more importantly, the justification given by an organization for the control program might be perceived to have certain intentions, affecting employee behavioral reactions.

In most cases, controls are put in place to improve the efficiency of processes in order to meet broader goals and objectives (Barker, 1993). In business, this usually means an improved bottom-line and profitability, which indirectly benefits the employee, but may be systemically so far removed that it would be difficult for the individual employee to appreciate. Another reason a control might be put in place is to promote safety within a process. Although this might also be done by the organization with purely fiscal motives, the individual employee might see a more direct link between the control and personal well-being, moderating the level of reactance.

Autonomy has been shown to be a primary source of human morality, growth, development, health, well-being, and effectiveness at work (Jermier & Michaels, 2001). Highly autonomous workers who are accustomed to these benefits might be more likely than employees who have low autonomy to actively investigate and interpret underlying justification for new control measures. The level of reactance even to a high threat control program would then be lower if the organizational justification is related to something directly related to the employee well-being. Justification type forms the basis of the second hypothesis:

H2: The relationship between the perceived threat of an organizational control measure and subsequent reactance is influenced by the perception that safety is the underlying purpose of the program, such that reactance will be lower for those individuals that have a higher perception of safety as the justification of the program.

As previously discussed, reactance is theorized to be a motivational state that occurs when there is a perceived threat to behavioral freedom (Brehm & Brehm, 1981). Just as important as determining the antecedents of reactance is determining the nature of individual reactions once this motivational state is reached. The theory envisions that an individual might react to this threat by attempting to *directly* reestablish the freedom in question, while other reactions have also been theorized and tested that might *indirectly* quench this need for restoration. Some examples of indirect behavior studied in the reactance research include increasing liking for the threatened choice (or behavior) (Brehm, Stires, Sensenig, & Shaban, 1966), derogating the source of threat (Kohn & Barnes, 1977; Smith, 1977; Worchel, 1974), denying the existence of the threat (Worchel & Andreoli, 1974; Worchel, Andreoli, & Archer, 1976), or by exercising a different freedom to regain the feeling of individual control (Wicklund, 1974).

Resistance literature is characterized by ethnographic field studies that detail a broad and often unanticipated spectrum of ways in which resistance is displayed in organizations (Prasad & Prasad, 2000). Individuals might develop a repertoire of resistant actions that lie outside the range of the control program which would allow the individual to recover their sense of autonomy. These indirect resistant behaviors are at times evident to outside observers, such as an employee purposely parking in the wrong parking space to protest a more invasive monitoring program. Many other behaviors, however, might be completely hidden and only discoverable upon disclosure from the employee. These indirect and somewhat routine resistant behaviors would seem to be the easiest and most likely response to reactance. Typologies of indirect resistance behaviors (i.e. Prasad & Prasad, 1998) are general and useful mainly in a qualitative sense. I predict focused analysis of this specific context will show a positive relationship between reactance and indirect resistance behaviors.

H3A: Levels of psychological reactance (state) will be positively related to higher incidence of indirect resistant behaviors.

As discussed, threats to autonomy from control programs that try to limit alternatives or force behavioral choice are likely to cause reactance. In response to organizational control programs like electronic monitoring, individuals may perceive a threat to a range of behaviors, or stated differently, a threat to autonomy. In an employment situation, it seems highly risky and therefore unlikely that an employee will attempt to directly reestablish the specific behaviors that have been targeted by a control program. This could result in negative repercussions up to and including termination, which seems tolerable to only those employees with the very lowest attachment to their job.

While direct resistance by attempting to repeat a targeted behavior is unlikely, other reactions are possible. One of the most intriguing instances might be the case when compliance with directives can actually become the basis of resistance. Autonomous employees in highly complex environments who are relatively free to interpret company regulations and make decisions about the best way to accomplish tasks might be particularly likely to exercise this style of protest. Employment contracts can be difficult to write because of uncertainty about future states and a lack of knowledge at the management level about specific processes (Williamson, 1975). They are often incomplete, providing employees multiple “gray areas” of behavioral discretion (Ackroyd & Thompson, 1999). In this case, abiding to the letter of the contract, or colloquially “work to rule” can actually be a highly effective resistance behavior. The autonomous worker is somewhat beyond reproach while potentially eliminating many of the extra-contractual behaviors that might have otherwise been advantageous to the company. This “malicious compliance” might be best described as an indirect behavioral resistance in response to a perceived loss of autonomy. I am interested in analyzing this behavior separately, however, so it is tested within a stand-alone hypothesis.

H3B: Levels of psychological reactance (state) will be positively related to higher incidence of malicious compliance.

Early theoretical treatment of control in organizational studies was primarily informed by a somewhat macroeconomic analysis of what benefits a bureaucratic system provided over a market (Coase, 1937; Weber, 1958; Williamson, 1975). As Organizational Behavior researchers began to open the “black box”, they noticed heterogeneity in individual attitudes and behaviors, even as structures and systems appeared to be similarly constructed and implemented across firms. These differences in behavior strengthened the idea that organizations are multi-faceted, and the effect on individuals is correspondingly multiple and complex.

Beginning in the 1980s, theorists began to assess organizational aspects that seemed to guide these contextually unique individual behaviors. In some ways, job enrichment and higher autonomy was an outcome of research that showed psychological benefits to individual workers (e.g. Hackman & Oldham, 1975). Other reasons, however, included better technology available to the individual employee, a more educated workforce that was capable of a higher variety of tasks, and fiscal pressures related to employment costs. Modern organizations felt the need to increase efficiency and operate on a thin “human resource margin.” This multi-faceted employment expectation, created a control problem that could not be easily solved by traditional bureaucratic rules (Barker, 1993).

Ray, addressing this so-called “crisis in bureaucratic control” whereby organizations could not seem to establish complete behavioral control through formal procedures, structure, and oversight, said the solution would be found in the organization’s culture (1986). William Ouchi, in a seminal work on the subject, labeled this type of socialized effect “cult control” based on informal, value-laden relationships versus the formal rule structure of typical bureaucracies (1980). Tompkins & Cheney, expanding on Edwards’ three traditional control strategies, used the term “concertive control” to describe this individually negotiated consensus of norms and ideals that help shape behavior for the overall organization (1985).

Subtle differences in nomenclature aside, these ideas share the common theme that the locus of control was moving away from management toward the employees. One mechanism through which individuals are thought to establish this type of self-control is identification with a group (e.g. Tajfel, et al., 1971). Individuals self-categorize by internalizing the values, norms, and beliefs of the larger group and take them on as part of their social identity, particularly if they are beneficial to positive self-esteem (Turner, 1985). To a certain extent, this process is

somewhat automatic and develops as a natural outcome of group membership. In an organizational context, the perception of oneness where the individual defines himself through group membership is also called organizational identification (Mael & Ashforth, 1992). Organizational identification and self-categorization has been shown to then be a strong guide to attitudes and behavior (Tajfel & Turner, 1985; Mael & Ashforth, 1992).

Identity theory says individuals are likely to have several identities, some of which are stronger and more central than others (Stryker & Burke, 2000). In modern organizations, an individual can have several work-related identities, particularly those who might also be members of a profession or trade union (Foreman & Whetten, 2002). These identities can be complementary, or in some cases, conflicting. In many cases, the effectiveness of the socialization of the membership will determine the alignment of norms and values (i.e. identity), which has then been theorized to lead to innovation and spontaneous cooperation, among other beneficial behaviors (Feldman, 1981). For relatively autonomous workers, in particular, structures and procedures can only be part of the control equation. Those who do not share norms and values with the company might be expected to have different behavioral reactions to a loss of autonomy than those who do. Each may experience similar reactance internally, but the strength of the identity with the source of the threat, which is in this case the company, might moderate behavioral outcomes. This leads to the final hypotheses:

H4A: The relationship between psychological reactance (state) and indirect resistance behaviors is influenced by the strength of identity with the company, such that those individuals who identify most with the company will display fewer resistant behaviors.

H4B: The relationship between psychological reactance (state) and malicious compliance is influenced by the strength of identity with the company, such that those individuals who identify most with the company will display lower malicious compliance.

Table 1
Summary of Hypotheses

<i>H1: Levels of threat perception of organizational control measures will be positively related to state reactance.</i>
<i>H2: The relationship between the perceived threat of an organizational control measure and subsequent reactance is influenced by the perception that safety is the underlying purpose of the program, such that reactance will be lower for those individuals that have a higher perception of safety as the justification of the program.</i>
<i>H3A: Levels of psychological reactance (state) will be positively related to higher incidence of indirect resistant behaviors.</i>
<i>H3B: Levels of psychological reactance (state) will be positively related to higher incidence of malicious compliance.</i>
<i>H4A: The relationship between psychological reactance (state) and indirect resistance behaviors is influenced by the strength of identity with the company, such that those individuals who identify most with the company will display fewer resistant behaviors.</i>
<i>H4B: The relationship between psychological reactance (state) and malicious compliance is influenced by the strength of identity with the company, such that those individuals who identify most with the company will display lower malicious compliance.</i>

Chapter Four

Research Methodology and Measures

As noted in the resistance literature, it is particularly difficult to observe and identify resistant behaviors without knowing underlying intent. Many behaviors that are classified as “resistant” might be innocent mistakes, while other behaviors that seem completely innocuous might actually be intentionally resistant (Prasad & Prasad, 2000). Additionally, workers who operate in complex environments create challenges because an observer would have to be highly knowledgeable of the environment and worker actions. Because of these difficulties, workers who are relatively autonomous have been understudied in the resistance literature. In order to shorten this research gap, I decided to study commercial airline pilots. I believe commercial airline pilots to be an appropriate representative sample of the overall population of “autonomous workers” who also have the requisite monitoring for this research. Pilots operate in a highly monitored and controlled environment, but also require a high amount of judgment under uncertainty, evaluation of multiple courses of action, and individual decision-making, especially once the aircraft has departed the terminal. The “pilot-in-command” concept stems from the tradition of maritime ship captaincy, and relies on the individuals in control of the vessel to make use of their own judgment in unique circumstances.

I utilized a two-stage data collection in an attempt to overcome some of the difficulties in identifying the behaviors of interest. The qualitative first stage involved in-depth interviews with representatives of the proposed sample in order to better understand existing control programs and potential resistant behaviors. The information gained in the interviews helped ground the proposed measures and reinforces the theoretical propositions. The second stage was a survey to gather data to test the stated hypotheses. Before discussing the specific results, it seems helpful to provide an overview of the main job tasks accomplished by a pilot and where autonomy and

decision discretion might be encountered. Following this overview, I discuss results of the two stages of data collection.

The qualitative interviews provided excellent insight into the world of commercial aviation, and inform the next few pages where I examine the context more thoroughly. While pilots enjoy a great deal of autonomy, their environment is also tightly controlled and regulated. There are three active programs that monitor, measure, and report pilot behavior in the cockpit: The Cockpit Voice Recorder (CVR) and the Flight Data Recorder (FDR) (together the “black boxes”), Flight Officer Quality Assurance (FOQA), and the Aircraft Communications Addressing and Reporting System (ACARS) automated reporting. Video monitoring is being proposed as a monitoring tool, particularly after a recent incident involving pilots who overflowed their destination, as well as other well-publicized behavioral anomalies.

In order to provide a degree of understanding of the context of interest, the following describes a typical day in the life of a commercial airline pilot. To begin with, a pilot will be awarded a schedule for the month which can be a fixed schedule of point-to-point flights (called a “line”) or a “reserve line” which has specific days that the pilot is on call and may be scheduled as needed. All types of aircraft currently flown by this particular airline have two pilots on board, a Captain and a First Officer. The Captain is vested with command authority during the flight, which means he or she will be the final decision-maker in regard to the conduct of the flight. Training emphasizes involvement and assertiveness from the First Officer, which intends to ensure the Captain has important information from other sources when making decisions.

Depending on the aircraft type, pilots may fly one flight in large aircraft or possibly two or even three flights in smaller, domestic aircraft. The pilots usually meet 2 hours prior to takeoff time for the first flight of the day. A dispatcher, who is normally based in a fixed,

separate location, has done some of the early planning and shares responsibility of final planning and execution of the flight with the pilots. During this meeting, the pilots will discuss weather, the route of flight, fuel planning, and any notices that might impact their flight. They have several decisions to make, including accepting the dispatchers recommended routing and fuel load. Once the preflight briefing is complete, the pilots go to the gate to speak with the agents there about the passenger load and any other issues. They proceed to the aircraft where the First Officer usually does an exterior inspection of the aircraft while the Captain briefs the flight attendants on the details of the flight.

When the plane is loaded, the gate agent pulls the jetway back and the flight attendants close the aircraft door. The pilots then coordinate with the maintenance personnel on the ground for “pushback” away from the gate. The release of the parking brake to allow the tug to push the aircraft is a measured event recorded and reported by the ACARS system. This is the “departure” metric that is aggregated and reported to various internal and external agencies, including the FAA. Once the flight is airborne, the Captain has authority over how the flight is conducted. In general, the flight is expected to be flown at the speed, altitude, and route specified in the flight plan, which is optimized primarily for fuel efficiency but also ensures the expected enroute time. Sometimes the Captain will choose to deviate from the plan, for reasons such as weather, unexpected winds, turbulence, or other aircraft traffic.

These areas of operational discretion are where the opportunity exists for the primary behavior of interest. Malicious Compliance is the intentional withholding of behaviors and actions that might be operationally beneficial but are outside of the employment contract. In the context of commercial aviation, safety is paramount and the well-being of the passengers and crew dictate many decisions. There is inherent risk in operating an aircraft, however, and pilots

use a variety of techniques to mitigate these risks. Decisions are made to meet certain safety standards for the operation of the aircraft. Once this level is met, however, there are many times pilots have some discretion as to how and where the aircraft is flown. On the ground, for instance, an aircraft may not have all systems functioning for the flight. Unless that piece of equipment is specifically listed in a manual as being necessary for flight, the Captain (with input from the First Officer, maintenance, and dispatch) has the choice to proceed with the flight or not. Once the flight is airborne, other decisions about the altitude, the speed, and the route of flight can all affect how efficiently the aircraft goes from one place to another. Unless contractually obligated, these decisions reflect the autonomy and discretion pilots have that can impressively impact not only an airline's operational performance metrics, but also its financial performance.

Surveillance systems and programs are functioning once the aircraft is powered at the gate. The CVR captures voices in the cockpit for a certain duration (typically 30 minutes), then records over in a loop. The FDR captures aircraft performance such as speed, attitude, and altitude. As mentioned, these are the "black boxes" which are retrieved and analyzed after a safety incident. These devices are supposed to only be used by safety specialists in response to an incident, and the data kept within safety channels only to prevent further similar accidents. There have been times, however, that data has been released to the public, which might affect how well pilots trust the process and subsequent behavioral patterns. With this context in mind, I summarize the data collection strategies below.

Qualitative interviews. I interviewed members of the target population (commercial airline pilots) in order to more fully comprehend individual perceptions of specific control systems and actual workplace reactions. These interviews also helped refine the survey

instrument, particularly those measuring the dependent variables, malicious compliance and indirect resistant behaviors. A difficulty in qualitative research is determining a sample size that will be suitably informative while not overly time-consuming. Many factors affect when saturation can occur, including type of research, participant expertise, and the ultimate aims of the study (Mason, 2010). Recent research by Guest, Bunce, & Johnson (2006) showed saturation occurred within the first twelve interviews, although metathemes were present in as early as six interviews. Other research regarding phenomenology recommends a similar sample size: five to twenty-five (Creswell, 1998), and at least six (Morse, 1994).

Following this research, I interviewed nineteen individuals using a semi-structured interview guide (Appendix A). After ten interviews, repeating themes were apparent, and at nineteen interviews no new or unique insights or behaviors in regard to the monitoring systems had emerged. I assumed I had achieved behavioral saturation at this point. The interviews illuminated many facets of day-to-day exposure to aircraft control systems, and subsequent pilot behaviors and reactions. To summarize the results of the interviews, I aggregate particularly enlightening answers to specific questions from the interview guide.

1. *Tell me about your background in commercial aviation.*
 - a. *Length of time, different airlines or unions, aircraft flown, schedule and routes, current aircraft and qualifications*

The nineteen interviews included eight Captains and eleven First Officers of which seventeen were male and two female. Most were hired in the 1990s with a few in the 1980s. The average time of employment for the interview group is fifteen years. Thirteen participants had military flight training and experience, and then joined this airline immediately. The remaining six had civilian training and flew for various regional airlines before joining this airline. All current equipment types are represented, 757, 767, 777, and the Airbus 319/320 with

the modal equipment being the Airbus (ten pilots). The 727 and 737 are also represented, although they are not currently being flown by the airline. In summary, the group was fairly representative of the overall target sample, while being somewhat overrepresented by military background and male gender.

2. *Are you aware of any control systems while you are operating the aircraft?*

There were various levels of awareness among different crewmembers. Most mentioned the Cockpit Voice Recorder (CVR), the Flight Data Recorder (FDR), and Flight Officer Quality Assurance (FOQA) immediately. When I mentioned the Aircraft Communications Addressing and Reporting System (ACARS), all respondents agreed that it is a monitoring system (for its time reporting function), but in general most thought of it initially as a communication device. The Line Operations Safety Audit (LOSA) program was not initially mentioned as a “control system” and this could be for a few reasons. First, it is a program in which another person is the monitor, which makes it unique among the surveillance programs. Second, it is a program in its infancy, and very few pilots have been exposed to it on a first-hand basis.

3. *Describe your experience with the following programs:*

a. *LOSA*

i. *Have you ever been asked to participate in the LOSA program?*

None of my interview subjects had been asked to allow a LOSA observer on their flight.

1. *Number of times?* N/A

ii. *Describe your experience:* N/A

iii. *Have you refused a LOSA observer? Why?*

Although this question didn’t apply to any of my subjects, I asked if they would refuse a LOSA observer, if requested. A majority (13/19) indicated they would not refuse. The other six said (generally) that there was not enough information provided by the union/company about the program for them to trust

the process, and provided no new information was made available they would lean toward refusal.

iv. *Have you seen another pilot refuse a LOSA observer? Do you know why?* None

b. *FOQA*: All aircraft at this airline are equipped with this data collection and reporting system. There is no way for a pilot to deactivate the system from the cockpit.

There was a high level of knowledge and awareness of the FOQA system among all respondents. Some typical comments include:

1. "its there all the time, whether you want it or not."
2. "Big Brother is watching"
3. "FOQA affects the training program"
4. "(FOQA)...always in the back of your mind"
5. "affects how I fly"
6. "data would be used against me"
7. "electronic watchdog"
8. "used to single out cowboys"

i. *How have you seen FOQA data being used? Who uses it and how (chief pilots, safety, etc)?*

Generally, all subjects were aware of different situations where a crew was admonished or otherwise disciplined by their domicile flight managers for flying outside of Standard Operating Procedure. Some used the term "FOQA tag" to indicate when a maneuver exceeded SOP criteria and the system highlighted the event. Generally, the subjects said if they had any doubt that a maneuver they had performed would be flagged by FOQA, they would report it using the airline's

safety reporting system¹. This action would provide some level of immunity from punishment, if the discrepancy was not overly egregious.

Pilots (representing the union) and management personnel make up a FOQA Monitoring Team (FMT) whose job it is to identify and track data. A few pilots are also “gatekeepers” who are the few who can link abnormal data to specific crewmembers². The FMT looks for single anomalies or trends across the data, and report these findings to flight managers at respective domiciles and to fleet managers at the pilot training center. The trend information is disseminated to the pilots via written notice and/or added to the training program during annual simulator refresher training. I found the majority of the subjects to be fairly matter-of-fact about the system itself, but definitely somewhat uneasy that their aircraft performance was constantly being monitored.

ii. Have you ever heard of anyone being singled out using data from this system? Was it for punishment, rewards, other purposes?

The inclusion of “rewards” in this question was met with more than one chuckle. I learned that rewards are generally given to employee groups as a whole (on time performance, profit sharing, etc) and not to individuals. There are occasional times when crews are given awards for outstanding airmanship, in which case the FOQA data might be used to validate the crew’s actions.

More commonly, respondents were keenly aware of stories about crews who had been contacted to explain deviations flagged by FOQA. It seemed like the informal communication network among pilots is a very effective way to

¹ This process, known as the Flight Safety Awareness Program (FSAP), allows pilots to report unusual situations that might affect safety of flight. Reporting an incident

² The “gatekeepers” of the FOQA system are assigned by each domicile chief pilot and have the responsibility to represent union pilots on the FMT, but also can identify specific crewmembers if the need arises.

disseminate “what not to do” based on a FOQA tag. One respondent knew of a crew that was called in for being 50 knots above profile on a landing (which is significantly fast). They were asked about extenuating circumstances and told they were “on probation” for a certain amount of time. Another crew had momentarily flown too fast for the flap setting. Several subjects mentioned “hard landings” as being commonly tagged by FOQA, but not commonly reported by crews because it is fairly subjective from a pilot perspective.

While telling about other crews who had been “tagged” it was obvious that the subjects thought it was very important for evaluators to establish the context as closely as possible when something happens. It is difficult to take raw data and retrospectively try to create an accurate account, to include the exact environmental cues, and this worried the subjects. This desire for accurate context was often mentioned as a reason to proactively fill out a safety report, as mentioned above. It was also evident that the subjects I interviewed were concerned about procedural fairness if they were flagged by FOQA. The criteria (SOP) weren’t singled out as being overly stringent or difficult to achieve, but there was concern about the ability of the reviewers to independently and objectively use the data. This was also cited as a concern and addressed consistently in the video monitoring discussion.

Nearly all respondents (17/19) talked about how FOQA is incorporated into the training program. If the data is aggregated and certain trends emerge, the training managers are notified and feedback is given to crews that come through for either initial or recurrent training. This was seen as a positive aspect of the

program. The pilots appreciated being able to practice in situations where other crews in real time exceeded some operating criteria or put themselves in an unfavorable situation.

c. *CVR/FDR*: Current SOP has the pilots turn these systems on 5 minutes prior to engine start and they stay on until the aircraft is shut down at the arrival gate.

i. *Have you ever seen anyone disable or otherwise manipulate this system? Describe the circumstances.*

Five respondents said they have seen or been part of a crew intentionally disabled the CVR, but exclusively on the 727 which had older technology and a circuit breaker that could easily be pulled. These actions seemed to be single occurrences and appear to be difficult to do in current aircraft. Three of the subjects felt the CVR and FDR might provide beneficial information in an accident that might support the crew. Most, however, did not trust the process to keep this data in the hands of safety professionals only. One respondent told a story about a crewmember saying, “I don’t agree with this decision” loud enough to be recorded. It was likely said in jest, but this highlights the extent of the awareness crews have about their monitoring systems.

Most (13/19) of the interviews included some type of reference to an accident or incident when CVR/FDR data had been leaked to the press. In particular, the recent Colgan Air crash near Buffalo was cited seven times. This again reflects one of the largest concerns with these monitoring systems...that the data or information will be released outside of safety channels to the public at-large, who could form their own reality without other situationally-specific cues or knowledge.

- d. *ACARS automated reporting*: This system reports “OOOI” data or Out (brake release and cabin door shut), Off (takeoff), On (land), and In (parking brake set at the gate).

i. *Have you ever seen anyone disable or override this system? Describe the circumstances.*

There were two types of motivation for this action. First, two subjects describe situations where the parking brake could be released early to fool the system into reporting the “Out.” This was done to show the aircraft had departed the gate, which started the “clock” for pay purposes. Alternatively, and more in line with my model, fifteen of the subjects have seen some type of manipulation of this system to erroneously report a time that would negatively impact the metrics used by the company and the FAA to assess operational performance.

This seems to be a clear resistance behavior done to harm the organization.

4. *What is your assessment of the benefits and shortcomings of these systems?*

a. *FOQA*

Benefits:

- Prevents “normalization of deviance”
- Fewer people outside of Standard Operating Procedures
- Direct feedback to incorporate into recurrent training

Shortcomings:

- Does not provide overall context
- Focus on preventing “tags” instead of flying aircraft
- Makes crews more reactive vs. proactive

b. *LOSA*

Benefits

- Signals that safety is more important than operations

Shortcomings:

- Very little education about the program

c. *CVR/FDR*

Benefits

- Valuable in safety investigations

Shortcomings:

- Data that is supposed to be safeguarded released to public

d. *ACARS*

Benefits

- Automated accounting of times. Close to eliminating human error, but there are creative ways to override

Shortcomings:

- Provides very limited information across communication channels; full context not available for deviations

5. *What are some of the behavioral reactions you have seen from pilots relating to these systems or programs?*

Some of these have been covered when discussing the specific systems.

Overall, the subjects gave me the perception that they are very aware of being monitored. While most have accepted their fate in a way and just do their job as best they can, I also got the feeling that they have changed the way they operate, to a degree. The Captain of the aircraft has quite a bit of decision authority when the aircraft is airborne, which is a legacy of the tradition of maritime ship captaincy. My impression from the Captains I interviewed was that they are very likely to seek other sources of information and guidance, like maintenance or the flight dispatcher (who is an operational expert, but generally not a pilot), when a decision falls in a gray area. Even with outside approval, many subjects still said they would be likely to refuse an aircraft that had inoperative systems (but still deemed by maintenance as safe to fly) or be more inclined to divert to a maintenance airport if airborne. This is indicative of a change from a generation of pilots ago, when the Captain rarely asked anyone's opinion, even the pilot sitting next to him. I believe this revelation of seeking external validation or approval for decisions reinforces my assertion that while monitoring has benefits (enforcing SOP compliance), it also has some second-order effects, including intentional behavioral reactions that limit productivity.

6. *Do you have any opinion about video monitors being placed in the cockpit? Pros and cons? What concerns you?*

This question, as expected, brought out strong opinions, but I also observed some variance which was a little surprising. Most said that their initial reaction was to oppose it, for a variety of reasons including privacy, dignity, personal space, and doubts that it would provide any better information than was already available. Once I described that it might be used just for safety purposes, like the CVR or FDR, and it would be a wide-angle, rear-aspect view of the pilots, opposition relaxed somewhat and the discussion became more focused on how the data would be used.

Pros: I would say none of my subjects gave a potential video system a “pro.” The common theme was, “if management and the union say it has to be there, then I’ll just live with it.”

Cons: The potential for real-time playback (somewhere), the potential misuse of the captured data (for other than safety reasons), the lack of dignity/privacy for the family in the case of an accident (i.e. public release).

A common critique (and the biggest concern): If the system has the requisite low fidelity to address privacy concerns, then it compromises the high fidelity required to obtain the necessary context to make accurate assessments and decisions about a crew’s performance.

7. *Have you ever seen other pilots intentionally withhold behavior that might have been good for the operation but was outside of contractual obligations? Have you ever experienced this situation? Why did you choose your course of action?*

This behavior was widely acknowledged by all subjects, and twelve gave examples. One general theme is that there is some discretion by the pilots as to

what type of equipment on the aircraft must be operable to accomplish the particular flight. Many dynamic factors are involved in the decision, including weather, fatigue, passenger load, and more. In general, the pilots have resorted to the principal of the “most conservative response” because they are concerned about being second-guessed by supervisors. The most conservative response is sometimes appropriate, but can also be limiting when conditions might allow the acceptance of more risk.

One Captain described himself as being more reactive vs. proactive, as monitoring has become more prevalent. Another first officer described how he used to help the baggage guys out by carrying the gate checked items down the jetway to the plane when he would go down for his exterior inspection. Now he doesn't do that because he'll get tagged with a late if they are even one minute over push time. A First Officer recently successfully lobbied his Captain to turn down an aircraft because of an inoperative bathroom. The flight was only two hours and it was legal to fly the aircraft, but with a full plane, they did not want to be second-guessed if something happened where they might be on the tarmac for an extended period.

Summary. It is fairly evident from the interviews that the pilots are aware of the monitoring systems in the cockpit, particularly the FOQA program and the ACARS time reporting. The CVR/FDR are somewhat accepted as part of the job, but recent accidents and the perceived inappropriate disclosure of data outside of safety channels give pilots an uneasy feeling about how they might be used. It appears that LOSA is not widely acknowledged as a control or monitoring system. Although most pilots are aware of the program, there are very few

to date who have participated or been asked to participate. While the human monitoring variation is an interesting component to this program, I do not believe there is enough experience among the subjects to draw meaningful conclusions.

I also asked about indirect resistant behaviors, which I define as behavior not directly related to safely operating the aircraft. Initially, most subjects focused only on behavior in the aircraft. Reactance theory predicts that there are direct and indirect responses to the loss of individual freedom. Direct responses might include disabling the systems, or simply ignoring them and accepting the consequences.

The interview subjects indicated some indirect behaviors, and these could be placed into three major categories: scheduling (including flying overtime, use of sick call, etc), appearance, and intentionally slowing down to alter performance measures. Scheduling behaviors might include being unwilling to waive or come close to a flying hour limit in order to accept an assignment, using sick time to avoid an assignment, or being unwilling to pick up open trips even if it is a personal financial benefit. This sticker from a web forum reflects this attitude.



Subjects also said they showed resistance by altering their appearance. An airline pilot uniform is an important and distinct signal of professionalism. Most (15/19) of my subjects said they no longer wear their hats as a sign of unhappiness with work conditions. Other resistant behaviors associated with appearance might be to grow hair or moustaches longer, not shine shoes regularly, or just generally wear the uniform improperly (including union pins or other badges). This aligns with reactance theory which predicts individuals will find alternate avenues of self-expression and control if it is not practical to directly challenge an eliminated behavioral option.

Many subjects indicated they have seen examples of slowing down or what seemed like intentional sabotage of a company metric. Although none claimed to have done this individually, I believe the responses provide enough support to ask this question to the sample as a whole.

Based on the interview results, I made the following changes to the survey.

1. Eliminated LOSA as a control system due to lack of pilot exposure.
2. Combined behavioral reactions in one matrix-style assessment with larger range of answers (not a dichotomous yes/no).
3. Expanded the response range scale on most measures to six points instead of four.

Survey methodology and sample. I used a single-wave survey to obtain data in support of this study (Appendix B). I initially conducted a pilot-test of the survey instrument, selecting thirty respondents from the proposed population. The results of the pilot test generally supported the model. Additionally, three of these respondents agreed to take the survey using a think-aloud format. The basic concept in a think-aloud survey review is for the respondent to read a question aloud, and then verbalize internal thought processes concerning the questions and answers (Sudman, Bradburn, & Schwartz, 1995). This allowed me to fine tune the instrument using direct input from members of the proposed population. In general, feedback about the survey was positive, with the structure being fairly simple and easy to understand. The pilot test and specific comments resulted in changes to the instrument itself:

1. For the ACARS system, I specified the automatic time reporting function. Many of the ACARS other functions are not related to monitoring and therefore were not within the scope of this study.

2. I established consistency in scale response range from left to right (some scales started with “strongly agree” on the left-most column, and some started with “strongly disagree”).
3. The dependent variables measure what is presumed to be low base-rate behaviors. Given this, I expanded the infrequent end of the response range and eliminated the high-frequency answer “always.”
4. Respondents showed some difficulty narrowing down the answer to “who does this system benefit the most?” to either the individual or the company. All think-aloud respondents wanted other options for the answer, and two became focused on the presumption that what is good for the company might also be good for the individual. Basically, the question caused confusion and I removed it from the final version.

The main variables included in the hypotheses are individual-level perceptions and behaviors. Surveys are well suited to gather this type of primary data, because the instrument can be tailored to ask specific questions, making the data more reflective of the exact research question (Wilson, 2005). There are also drawbacks to surveys, including potentially low response rates, bias introduced by inappropriate item wording, and reliance on individuals to accurately self-report. In this study, however, gathering first-hand primary data that might otherwise be difficult to measure seems to outweigh the potential costs. A well-constructed survey instrument can be an efficient and relatively reliable way to determine underlying intention. It can also mitigate “observer-expectancy effect” whereby a researcher might influence the behavior of subjects as well as misinterpret, misidentify, or overlook certain behaviors of interest.

The difficulty in measuring resistant behavior became immediately apparent as I coordinated the administration of the survey to my target population. I had previously contacted the union representing the pilots well in advance and asked for their assistance in sending a survey to their membership regarding monitoring and behavioral reactions. The union was supportive and interested in my research. As the time to administer the survey grew nearer, I sent the actual survey with a link to the union representatives. They reviewed the survey and felt it was too sensitive and they did not want to be associated with the content. In their defense, there were unusual circumstances with this particular company happening at the time I proposed to do the survey, which made all parties suspicious and very cautious about anything with potentially negative perceptions. The union declined to support the study, but did not explicitly ask me to stop my research.

My strategy then shifted to a web forum administered and populated by pilots for this particular company. I had been following this forum as part of my effort to better understand the attitudes and behaviors of pilots, and I thought it would make an excellent controlled subsample of my target population. There were approximately 975 members of the forum at the time of the study and the administrators, who require employment validation to join, strictly control membership. All domiciles were represented with a mix of Captains and First Officers. I obtained prior approval from the administrators, then posted a short explanation and a link to the survey. I included statements containing elements of verbal consent, emphasizing the anonymity of the participants and that no individual data would be disclosed to the company or the union. The request to participate was kept on the forum for fourteen days.

The web forum proved to be relatively uncharted territory as a research tool, and provided unique opportunities as well as some challenges. Since I had the ability to post items as an insider, I presumed that there would be a certain level of trust and most would take the survey without too much hesitation. Almost immediately, however, a person responded publicly on the forum and questioned the nature of the research and doubted that I was a pilot. Another post asked me to provide any affiliation to the company, any affiliation to a private company that provided electronic monitoring devices, all sources of funding, and my hypotheses. Thinking my research was coming to a sudden death, I responded by providing as much detail as I could without divulging the specific hypotheses, and trying to minimize any bias I might introduce by explaining too much of the research program. Once I did this, several members took the survey and responded that they had done so and supported my research. Ultimately, a negative aspect of the forum was that it provided a public venue for complaints and suspicion about the survey, which are usually private thoughts for anonymous survey respondents. On the other hand, it gave me the ability to reassure potential survey respondents, and let other members of the population make supportive statements as well.

After the survey duration, there were 217 complete responses and 27 incomplete responses. I calculated a sample size of 698 based on the number of discrete “views” of the thread, which the forum tracked. A view was logged when a forum member clicked on the topic heading, which was labeled “research on cockpit monitoring”. This opened the thread with the link to participate in the survey. In consideration of the complete responses and using the number of views as the number of eligible respondents, the overall response rate is

217/698, or 31.1%. This response rate is in the range of what is considered an acceptable representation of the sample in social science (Sapsford, 1999).

Demographic analysis of the respondents shows appropriate representation across variables. The following table shows demographic variables for the respondent group compared to the pilot population of the specific company.

Table 2

Variable	Respondents	Population	T-Test
Crew Position (Capt/First Officer)	83/134 (38.2% Captains)	3009/4658 (39.2% Cpts)	p = .06
Gender (Male/Female)	177/40 (81.6% Male)	6557/1110 (85.5% Male)	p = .09
Background (Military/Civilian)	103/114 (47.5% Military)	unknown	n/a
Ever furloughed	59/217 (26.3%)	2172/7667 (28.3%)	p = .79
Age	30-39 (5.5%), 40-49 (48.4%), 50-59 (36.9%), 60-above (9.2%)	unknown	n/a

There is limited information available from the company or the union concerning the demographic makeup of the pilots. I was able to obtain the Captain to First Officer ratio and the number of pilots furloughed from union information. The company provided the gender breakdown. Using a one-sample t-test at 95% confidence, I did not find significant differences between the respondent group and the population for the known variables. In the case of crew position, raw data suggests a slightly lower representation of Captains and a lower percentage of males. While I cannot statistically conclude there are no differences in background, the raw data shows a nearly even split between military and civilian. This is an expected ratio based on my qualitative interviews and knowledge of the pilot workforce, in general. Age, as well, cannot be statistically conclusive, but appears to be distributed in an expected manner across age groups.

While an n of 217 is a lower total response than I had programmed in my original sample strategy, it still provides an acceptable amount of power. Assuming the most

conservative small effect size of .03 (Cohen, 1977), the model produces a power of approximately .94, which is the probability of correctly rejecting the null hypotheses at a 5% level of confidence.

Measures

In this section, I provide specific measures for each variable as well as response scales and any recoding that was necessary. I then provide descriptive statistics and results of the specific hypothesis tests. The final analysis is a single factor test to determine the extent of common method bias.

Dependent Variables

Resistant Behaviors. The dependent variable(s) in this study are the resistant behaviors that I predict will result from state reactance to organizational control. In keeping with previous discussion, I measured both indirect behaviors and malicious compliance.

The first dependent variable, which I label “indirect resistance,” is derived from measuring six different behaviors with answers based on frequency of occurrence, using the following scale:

- 1—Never
- 2—Rarely
- 3—Sometimes
- 4—Often
- 5—Nearly always

These indirect resistant behaviors, developed in part and refined through the qualitative interviews, reflect activities that are not a direct challenge to specific monitoring systems. For example, the survey asked, (how often have you) “Intentionally disregarded dress and appearance standards (e.g. no hat)?” Initially, this measure consisted of seven items. But one item, which asked if a pilot wore their union pin incorrectly, negatively impacted the reliability

of the scale. The mean of this item was 1.34, which places the average respondent squarely between “never” and “rarely” on the scale. The item just previous to this on the survey asked more generally about incorrect wear of the uniform, which I believe captured this behavior. The Cronbach’s Alpha for the measure with the union pin question included was .64. Without this item, the Alpha improves to .75, which seems very good considering the scale measures behaviors that seem on the surface to be unrelated. Based on the low level of occurrence and impression that this behavior is captured in a different item, I eliminated the union pin question from the measure. The remaining six items are listed below:

How often have you:

1. Slowed down to intentionally miss a metric?
2. Ignored calls from the scheduling desk?
3. Called in sick when not actually sick?
4. Intentionally disregarded dress and appearance standards (e.g. no hat)?
5. Reduced effort and quality in job areas not under direct surveillance?
6. Placed a sticker on your flight bag displaying displeasure? For example: "No waivers, no favors, I follow the contract".

The second dependent variable is “malicious compliance”, which I define as intentionally and willfully withholding an action that is presumed to be "operationally beneficial", but is not specifically part of an employee’s contracted duties. Operationally beneficial can have different meanings in different environments. In the context of this research, I define it as: Over and above flying the aircraft safely, a pilot has a range of discretionary actions that might yield higher completion rates or increase efficiency of the operation ("operationally beneficial"). This variable was measured in a single item by first providing the definition, then asking a frequency for this behavior:

Over and above flying the aircraft safely, a pilot has a range of discretionary actions that might yield higher completion rates or increase efficiency of the operation ("operationally beneficial"). For instance, a Captain might decide to fly an aircraft with a mechanical writeup for a system (e.g. the APU) that is not necessarily required for the flight. Or a First Officer might hustle some gate checked bags down to the baggage hold. How often have you

intentionally withheld an action that might have been "operationally beneficial," but was not specifically part of your contracted duties?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- Nearly Always (5)

While not a theorized dependent variable, I also measured "direct resistance," which were different behaviors associated with each monitoring system. Each direct behavior is in reaction to each specific system, and in general has to do with tricking or bypassing the system. For example, the survey asked, (how often have you) "Intentionally caused the ACARS to make an erroneous report (e.g. to indicate a late pushback when actually on time)?" The qualitative interviews reinforced the occurrence of these behaviors, as well as eliminating one direct behavior, turning the system off. In some cases, there were reports of pilots simply turning a monitoring system off (or removing power by pulling a circuit breaker). The interviewees were unanimous in saying this no longer happens, as aircraft modernization has made this nearly impossible. As discussed in Chapter 3, I did not theorize a relationship to direct resistance, but did gather data to measure the behavior. The items from the survey are:

How often have you:

1. Intentionally caused the ACARS to make an erroneous report (e.g. to indicate a late pushback when actually on time)
2. Filed a (pilot report) simply to "cover" for a potential "FOQA tag"
3. Sought out more advice than necessary during an unusual situation that might be "FOQA tagged"
4. Said something for the CVR to record (e.g. "I don't agree with this course of action")

The survey results also support the omission of direct resistance as a typical behavior, with means of 1.55, 1.57, and 1.17, respectively for direct behaviors related to ACARS, FOQA,

and the Black Boxes. The response scale is coded as “1-never” and “2-rarely”, which reinforces the sentiment related in the interviews.

A factor analysis of the items in the dependent variable measures is described below. The initial solution resulted in three components with eigenvalues over 1.0, with the third being just slightly so. Reactance theory, however, predicts that there are two general types of behavior, indirect and direct (Brehm, 1966). I structured the behaviors in this research to align with this theoretical assumption, and there are several items that I believe are indirect and others that I categorize as direct. I categorize malicious compliance as an indirect behavior, and direct behaviors are the previously described system specific behaviors. In keeping with this theorization, I ran a factor analysis, forcing a solution of two factors (Table 3).

Table 3
Dependent Variable Items

	Factor	
	1	2
Indirect #1	0.401	0.426
Indirect #2	0.594	
Indirect #3	0.383	
Indirect #4	0.828	
Indirect #5	0.416	0.309
Indirect #6	0.674	
Malic Comp	0.311	
Resist ACARS		0.529
Resist FOQA #1		0.633
Resist FOQA #2		0.624
Resist BB		0.370

Extraction Method: Principal Axis Factoring.
Rotation: Promax with Kaiser Normalization.
Coefficients below .300 suppressed

In order to improve interpretation I used a promax rotation with Kaiser normalization, which is an oblique rotation. I selected this rotation in lieu of an orthogonal rotation (e.g. varimax) because the latter presumes relative independence among the individual items. In this research, I believe the items have underlying correlation to a degree, some highly so. An oblique rotation is the preferred method under these circumstances. The results of this analysis show relative support for the combination of items measuring indirect resistance behaviors on the first

factor, with the four direct resistance behavior items loading the least, and all items I classify as indirect behaviors loading at .311 and above.

The second factor is more difficult to interpret, but the three of the four direct resistance items load at .529 and above, with the remaining direct item loading at .370. Two of the indirect items load above .300, and are the indirect items that have the most “operational” feel. The first item asks about slowing down to intentionally miss a metric, and the second addresses reduced effort and quality in job areas not under direct surveillance. Ultimately, information from the qualitative interviews combined with this analysis reinforces the combination of the indirect resistance behavior items as one variable.

Independent Variables

Perception of threat to freedom. The first variable in the model is the perception of threat to a behavioral freedom in relation to one of the three control programs currently present in the cockpits of the airline being studied. This measure was used for all three systems and determines the degree to which an individual perceives a behavioral freedom is threatened or possibly already removed. The scale is based on a previously developed scale that measured the threat from a message (Dillard & Shen, 2005):

1. {This program (e.g. The Cockpit Voice Recorder)} threatens my freedom to perform my job as I see fit.
2. {This program} makes decisions for me.
3. {This program} manipulates the way I perform my job.
4. {This program} pressures me to modify my on the job behavior.

Original Scale (Dillard & Shen, 2005):

1. *The message threatened my freedom to choose.*
2. *The message tried to make a decision for me.*
3. *The message tried to manipulate me.*
4. *The message tried to pressure me.*

Psychological Reactance (State). Although reactance was originally conceptualized as being a state-specific motivational state, it has also been operationalized and measured as a trait (Dillard & Shen, 2005). Trait reactance is a person's inclination to distrust authority and resist persuasion, and is included in this model as a control variable and discussed more fully in that section. State reactance, or the specific motivational state instigated by a threat, is the independent variable of interest. Dillard and Shen advanced four possible operationalizations of state reactance for use in communication research. These included (a) only cognitions, (b) only anger, (c) both anger and cognitions but each defined separately, or (d) a single construct defined by both anger and cognitions. Their research revealed that state reactance is best operationalized as a latent construct comprised of state anger and negative cognitions. Furthermore, they persuasively argued that cognitive and affective responses are "empirically inseparable" when measuring state reactance (2005: 24). A second communications study by Quick & Stephenson (2007) reinforced Chen & Dillard's operationalization of state reactance as a latent construct comprised of state anger and negative cognitions.

Prior to Dillard and Shen (2005), state reactance was conceptualized and measured as a purely cognitive construct. It was measured by a variety of self-report techniques, including thought-listing (Dillard & Shen, 2005). In lieu of thought-listing, I generated a list of typical negative cognitions which emerged from the qualitative interviews, which includes: hostility, unfair, distrust, hesitant, uneasy, and intimidated. Respondents were asked to think about the specific control system and rate how well these cognitions reflect their feelings using the following 6-point scale:

1. Clearly describes my feelings
2. Mostly describes my feelings
3. Somewhat describes my feelings
4. Somewhat does not describe my feelings

5. Mostly does not describe my feelings
6. Clearly does not describe my feelings

To measure the anger portion of the construct, I used the 4-item scale developed and used by Dillard, Kinney, and Cruz, (1996).

State Anger Scale:

Consider the (Cockpit Voice Recorder/Flight Data Recorder) when reacting to these statements.

1. I feel irritated
2. I feel angry
3. I feel annoyed.
4. I feel aggravated

These items were measured on a 6-point scale as follows:

- 1—strongly agree
- 2—agree
- 3—slightly agree
- 4—slightly disagree
- 5—disagree
- 6—strongly disagree

The values from the cognition scale were summed with the values from the anger scale and resulted in the overall “state reactance” value for an individual respondent in regard to a specific monitoring system.

Perception of Justification. I asked individuals to rate their perception that safety was the justification for each specific program on a scale from 0-10. The response number was input to qualtrics via a sliding bar which tracked on a number line from 0 to 10. I asked on a second number line about their perception that performance was the justification, with the same process to input the rating.

Identity Strength. Individual identity salience was measured using Mael and Ashforth’s Organizational Identification (OID), which is conceptualized based on Social Identity Theory as “the perception of oneness with or belongingness to an organization, where the individual

defines him or herself in terms of the organizations(s) in which he or she is a member” (1992).

The strength of identification with the company is the most important OID in this context, because the company is most closely associated with the threat and subsequent reactance an employee feels from a monitoring system. While there are other groups an employee might identify with, including the union and the profession as a whole, the company identity might indicate how successful the employee has been socialized to have shared norms and values with the entity that is establishing the monitoring protocol. This company identification strength is predicted to moderate the relationship between state reactance and resistant behaviors.

Organizational Identification (Modified from Mael & Ashforth, 1992):

1. When someone criticizes (the organization) it feels like a personal insult.
2. I am very interested in what others think about (the organization).
3. When I talk about (the organization), I usually say ‘we’ rather than ‘they’.
4. (The organization)’s successes are my successes.
5. When someone praises (the organization), it feels like a personal compliment.
6. If a story in the media criticized (the organization), I would feel embarrassed.

For nearly all independent variables, I recoded the values obtained in the survey in order to make left to right on the scale less to more of the particular variable. This created more straightforward interpretations of the coefficients in the regression models.

In all scales, I did not include a “neutral” category because I feel like it might be considered a safe place for employees in what is potentially an emotional subject. I also feel that employees can have an ambivalent feeling toward their employer, especially after many years of interaction that might have included situations that were both positive and negative. This ambivalence might result in a tendency for the experiences to negate the others, leading to a “neutral” attitude. I really wanted the respondents to analyze their experience and provide an answer that indicated their opinion, one way or the other. The scale also had the two “slightly”

categories which possibly provided a place for a respondent to answer if the attitudes they reported are not strong or are somewhat conflicting.

Control Variables

Trait Reactance. A high “reactance trait” would indicate a person who is more likely to already have an elevated sensitivity to a perceived loss of freedom. This predisposition might include a distrust of authority, a dislike of attempts at persuasion, or just generally a sense of steadfastness and a hesitancy to take advice (Hong & Faedda, 1996). I included trait reactance as a control variable in the model, and measured it using the 11-item Hong Psychological Reactance Scale (HPRS), (Hong & Faedda, 1996). Repeated factor analyses of this scale have replicated four distinct factors, which have been labeled “Freedom of Choice”, “Conformity Reactance”, “Behavioral Freedom”, and “Reactance to Advice and Recommendations” (Shen & Dillard, 2005).

(HPRS, Hong & Faedda, 1996)

1. Regulations trigger a sense of resistance in me.
2. I find contradicting others stimulating.
3. When something is prohibited, I usually think, “That’s exactly what I am going to do”.
4. I consider advice from others to be an intrusion.
5. I become frustrated when I am unable to make free and independent decisions.
6. It irritates me when someone points out things which are obvious to me.
7. I become angry when my freedom of choice is restricted.
8. Advice and recommendations usually induce me to do just the opposite.
9. I resist the attempts of others to influence me.
10. It makes me angry when another person is held up as a role model for me to follow.
11. When someone forces me to do something, I feel like doing the opposite.

Job Satisfaction. It is conceivable that some of the behaviors I have discussed to this point might be the result of being dissatisfied at work, and not a reaction to being observed. Job satisfaction research has found significant relationships between job satisfaction and a number of attitudes, behaviors, and outcomes (e.g. Brown & Peterson, 1993). The airline industry has a

history of contentious relationships between management and workers, especially pilots (Hopkins, 1982). To account for the possible effects related to employee frustration and unhappiness with the job, I measured job satisfaction using a five-item scale (Judge, Locke, Durham, & Kluger, 1998) and include it as a control variable in the models.

1. I feel fairly well satisfied with my present job.
2. Most days I am enthusiastic about my work.
3. Each day of work seems like it will never end. (R)
4. I find real enjoyment in my work.
5. I consider my job rather unpleasant. (R)

Other control variables. Other variables I collected data for are generally demographic, including flight training background (military or civilian), current crew position (Captain or First Officer), age, and gender. I do not have a theoretical explanation for the effect of these variables, but include them to account for any variance they explain.

Chapter Five

Results

The interviews and pilot test of the survey indicated variance in how individuals felt about the different control systems. There is also evidence that the control systems operate somewhat differently. The ACARS reports performance more or less continuously, while the FOQA and Black Boxes only report in the case of deviations from normal. While one pilot might feel highly threatened and distrusting of the FOQA system, another might feel that it is a good system with positive outcomes. In this light, I chose to analyze the hypothesized relationships for each system separately.

Descriptive Statistics

Tables 4A, 4B, and 4C report the means, standard deviations, correlations, and reliabilities of the measures for each system, respectively. The reliability for every scale exceeds .90 except for two, indirect resistance and direct resistance for the FOQA system. The Alpha for indirect resistance is .75, which still exceeds the .70 threshold recommended by Nunnally (1978). The measure for “direct resistance to FOQA” is made up of only two items, which can result in a relatively lower Alpha than a multi-item construct.

Table 4A
Means, Standard Deviations, Correlations, and Reliabilities (N = 217) (ACARS System)

Variables	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Age	3.50	0.74	1														
2 Background	1.53	0.501	0.003	1													
3 Gender	1.18	0.389	-0.047	0.142*	1												
4 Crew Position	1.71	0.626	-.686**	0.016	-0.007	1											
5 PsychR Trait	3.22	0.572	0.047	0.009	0.131	0.027	(.90)										
6 Job Sat	3.11	0.889	-0.071	0.013	0.020	-0.024	0.131	(.91)									
7 ID Company	3.22	1.04	-0.107	-0.049	0.009	0.060	0.042	0.527**	(.94)								
8 ID Union	3.20	0.867	0.049	-0.071	0.023	0.006	-0.007	-0.023	0.019	(.93)							
9 ID Prof	3.73	0.88	-0.117	-0.017	-0.047	-0.082	0.086	0.004	-0.026	0.273**	(.92)						
10 ThreatACARS	2.60	0.842	-0.104	-0.053	0.073	0.034	0.215**	0.089	-0.105	0.117	-0.099	(.94)					
11 StateReactACARS	2.86	0.629	-0.106	-0.041	0.037	0.049	0.187**	0.005	-.183**	-0.003	-0.239**	0.682**	(.93)				
12 JustACARSSafety	2.39	1.870	0.182**	0.039	-0.099	-0.125	0.158*	0.142*	0.022	-0.010	-0.246**	-0.204**	-0.280**	1			
13 Resist ACARS	1.57	0.628	0.008	0.020	0.025	0.032	-0.034	-0.086	-0.170**	0.049	-0.125	0.304**	0.367**	-0.192**	(.75)		
14 Indirect Resist	2.79	0.564	0.044	0.065	-0.080	0.026	0.080	-0.191**	-0.238**	-0.021	0.042	0.051	0.174*	-0.165*	0.289**	1	
15 Malic Comp	3.16	0.951	-0.022	0.074	0.019	-0.03	0.016	-0.185**	-0.146*	0.039	0.101	0.008	0.026	-0.041	0.032	0.315**	1

** Correlation is significant at the 0.01 level (2-tailed).

Reliabilities are reported along the diagonal

* Correlation is significant at the 0.05 level (2-tailed).

Table 4B
Means, Standard Deviations, Correlations and Reliabilities (N = 217) (Black Boxes)

Variables	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11	13	14	15	16
1 Age	3.50	0.740	1														
2 Background	1.53	0.501	0.003	1													
3 Gender	1.18	0.389	-0.047	0.142*	1												
4 Crew Position	1.71	0.626	-0.686**	0.016	-0.007	1											
5 PsychR Trait	3.22	0.572	0.047	0.009	0.131	0.027	(.90)										
6 Job Sat	3.11	0.889	-0.071	0.013	0.020	-0.024	0.131	(.91)									
7 ID Company	3.22	1.040	-0.107	-0.049	0.009	0.061	0.043	0.527**	(.94)								
8 ID Union	3.20	0.867	0.049	-0.071	0.023	0.006	-0.007	-0.024	0.019	(.93)							
9 ID Prof	3.73	0.880	0.117	-0.017	-0.047	-0.083	0.086	0.005	-0.026	0.273**	(.92)						
10 ThreatBB	2.68	0.750	0.015	-0.062	0.077	-0.028	0.278**	0.112	-0.036	0.209**	-0.105	(.91)					
11 StateReactBB	2.97	0.550	-0.048	-0.006	0.140*	.000	0.300**	-0.035	-0.163**	0.043	-0.106	0.663**	(.90)				
12 JustBBSafety	7.99	1.238	0.053	0.072	-0.158*	-0.035	-0.074	0.098	0.106	0.077	-0.226**	-0.113	-0.299**	1			
13 Resist BB	1.17	0.451	0.043	-0.060	-0.043	-0.091	-0.075	0.061	-0.042	0.100	0.079	0.080	0.133	0.203**	1		
14 Indirect Resist	2.79	0.564	0.044	0.065	-0.080	0.026	0.079	-0.191**	-0.238**	-0.021	0.042	0.104	0.232**	-0.093	0.207**	(.75)	
15 Malic Comp	3.16	0.951	-0.022	0.074	0.019	-0.030	0.015	-0.185**	-0.146*	0.039	0.101	0.023	0.113	0.010	0.131	0.315**	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Reliabilities are reported along the diagonal

Table 4C
Means, Standard Deviations, Correlations and Reliabilities (N = 217) (FOQA System)

Variables	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Age	3.50	0.740	1														
2 Background	1.53	0.501	0.003	1													
3 Gender	1.18	0.389	-0.047	-0.142*	1												
4 Crew Position	1.71	0.626	-0.686**	0.016	-0.007	1											
5 PsychR Trait	3.22	0.572	0.045	0.009	0.131	0.027	(.90)										
6 Job Sat	3.11	0.889	-0.071	0.014	0.020	-0.024	0.130	(.91)									
7 ID Company	3.22	1.040	-0.107	-0.049	0.009	0.060	0.042	.527**	(.94)								
8 ID Union	3.20	0.867	0.049	-0.071	0.023	0.006	-0.007	-0.023	0.019	(.93)							
9 ID Prof	3.73	0.880	0.117	-0.017	-0.047	-0.082	0.086	0.004	-0.026	0.273**	(.92)						
10 ThreatFOQA	3.44	0.933	-0.078	-0.080	0.071	0.022	0.253**	0.059	-0.042	0.083	-0.148*	(.94)					
11 StateReactFOQA	3.49	0.700	-0.055	0.024	0.089	0.005	0.293**	-0.041	-0.129	-0.058	-0.166*	0.642**	(.94)				
12 JustFOQASafety	5.46	1.826	0.028	0.012	-0.159*	-0.004	-0.202**	-0.170*	0.018	0.023	-0.183**	-0.599**	-0.549**	1			
13 Resist FOQA	1.55	0.529	0.030	-0.135*	-0.064	0.013	0.074	0.041	-0.205**	0.011	-0.045	0.438**	0.410**	-0.319**	(.55)		
14 Indirect Resist	2.79	0.564	0.044	0.065	-0.080	0.026	0.080	-0.191**	-0.238**	-0.021	0.042	0.245**	0.358**	-0.182**	0.297**	(.75)	
15 Malic Comp	3.16	0.951	-0.022	0.074	0.019	-0.030	0.016	-0.185**	-0.146*	0.039	0.101	0.116	0.103	0.032	0.164*	0.315**	1

** Correlation is significant at the 0.01 level (2-tailed).
 Reliabilities are reported along the diagonal

* Correlation is significant at the 0.05 level (2-tailed).

Some correlations emerge as noteworthy. Consistent with Hypothesis 4, the level of company identification (Variable 7) is significantly correlated with indirect resistance and malicious compliance. The perceived threat and the state reactance for each system are also highly correlated (.68, .66, and .64), which foreshadows a high regression R^2 when perceived threat predicts state reactance. Statistics literature states a rule of thumb that correlation between two predictor variables should be no more than .8 or .9, and caution should be exercised when correlation is .7 or greater (Tabachnick & Fidell, 2007). This helps avoid issues of multicollinearity and associated problems interpreting coefficients of highly correlated independent variables. While these variables do not quite reach this threshold, the higher than expected relationship might be due to construct or methodological issues, or a combination of both.

Further post-hoc analysis on these particular constructs and their measurement is warranted. First, it is important to determine the extent to which the scales might be measuring the same concept. The construct measurements are previously developed scales that have been used and validated in published research (Dillard & Shen, 2005; Quick & Bates, 2010; Quick & Stephenson, 2007b). The perception of threat four-item scale asks about impact on decision-making, impact on autonomy, and perceived pressure to modify job practices. The alpha was .90 or better across systems. The state reactance scales focus more on anger and negative cognitions, and also achieved similar alphas of .90 or higher. Considering the face validity of each construct, it appears the scales measure meaningfully different ideas. In a broad sense, each construct could also be placed in the realm of negative affect, and might be similarly regarded by a respondent and give results with unsurprisingly high correlation. In order to empirically support this assertion, I ran a Confirmatory Factor Analysis that considered the combined items

from each scale, and forced the solution to have two factors. Those results are summarized in Table 5 below, with coefficients below .30 suppressed from the data.

Black Boxes			ACARS			FOQA		
Pattern Matrix			Pattern Matrix			Pattern Matrix		
	Component			Component			Component	
	1	2		1	2		1	2
Threat Q1	0.893		Threat Q1	1.008		Threat Q1	0.953	
Threat Q2	0.890		Threat Q2	0.925		Threat Q2	0.943	
Threat Q3	0.841		Threat Q3	0.813		Threat Q3	0.892	
Threat Q4	0.816		Threat Q4	0.776		Threat Q4	0.860	
Anger Q1	0.428		Anger Q1	0.490		Anger Q1	0.532	
Anger Q2	0.400		Anger Q2	0.500		Anger Q2	0.488	
Anger Q3	0.380	0.522	Anger Q3	0.339	0.488	Anger Q3	0.370	0.530
Anger Q4	0.490		Anger Q4	0.519		Anger Q4	0.511	
Negative Cognitions #1		0.736	Negative Cognitions #1		0.582	Negative Cognitions #1		0.621
Negative Cognitions #2		0.619	Negative Cognitions #2		0.741	Negative Cognitions #2	0.411	0.470
Negative Cognitions #3		0.779	Negative Cognitions #3		0.765	Negative Cognitions #3		0.575
Negative Cognitions #4		0.901	Negative Cognitions #4		0.899	Negative Cognitions #4		0.988
Negative Cognitions #5		0.900	Negative Cognitions #5		1.000	Negative Cognitions #5		1.019
Negative Cognitions #6		0.846	Negative Cognitions #6		0.790	Negative Cognitions #6		0.877

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.
Coefficients below .30 suppressed

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.
Coefficients below .30 suppressed.

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.
Coefficients below .30 suppressed.

As expected two clear components emerge from this analysis. The anger scale questions, however, which are expected to load with the negative cognitions to form the state reactance measure, actually have loading with the items from the perception of threat scale. As previously noted, at face value these scales seem to measure different concepts, and these results suggest higher cross-loading than expected and the need for a closer look at methods.

The two constructs for each system appeared on sequential “pages” of the online survey. In an effort to counterbalance the item order and mitigate common method bias, the four state-anger items were interspersed throughout the threat perception items. In doing so, it appears that this effort may have led to the state-anger items loading more than expected with the threat perception items, and a possibly inflated correlation. Despite this, the measures reflect good reliability and have established validity, which provides solid basis for interpretation of the results.

Tables 6A, B, and C report the results for hypotheses 1 and 2. The first hypothesis in the model is basically a test of the fundamental assertion of reactance theory, that people who feel a threat to their autonomy will have a higher level of reactance than those who do not.

Table 6A

Models Predicting State Reactance (ACARS System)				
Variables	Model			
	1	2	3	4
<i>Control Variables</i>				
Age	-.164*	-.031	-.009	-.010
Gender	.009	-.027	-.035	-.036
Flying Background	-.042	.007	.011	.008
Crew Position	-.069	-.002	.000	.000
Job Satisfaction	-.034	-.073	-.052	-.052
Trait Reactance	.200***	.027	.011	.018
Perception of Threat		.812***	.794***	.796***
Justification is Safety			-.111***	-.280***
Threat x Safety				-.040
<i>adj R²</i>	.026	.656	.665	.665
<i>F</i>	1.97*	59.73***	54.61***	48.57***
<i>ΔR²</i>		.630	.009	.000
<i>df</i>	210	209	208	207
<i>N</i>	217	217	217	217

* p<.10; ** p<.05; *** p<.01

Standardized coefficients are reported.

Table 6B

Models Predicting State Reactance (Black Boxes)				
Variables	Model			
	1	2	3	4
<i>Control Variables</i>				
Age	-.132	-.118*	-.106	-.110
Gender	.098	.066	.034	.037
Flying Background	-.021	.025	.042	.038
Crew Position	-.100	-.070	-.068	-.071
Job Satisfaction	-.090	-.138***	-.112**	-.114**
Trait Reactance	.308***	.139***	.130**	.139***
Perception of Threat		.636***	.616***	.634***
Justification is Safety			-.203***	-.202***
Threat x Safety				-.056
<i>adj R²</i>	.090	.466	.503	.504
<i>F</i>	4.58***	27.90***	28.36***	25.35***
<i>ΔR²</i>		.376	.037	.001
<i>df</i>	210	209	208	207
<i>N</i>	217	217	217	217

* p<.10; ** p<.05; *** p<.01

Standardized coefficients are reported.

Table 6C
Models Predicting State Reactance (FOQA System)

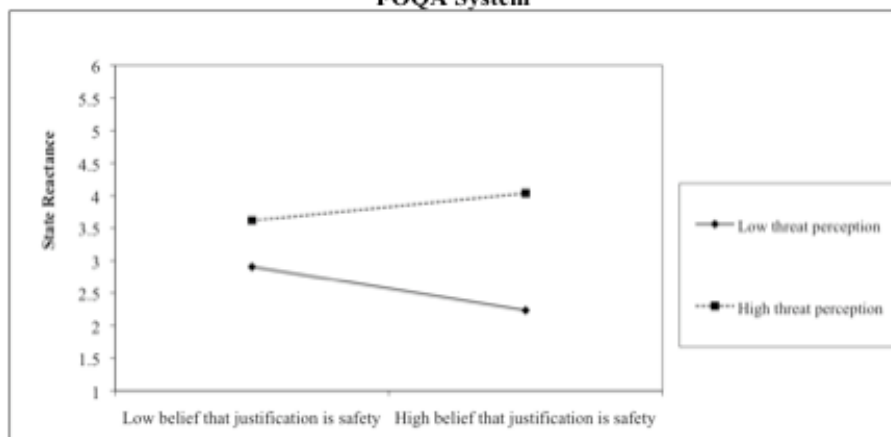
Variables	1	2	3	4
<i>Control Variables</i>				
Age	-.148	-.042	-.050	-.012
Gender	.039	.008	-.009	-.023
Flying Background	.019	.083*	.081*	.090**
Crew Position	-.108	-.047	-.052	-.054
Job Satisfaction	-.096	-.106*	-.127***	-.064
Trait Reactance	.310***	.119***	.116***	.081*
Perception of Threat		.748***	.658***	.630***
Justification is Safety			-.155***	-.063
Threat x Safety				.273***
<i>adj R²</i>	.081	.606	.619	.675
<i>F</i>	4.17***	48.39***	44.85***	50.87***
ΔR^2		.525	.013	.056
<i>df</i>	210	209	208	207
<i>N</i>	217	217	217	217

* $p < .10$; ** $p < .05$; *** $p < .01$
Standardized coefficients are reported.

The results for Model 2 show strong support for the first hypothesis, with the perception of threat significantly predicting state reactance for all three systems at $p < .01$. These results are not surprising given the high correlations and relative homogeneity of the sample, but should be interpreted with caution given the potential for method bias previously discussed.

Hypothesis 2 predicts that the state reactance a person experiences might depend on the underlying justification for the program, which is also one of Brehm's early postulates concerning Reactance Theory (1966). In this specific context, the more a pilot's perception is that safety is the organization's underlying justification for monitoring, the lower the level of state reactance the pilot will experience. Model 3 includes this perception as a predictor variable, then Model 4 includes the interaction term perceived threat x perception of safety. In all cases, the perception of safety is negatively and significantly ($p < .01$) related to state reactance, when controlling for perception of threat. The interaction term is only significant in the case of the FOQA system, however, and is plotted in Figure 2.

Figure 2
FOQA System



The points are plotted at one standard deviation below and above the mean for each variable, respectively. For those pilots with low threat perception (solid line), the reaction to justification is as theorized. As the belief that safety is the justification for the program increases, the state reactance decreases. Alternatively, for those pilots who have high threat perceptions, as the belief that safety is the justification for the program increases, the state reactance actually increases as well. Although different slopes are expected in the interaction, an increase in reactance for the high threat group is unexpected, and therefore does not completely support the hypothesized relationship. The coefficient for the interaction predictor in all three systems is consistent in the same direction, but only reaches significance for the FOQA system. Given the unexpected interaction for those who perceive high threats and the lack of significance in two of the three systems, Hypothesis 2 is not supported.

Tables 7A, B, and C include models testing the hypotheses associated with the right half of the overall model, with hypothesized relationships between state reactance, identity with the company, and the dependent variables (indirect resistance behaviors and malicious compliance). Each system has four models associated with the two dependent variables, respectively.

Table 7A
Models Predicting Indirect Resistance & Malicious Compliance (ACARS System)

DV	Model							
	1	2	3	4	1	2	3	4
	Indirect Resist.	Indirect Resist.	Indirect Resist.	Indirect Resist.	Malicious Comp.	Malicious Comp.	Malicious Comp.	Malicious Comp.
<i>Variables</i>								
<i>Control Variables</i>								
Age	.058	.085	.077	.101	-.123	-.121	-.124	-.103
Gender	-.099	-.100	-.099	-.077	-.001	-.001	-.001	.019
Flying Background	.079	.086	.077	.069	.079	.079	.075	.068
Crew Position	.056	.068	.073	.082	-.122	-.121	-.118	-.111
Job Satisfaction	-.200***	-.194***	-.119	-.113	-.204***	-.203***	-.172**	-.167**
Trait Reactance	.114*	.079	.081	.106	.051	.048	.049	.073
State Reactance		.173***	.144**	.121*		.014	.002	-.019
ID w Company			-.144*	-.170**			-.060	-.084
React x ID				-.198***				-.148*
<i>adj R²</i>	.037	.062	.072	.106	.024	.019	.017	.044
<i>F</i>	2.40**	3.04***	3.09***	3.85***	1.87*	1.60	1.46	2.11**
<i>ΔR²</i>		.025	.010	.034		-.005	-.002	.027
<i>df</i>	210	209	208	207	210	209	208	207
<i>N</i>	217	217	217	217	217	217	217	217

* p<.10; ** p<.05; *** p<.01

Standardized coefficients are reported.

Table 7B
Models Predicting Indirect Resistance & Malicious Compliance (Black Boxes)

DV	Model							
	1	2	3	4	1	2	3	4
	Indirect Resist.	Indirect Resist.	Indirect Resist.	Indirect Resist.	Malicious Comp.	Malicious Comp.	Malicious Comp.	Malicious Comp.
<i>Variables</i>								
<i>Control Variables</i>								
Age	.058	.089	.082	.108	-.123	-.110	-.113	-.092
Gender	-.099	-.122*	-.118*	-.103	-.001	-.011	-.010	.003
Flying Background	.079	.084	.075	.077	.079	.081	.078	.079
Crew Position	.056	.079	.084	.093	-.122	-.112	-.111	-.103
Job Satisfaction	-.199***	-.178***	-.105	-.095	-.204***	-.195***	-.173**	-.165**
Trait Reactance	.113*	.041	.044	.060	.051	.022	.023	.036
State Reactance		.235***	.213***	.172**		.096	.089	.056
ID w Company			-.141*	-.183**			-.043	-.077
React x ID				-.142**				-.114
<i>adj R²</i>	.037	.083	.093	.106	.024	.027	.024	.031
<i>F</i>	2.39**	3.80***	3.77***	3.86***	1.87*	1.87*	1.66	1.76*
<i>ΔR²</i>		.046	.010	.013		.003	-.003	.007
<i>df</i>	210	209	208	207	210	209	208	207
<i>N</i>	217	217	217	217	217	217	217	217

* p<.10; ** p<.05; *** p<.01

Standardized coefficients are reported.

Table 7C
Models Predicting Indirect Resistance & Malicious Compliance (FOQA System)

	Model							
DV	1	2	3	4	1	2	3	4
	Indirect Resist.	Indirect Resist.	Indirect Resist.	Indirect Resist.	Malicious Comp.	Malicious Comp.	Malicious Comp.	Malicious Comp.
Variables								
<i>Control Variables</i>								
Age	.058	.112	.106	.114	-.123	-.111	-.114	-.103
Gender	-.099	-.113*	-.111*	-.109*	-.001	-.004	-.004	.000
Flying Background	.079	.072	.065	.067	.079	.077	.075	.077
Crew Position	.056	.095	.100	.099	-.122	-.113	-.111	-.113
Job Satisfaction	-.199***	-.164**	-.095	-.086	-.204***	-.196***	-.171**	-.159**
Trait Reactance	.113*	.000	.019	.004	.051*	.027	.027	.031
State Reactance		.365***	.350***	.334***		.080	.074	.055
ID w Company			-.133*	-.149**			-.050	-.070
React x ID				-.064				-.078
<i>adj R²</i>	.037	.156	.164	.164	.024	.025	.022	.023
<i>F</i>	2.39**	6.69***	6.31***	5.71***	1.87*	1.79*	1.61	1.56
<i>ΔR²</i>		.119	.008	.000		.001	-.003	.001
<i>df</i>	210	209	208	207	210	209	208	207
<i>N</i>	217	217	217	217	217	217	217	217

* p<.10; ** p<.05; *** p<.01

Standardized coefficients are reported.

Hypothesis 3A, which says higher levels of state reactance will be related to higher levels of indirect resistance, is strongly supported across systems. When the strength of identification with the company is included as a predictor (Model 2), it is also significant and in the expected direction, but only the $p < .10$ confidence level. This indicates that as the identification with the company is stronger, lower levels of indirect resistance are predicted. Model 4 for each system is a test of Hypothesis 4A, which predicts that the levels of indirect resistance will be affected by levels of identification, such that those that have the strongest identification with the company will display the lowest levels of resistance behavior. This is supported at the $p < .05$ level in all cases except for the FOQA system. These interactions for the ACARS system and Black Boxes are interpreted and graphed in Figures 3 and 4 below, again at one standard deviation above and below the mean for each variable.

Figure 3
ACARS System

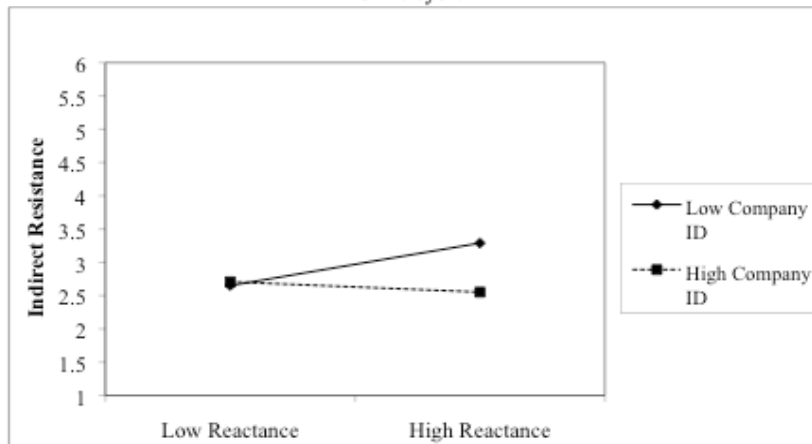
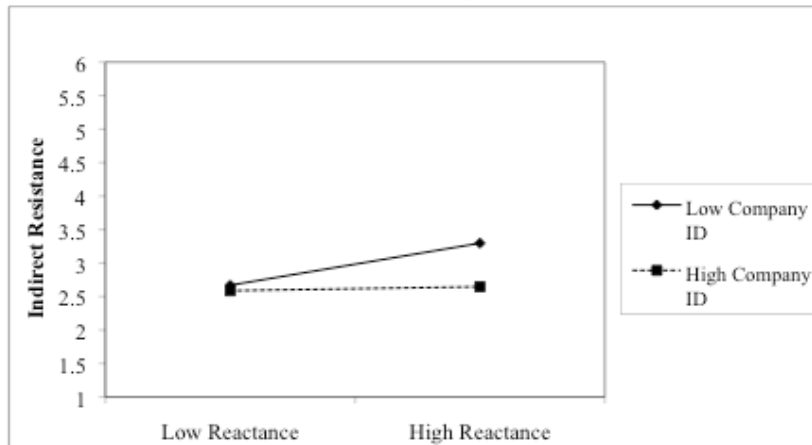


Figure 4
Black Boxes



Each interaction effect has similar patterns for the two systems. As reactance increases, indirect resistance behavior also increases at a steady rate for those who do not have strong identification with the company. For those who do have strong identification, the increasing levels of reactance do not affect the frequency of resistance behavior. Although the interaction effect for the FOQA system was not significant, it was mathematically consistent with the two systems above. Overall, there seems to be solid support of Hypothesis 4A, particularly for the ACARS system and Black Boxes.

Hypotheses 3B and 4B predict the same relationships except malicious compliance is the dependent variable. None of the hypotheses were supported predicting malicious compliance, except a significant interaction effect for the ACARS system at the .10 level.

While there is not a significant direct relationship in the malicious compliance models, one noteworthy observation is that the control variable “job satisfaction” is consistently significant across models in the expected direction. Lower job satisfaction is highly predictive of correspondingly higher levels of malicious compliance.

Single Factor Test. The final empirical analysis accomplished is a test to ascertain the existence of common method bias, which is variance that is attributable to the method as opposed to the measurement construct itself. This bias might introduce systematic measurement error which can create alternative explanations for hypothesized relationships (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). When the variables are all measured from a single source, as they are in this study, one method to retrospectively check for common method bias is to run a factor analysis for all variables in the model. If they load on to one primary factor, then a serious problem with method bias would be indicated (Podsakoff, et al., 2003). I accomplished a factor analysis using principal components extraction for all primary variables, and five components returned eigenvalues over 1.0. The first component accounted for 29% of the total variance, and the top five components accounted for a cumulative variance of 62%. These overall results show some indication of a primary explanatory component, but the fact that four others emerged separately suggests common method bias is not a serious issue in the overall model. This is shown graphically in Table 8 below:

Table 8

Pattern Matrix	Component				
	1	2	3	4	5
ID Company		0.801			
ID Union					0.796
ID Prof					0.712
PsychR Trait		0.327	-0.304		
JobSat		0.887			
ThreatBB	0.865				
StateReactBB	0.744				
JustBBSafety			0.623		
ThreatFOQA	0.841				
StateReactFOQA	0.695				
JustFOQASafety	-0.658				
ThreatACARS	0.919				
StateReactACARS	0.859				
JustACARSSafetyMC			0.497		
Indirect Resist				0.740	
Resist ACARS	0.492				
Resist FOQA	0.512		0.449		
Resist BB			0.741	0.316	
Malic Comp				0.711	

Extraction Method: Principal Component Analysis.

Rotation Method: Promax with Kaiser Normalization.

Coefficients below .30 (abs value) suppressed

Interesting patterns emerge from this principal components analysis. As expected, the first component is primarily the threat and state reactance variables for each system. The second combines company identification and job satisfaction, variables that are somewhat intuitively linked. The third component does not have a cohesive story, but the fourth is interesting in that it combines the two dependent variables, indirect resistance and malicious compliance. Finally, the fifth component highlights a relationship between two variables not utilized in the models, the union and profession ID. These and other observations and their impact on theory will be further discussed in the next chapter.

Chapter Six

Discussion, Limitations and Implications

This chapter will discuss the results of the survey, which provide general support for the main theorized relationships in the model, and mixed support for the variables that are theorized to moderate those relationships. First, I will discuss the results of Hypotheses 1 and 2, which are derived from the relationship between perceived threat, state reactance, and justification. Next I will move to Hypotheses 3 and 4, which include the relationship between state reactance, resistant behaviors, and organizational identity. I will then explain what I believe are limitations to this research, and finally describe implications for theory and possible future research avenues.

Discussion

Hypothesis 1 predicts a positive significant relationship between perceived threat levels and psychological reactance. This hypothesis is based on an underlying assumption of Psychological Reactance Theory (PRT) that individuals believe they have an inherent right to be autonomous agents (Brehm, 1966). The perceived threat measure specifically asks about threats to autonomy by focusing on the impact of certain management control systems on being able to do a job as the employee sees fit. State reactance is defined as an emotional state triggered by a specific threat that creates motivation to regain control of behavioral freedom (Brehm & Brehm, 1981). As expected, in a model where threat perception predicts state reactance, the R-squared showing the proportion of variance explained by the model is high, and offers reinforcement to the relatively lengthy empirical record supporting the primary basic prediction of PRT.

As explored in Chapter 5, there may have been method and/or construct bias that could be related to inflated statistical relationships between the two constructs. But the strong correlation is also expected in that they occupy similar somewhat negative dimensions in the

overall landscape of affect and emotion. Additionally, the selection criteria for airline pilots is stringent, and often those chosen have very similar behavioral traits. The highly correlated findings are not surprising given the relatively homogenous nature of the target population.

Since Dillard and Shen's operationalization of state reactance as a latent construct comprised of state anger and negative cognitions in 2005, most new research has come in the communications and marketing fields (Quick & Stephenson, 2007; Rains & Turner, 2008; Quick & Bates, 2010). Presently, I am not aware of any research in organizational studies (Organizational Behavior, Organizational Theory) that apply state reactance measures using Dillard and Shen's conceptualization (2005). The findings in the present research extend the validity of the measure by including the organizational context.

The second hypothesis on this half of the model predicts an interaction effect with the "perception of safety as the organization's justification" moderating the threat-state reactance relationship. PRT theorizes that two aspects of an individual's perception will affect the subsequent level of reactance: the legitimacy of the source and the justification (Brehm, 1966). In an employment situation, I presume the legitimacy to be largely unquestioned by individual employees and therefore have minimal effect on resulting state reactance. In the context of this study, justification by the company for monitoring systems might be very important. Individuals might interpret their perception that safety is the justification as a signal from the company of a more important purpose than just efficient performance, which would be expected to diminish subsequent negative emotional responses. For those who have higher perceptions of safety as the primary justification for the monitoring system, the state reactance will be lower for a given threat perception. The results provide support for this direct relationship. For one unit higher in this perception, the state reactance score is expected to be about .15 points lower on average

across systems. “Justification is safety” as a predictor variable is significant in all three cases, and in the expected direction.

The results for the interaction, however, were not significant except in the case of the FOQA system. For two of the three control systems, the level of reactance does not depend on perception of safety. Is there something unique about the FOQA system that might make the interaction effect significant? The raw mean threat score for FOQA is 3.43, compared to 2.68 for the Black Boxes, and 2.60 for the ACARS. The FOQA system is clearly perceived as more of a threat than the Black Boxes and ACARS. The qualitative interviews indicated the FOQA program is thought of as somewhat punitive in nature. This is the system that effectively monitors a pilot’s performance, and records and flags deviations for supervisory review. Punishment could range from temporary grounding and additional training to loss of employment. The Black Boxes are considered to be almost exclusively a safety program, and although there is a threat from the information gathered to be leaked, the level of concern does not approach that related to the FOQA program. The ACARS, as well, is seen as more of a nuisance that might lead to a reprimand, but does not gather and report the type of data that might get an individual pilot fired.

The group that had the unexpected result was the pilots who perceived the highest threat, creating the interaction for the FOQA system. I expected higher perceived justification of safety to decrease the state reactance, closer to a point near the low perceived threat group. The results showed the opposite effect and the state reactance actually increased for this group. One explanation for this may be that once a certain threshold of perceived threat is crossed, organizational justification cannot placate the resulting state reactance. The FOQA system may be the only one of the three systems in which the perceived threat exceeds this threshold.

Therefore, these findings do not support the idea that justification might moderate the threat-reactance relationship, and in fact is opposite of the prediction in the case of those who feel threatened the most, specifically by the FOQA system.

Moving to the right half of the model, Hypothesis 3A and 3B predict that higher state reactance will be related to higher levels of the two dependent variables, indirect resistance behaviors and malicious compliance. In accordance with reactance theory, as people experience higher levels of reactance, they look for ways to either regain the lost freedom or expand their behavioral freedom in other areas. As previously discussed, the focus of this research is on indirect behaviors that do not directly challenge the monitoring system itself. For all three control systems, higher levels of state reactance were significantly related ($p < .01$) to higher levels of indirect resistance behavior. This research establishes the idea that in organizational studies, threatened behavior might most likely be met with responsive behaviors that are peripheral to the focal situation where control systems are deployed. It is noteworthy, however, that the indirect behaviors most frequently displayed by the pilots were intentionally disregarding dress and appearance standards and placing a negative sticker on the flight bag, which are the most outwardly obvious behaviors on the list. While employees may not want to re-establish directly threatened behavior, it may feel more empowering to act in a public way to gain social acknowledgment and feedback.

On the other hand, I found no direct relationship between elevated reactance levels and malicious compliance, which is surprising. Malicious compliance, the intentional withholding of behaviors beyond contractual obligations, seems like it would be similar to indirect resistance behavior in that it might be difficult to detect or observe and is most likely not a behavior specifically related to a control system. While the coefficients in the models are positive (the

expected sign), the effect is not statistically significant. One explanation for this might be that the construct measure was one item. Further investigation and clarification of this construct might lead to a multi-item measure and capture the boundaries more completely.

It may also be that the results are correct in that pilots do not resort to this type of behavior when control systems create a threat to autonomy. The indirect and direct resistance behaviors in this study all include some form of acting out, while malicious compliance is a lack of action. Although it is a conscious decision and might re-establish some level of control on an individual level, malicious compliance may be perceived by the employee differently than taking a specific action. It may not fully quench the need to regain autonomy in response to reactance. Other statistical relationships lend credibility to this idea, as the control variable “job satisfaction” is significantly ($p < .05$) related to malicious compliance across systems.

This result aligns with the theme of this research, that there might be alternative paths to fostering desired employee behavior. One is by bureaucratically establishing rules and procedures, then monitoring to check on their effectiveness. Another might be to instill an internal desire within an employee to do what is best for the organization. The outcome of these socialization efforts might be higher job satisfaction and higher organizational identity, which have been shown in the literature to be significantly correlated (e.g. Van Dick, et al, 2004). I discuss this moderation of the reactance-resistance behavior relationship below.

Hypotheses 4A and 4B are the final hypotheses, and predict that the strength of the relationships in Hypotheses 3A and 3B will depend on the amount an individual identifies with the company (OID). Social Identity Theory has shown that an individual’s identity salience can be a strong predictor of behavioral outcomes (e.g. Hogg & Terry, 2000). The hypothesized moderation effect received moderate support for the indirect resistance models. The interaction

term was supported at the .05 confidence level for both the ACARS system and Black Boxes, and was in the expected direction but did not reach significance for the FOQA system. With regard to the two significant systems, for those pilots with a strong company identity, the level of state reactance has little to no effect on the level of indirect resistance. However, for those pilots with a lower company identity, higher levels of state reactance were related to higher levels of indirect resistance. To the extent an employee's identity is aligned with the organization, he or she perceives they are psychologically intertwined with the fate of the group, sharing a common destiny, and experiencing its successes and failures (Mael & Ashforth, 1992). Additionally, Social Identity research has shown that individuals tend to engage in activities congruent with their most salient identities, and share norms and values with other members (e.g. Ashforth & Mael, 1989). This suggests strong identification with the company provides a cognitive guide to behavior that is generally supportive of the organization and aligned with its goals. While these individuals may feel an elevated state reactance, they overcome the emotion and temper their behavior so as not to potentially harm the company.

This is another case where the FOQA system has distinct results. The mean for state reactance for the FOQA system is 3.49, compared to 2.97 for the Black Boxes and 2.86 for the ACARS. Consistent with higher threat levels, the FOQA system has higher reactance levels, as well. It may be that above a certain reactance level, only reached by the FOQA system in this research, pilots will tend to have more uniform behavioral reactions, regardless of OID. It may also be that the nature of the FOQA system overrides potential moderating effects of OID, which is similar to the discussion for Hypothesis 2. Since this monitoring system seems to present the most lethal threat, the results suggest that pilots will act out more readily, despite identity influences. However, the direction of the coefficient is as expected (albeit non-significant), so it

is not necessarily contradictory to the hypothesis. Given this and the significance of the coefficient on the Black Boxes and ACARS, there is modest support for Hypothesis 4.

Limitations

The primary challenge with resistance research is being able to accurately identify the behaviors that are classified as resistant (Prasad & Prasad, 2000). Different research designs to capture these behaviors offer tradeoffs. More controlled environments that are not dependent on individual self-reporting depend instead on an observer or machine to accurately determine the occurrence of specific behaviors of interest. These observers have difficulty determining underlying intent and behaviors that an observer might categorize as resistant might actually be an honest mistake on the part of the subject. In sum, researchers have noted the unique nature of resistance sets it outside the scope of traditional observation or laboratory research (Prasad & Prasad, 2000).

Designs that try to overcome these obstacles, including the present study, use subject self-reporting in an attempt to determine underlying intentionality, which might be an indication of motive. These designs, however, depend on the veracity of the respondent as well as the ability of the instrument to obtain unbiased data. In fact, I regard the dependence on self-reports as the source for measurement of all variables to be a limitation in this study. However, I believe there is ample justification for the chosen methodology, and there was a priori consideration given to common method bias in the design and application of the survey instrument.

The risk for using a self-rating versus other-rating measurement instrument is that a respondent might systematically be influenced to respond to items in similar fashion, possibly yielding spurious inflated correlations (Conway & Lance, 2010). The variables in this study, however, would be difficult to rate by an observer or associate. They are *perceptions* (of threat,

justification), *internal emotions or attitudes* (state reactance, OID), or *behaviors that need an attached motive* for evaluation (resistance). In other words, they are “private”, and as such are “clearly appropriate” to be self-reported (Chan, 2009). Additionally, other-rating measurements can be susceptible to similar biases as self-reports, such as response sets or affect bias, although there are misconceptions in the Social Sciences that other-reports are innately superior (Conway & Lance, 2010). Despite the limitations and potential for inflated correlation, I believe the self-reporting instrument is best-suited for measuring the research variables.

In addition, proactive strategies noted in the methods literature (e.g. Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) were utilized to design and administer the survey in such a way to mitigate potential method bias. First, reassurance of respondent anonymity was made on the introduction of the survey, on the lead-in to the indirect resistance behavior question (which was identified as the most sensitive in the think-aloud interviews), and on the forum posting inviting participation. Anonymity might help avoid social desirability effects and provide more forthcoming responses. The scales which seemed to induce the most negative affect were placed toward the end of the survey, in order to minimize negative priming. The scales themselves were nearly all chosen from previous studies where they showed solid validity and reliability. Finally, some state reactance items were interspersed among the perceived threat scale in order to minimize the potential for response sets to a grouping of like-items.

Despite these efforts, there is some evidence of method bias. The combined state-anger items which were interspersed with the threat perception scale might have influenced respondents to answer in a “response set” since those items were presented on the same page, resulting in a higher than expected correlation. This issue was thoroughly discussed in Chapter 5, but is also mentioned here as a limitation because the particularly high correlations and

regression results associated with these measures should be interpreted with restraint. However, I believe the benefit of obtaining primary data and relatively accurate underlying intent about resistance behavior is worth this possible introduction of measurement error.

Another limitation of this research related to constructs is the measure for malicious compliance. The early theorizing and construction of models was related to malicious compliance as the primary dependent variable of interest. The results, however, did not support the hypothesized relationships, which was disappointing and not consistent with the results for the other dependent variable, indirect resistance. The lack of significant results might be due to the narrow definition and measurement of the construct. A broader operationalization of this construct might reveal more facets of the behavior, and result in stronger relationships with state reactance. Specifically, do individuals view the act of intentionally complying with contractual expectations as a proactive or withdrawal behavior? Are there specific antecedents leading to this activity? Are there certain types of situations that are more likely to lead to malicious compliance? Additionally, the construct was to some extent correlated with the indirect resistance behaviors. The temporal relationship between these behaviors might be informative. In other words, is there an order that individuals generally follow when exercising resistance behaviors? Is malicious compliance the “last straw” for employees or is it the initial resistance behavior? Answers to these and other questions in a more fully explored construct analysis might result in support of the hypothesized relationships.

Related to this issue, the scale for both dependent variables was a frequency. In this context, pilots do not fly the same number of hours. A pilot who flies once a month, but has a resistant behavior every time he flies, might characterize that behavior as “rarely” or “sometimes”. On the other hand, a pilot who flies four times per week and has a resistance

behavior on one of those flights, might characterize this behavior as “often”, even though his behavioral resistance *rate* is lower by comparison. The evidence from the qualitative interviews, however, showed most pilots flying between 50 and 80 hours per month. While I believe the generic frequency scale captured a consistent assessment of different rates of behavior, it may have been more accurate to ask about behaviors per flight.

A final limitation is that the results might be highly contextual, and not very generalizable to other types of autonomous workers. The monitoring literature points out that the capability to monitor employees is increasing at a rapid pace (Stanton, 2000). Jobs that traditionally enjoyed a high level of autonomy and behavioral freedom are now under ever-increasing management scrutiny. So I would argue that the sample for this study is representative of those types of jobs that have autonomy, but are also becoming more highly monitored. Professions that might be included in this category are physician, pharmacist, truck driver, or lawyer, to name a few. A lawyer, for instance, might find himself in a new computer-based system of billing. It seems reasonable that a lawyer in this situation would comply with the billing system, but react in other ways like coming into work later than usual, or challenging certain appearance standards at the firm, like growing a moustache. Truck drivers and other types of transportation professionals might find their vehicles tracked by GPS or have video cameras installed. These workers who were used to a high level of freedom while operating might find themselves more tightly bound by management surveillance. They would likely follow the new rules being specifically observed, but express their freedom in ways peripheral to operating the vehicle.

Implications

The results of this survey have important implications for the theories underlying the tested hypotheses. Research in Electronic Performance Monitoring (EPM) has been contextually limited by using primarily laboratory observations on simple, repetitive tasks to determine the effects of electronic controls. Results have been mixed, finding both negative and positive aspects of monitoring. The contextual setting of this study is an important contribution in that the authority relationship exists in reality as do the threat of punishment and reprimand. It also distinctively concerns relatively autonomous employees who are under surveillance by three separate EPM systems. This type of employee is understudied in the EPM literature, and the results suggest reactions that are beyond what is theorized by EPM scholars. In essence, this research unites EPM research with resistance theory.

Psychological Reactance Theory (PRT), initially articulated in 1966, has been used infrequently in organizational studies. This research found solid support for the main proposition that threatened individuals will have a heightened emotional reaction that includes aspects of anger and negative cognitions, which primes them to seek out ways to re-establish control and autonomy. I also found support for the justification aspect of the theory, that individuals consider how the organization might justify the source of the threat. But there was not support to indicate that there are differences between those who perceive low and high justification.

Additionally, PRT's prediction that outcomes might be either indirect or direct was also supported, particularly for indirect behaviors. The primary contribution of this research to PRT is its application in the organizational studies context, and the suggestion that indirect behaviors will be the most prevalent response. The qualitative interviews as well as the significant survey

results support this assertion. And while the interviews indicated that direct resistance to particular systems was an uncommon behavior, survey respondents reported higher frequencies of direct resistance than interview respondents (Appendix C). It is possible that the anonymity of the survey led people to be more open about these potentially sensitive activities.

These findings also strengthen recent research in resistance theory. In particular, following Braverman's Labor Process Theory (1974) from Sociology, individuals are seen as active agents who have skill sets that are diminished and neglected by the control systems of modern capitalism. Resistance is ubiquitous and uniquely individual, comprised of mostly subtle acts occurring in all facets of the workplace environment. The results support this theoretical movement away from large-scale, organized labor protests, and demonstrates that resistance is a uniquely individual and socially constructed behavior. The indirect resistance measure included behaviors in many different aspects of the job, and further research may reveal more examples of such indirect resistance that could undermine organizational effectiveness.

The findings related to Organizational Identity are notable, and reinforce already well-defined and supported findings from the Social Identity Theory (Social Psychology) and Identity (Sociology) literatures. This research, however, uses OID as a mechanistic construct to explain some of the tenets of control theory, particularly those concepts included in clan control (Ouchi, 1980) and concertive control (Barker, 1993). These ideas diverge from strict bureaucratic control, in that individual behavior is molded through pressures of group membership and peer influence instead of by rules and policies. The findings reinforce the idea that identity strength can be a powerful influence on employee behavior, which is the ultimate goal of control systems. Specifically, however, the system eliciting the highest reactance, FOQA, did not have an interaction effect from OID. This indicates that those with higher OID had statistically the same

behavioral response to reactance as those with lower OID. This indicates that this effect is most pronounced at relatively low levels of employee reactance. It is possible that even those who have the highest OID might still be subject to the effects of reactance and the subsequent motivation to re-establish behavioral freedom.

Further Research. While the findings are generally supportive of the hypothesized relationships, the support would be enhanced if they could be replicated in autonomous jobs in different contextual settings. Airline pilots are a fairly homogenous sample, hired from a narrow pool of a thin slice of the overall population. It might be considered conservative that there were findings among such a sample, but it would also be meaningful to expand the research to other contexts. Other control variables might also be considered in order to exploit potential heterogeneity. In this sample, I asked about general demographic information, but more specific items like tenure at the company or experience in companies with similar monitoring systems might provide more meaningful information.

As mentioned, the primary behavior of interest in this project was malicious compliance. The lack of significant results might be due to the narrow definition of the construct. A broader operationalization and measurement of this construct might reveal more facets of the behavior, and result in stronger relationships with state reactance. Specifically, do individuals view the act of intentionally complying with contractual expectations as a proactive or withdrawal behavior? What are the antecedents leading to this activity? For example, a research stream that predicts malicious compliance as a specific outcome of lower job satisfaction might be a meaningful extension to that well-researched literature.

I hypothesized that the strength of identity would primarily have effects on the reactance-resistance relationship. As discussed, reactance research has shown a relationship between

threatened autonomy and elevated levels of reactance in many different contexts. In this setting, as well, it seemed more likely that high-identity individuals would still experience this internal frustration at losing autonomy, but that the high shared identity would diminish subsequent behavioral reactions. However, a logical extension of this research might be to determine if there is an effect of identity on the perceived threat-reactance relationship, or if it is an antecedent to initial levels of perceived threat.

Implications for Practice. This research highlights the importance of systems thinking and consideration of multiple courses of action and effects when implementing control measures. While EPM programs may provide a large amount of data at a low cost and very little human interaction, there might also be second and third-order effects which are difficult from a managerial perspective to foresee. Employees have been shown to be very creative at subverting control programs, through a variety of means. This research shows they can demonstrate indirect resistance behavior that could also be harmful to the organization, or at least indicate a lack of shared values. Additionally, long-term negative reactions, from physiological harm to a loss of trust in the company, might be a result of monitoring programs that diminish autonomy.

Another consideration for practitioners is the type of indirect resistance that was most frequent, the display of a sticker on the pilot flight bag and improper dress and appearance. It seems as though even small, somewhat inconsequential behaviors satisfied the desire to act out. If a manager is installing a new program that curtails behavioral freedom, it might be wise to allow some flexibility in other less important areas for employees to exercise their autonomy.

Finally, it might be meaningful from a managerial perspective to categorize presumed resistance behaviors in other ways, such as functional vs. non-functional or by the overall impact to important processes. This might also inform targeted policies and enforcement as opposed to

simply trying to eliminate all behaviors that appear to be counter to company expectations. For example, the improper wear of the uniform, while symbolically important, might have little impact on the performance of the operation. A more impactful behavior, like holding up a process until certain paperwork is perfectly complete, could have major implications, and require more attention from managers.”

Conclusion

This research program was phenomenon-driven: I was intrigued by strong public belief that the prospect of video cameras in commercial cockpits would be a panacea for recent incidents, which was met by an equally emotional negative reaction by pilots to this suggestion. Why would a pilot who is already “well-monitored” be adverse to simply a different kind of monitoring? Maybe it is that the pilots do have negative reactions to the existing monitoring systems, they just are not very evident to the casual observer. The face-to-face interviews and survey provided insight to these reactions and the nature of subsequent resistant behaviors in a highly monitored environment. The findings might recalibrate opinions of those who think EPM systems just melt into the background noise and are not affecting behaviors. As these results show, however, the introduction of EPM will have a negative impact at some level of operation, and implementation of these control systems should be driven by a substantial need or positive expected outcome.

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Appendix A

Semi-Structured Interview Guide

You are being interviewed to provide background data for a study concerning control systems at work. This study will be followed by a larger survey where all xxxx pilots will have the opportunity to participate. Your answers will be recorded accurately and used only to enhance this research. I am not recording any identifying aspects that might link you to your answers. I appreciate your time and honest insight.

1. Tell me about your background in commercial aviation.
 - a. Length of time, different airlines or unions, aircraft flown, schedule and routes, qualifications
2. Are you aware of any control systems while you are operating the aircraft?
3. Describe your experience with the following programs:
 - a. LOSA
 - i. Have you ever been asked to participate in the LOSA program?
 - ii. Have you refused a LOSA observer? Have you seen another pilot refuse a LOSA observer? Why?
 - b. FOQA
 - i. How have you seen this data be used? Who uses it (chief pilots, safety, etc)?
 - ii. Have you ever heard of anyone being singled out using data from this system (for punishment or otherwise)?
 - c. CVR/FDR
 - i. Have you ever seen anyone disable or otherwise manipulate this system? Why?
 - d. ACARS automated reporting
 - i. Have you ever seen anyone disable or override this system? Why?
4. What is your assessment of the benefits and shortcomings of these systems?
 - a. FOQA
 - b. LOSA
 - c. CVR/FD
 - d. ACARS
5. What are some of the behavioral reactions you have seen from pilots relating to these systems or programs?
6. Do you have any opinion about video monitors being placed in the cockpit?
7. Have you ever seen other pilots intentionally withhold behavior that might have been good for the operation but was outside of contractual obligations? Have you ever experienced this situation? Why did you choose your course of action?

Appendix B

Survey Instrument

Airline Pilots 2012

Q1 Thank you very much for participating in this survey. I am a twice furloughed xxxx pilot, finishing the last stages of a PhD program in Organizational Studies. I really appreciate your time. This study supports research about control systems at work, specifically your perceptions of surveillance in the cockpit and subsequent reactions. Findings from this program might help organizations design more effective control systems and lead to a better understanding of employee behavior. The survey should take approximately 15 minutes to complete and participation in this survey is completely voluntary. Your answers will be anonymous and only the principal investigators will have access to your responses. Demographic data are for research purposes only, and your individual responses will not be released to (the airline) or (the union). If you have any questions or concerns about the survey or research program, please contact First Officer Pat Heflin via email at patrick.heflin@colorado.edu. Thanks again!

Q34 These statements address your feelings about your work.

	Strongly Agree (1)	Agree (2)	Somewhat Agree (3)	Somewhat Disagree (4)	Disagree (5)	Strongly Disagree (6)
I feel fairly well satisfied with my present job. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider my job rather unpleasant. (2) (R)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most days I am enthusiastic about my work. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Each day of work I wish would go on forever. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find real enjoyment in my work. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q6 You are about halfway done. The next sections refer to surveillance systems on the aircraft.

Q8 To what extent do the following describe your feelings about the CVR and FDR?

	Clearly describes my feelings (1)	Mostly describes my feelings (2)	Somewhat describes my feelings (3)	Somewhat does not describe my feelings (4)	Mostly does not describe my feelings (5)	Clearly does not describe my feelings (6)
hostility (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
unfair (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
distrust (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hesitant (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
uneasy (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
intimidated (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q9 On a scale of 1 to 10, what is the underlying purpose of the "black boxes"?

_____ Safety (1)

_____ Performance (2)

[illegible]

Q12 To what extent do the following describe your feelings about the FOQA program?

	Clearly describes my feelings (1)	Mostly describes my feelings (2)	Somewhat describes my feelings (3)	Somewhat does not describe my feelings (4)	Mostly does not describe my feelings (5)	Clearly does not describe my feelings (6)
hostility (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
unfair (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
distrust (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hesitant (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
uneasy (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
intimidated (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q13 On a scale of 1 to 10, what is the underlying purpose of FOQA?

_____ Safety (1)

_____ Performance (2)

Q16 To what extent do the following describe your feelings about the ACARS automated reporting feature?

	Clearly describes my feelings (1)	Mostly describes my feelings (2)	Somewhat describes my feelings (3)	Somewhat does not describe my feelings (4)	Mostly does not describe my feelings (5)	Clearly does not describe my feelings (6)
hostility (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
unfair (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
distrust (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hesitant (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
uneasy (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
intimidated (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q17 On a scale of 1 to 10, what is the underlying purpose of the ACARS automated reporting?

_____ Safety (1)

_____ Performance (2)

Q19 How often have you: (Remember your individual responses will be anonymous, and will not be shared with (the airline) or (THE UNION))

	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Nearly Always (5)
Slowed down to intentionally miss a metric (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ignored calls from the scheduling desk (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Called in sick when not actually sick (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intentionally disregarded dress and appearance standards (e.g. no hat) (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intentionally worn your (union) pin upside down or inappropriately (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced effort and quality in job areas not under direct surveillance (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Placed a sticker on your flight bag displaying displeasure. For example: "No waivers, no favors, I follow the contract" (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intentionally caused the ACARS to make an erroneous report (e.g. to indicate a late pushback when actually on time) (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Filed a (pilot report) simply to "cover" for a potential "FOQA tag" (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sought out more advice than necessary during an unusual situation that might be "FOQA tagged" (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Said something for the CVR to record (e.g. "I don't agree with this course of action") (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q20 Over and above flying the aircraft safely, a pilot has a range of discretionary actions that might yield higher completion rates or increase efficiency of the operation ("operationally beneficial"). For instance, a Captain might decide to fly an aircraft with a mechanical writeup for a system (e.g. the APU) that is not necessarily required for the flight. Or a First Officer might hustle some gate checked bags down to the baggage hold. How often have you intentionally withheld an action that might have been "operationally beneficial", but was not specifically part of your contracted duties?

- ☐ Never (1)
- ☐ Rarely (2)
- ☐ Sometimes (3)
- ☐ Often (4)
- ☐ Nearly Always (5)

Q21 Overall, surveillance programs improve my on-the-job performance.

- ☐ Strongly Disagree (1)
- ☐ Disagree (2)
- ☐ Agree (3)
- ☐ Strongly Agree (4)

Q22 Please provide any comments or observations you have about surveillance systems.

Q24 To what extent do the following describe your feelings about a potential video monitoring system?

	Clearly describes my feelings (1)	Mostly describes my feelings (2)	Somewhat describes my feelings (3)	Somewhat does not describe my feelings (4)	Mostly does not describe my feelings (5)	Clearly does not describe my feelings (6)
hostility (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
unfair (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
distrust (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hesitant (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
uneasy (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
intimidated (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q25 On a scale of 1 to 10, what would be the underlying purpose for a video monitoring system?

_____ Safety (1)

_____ Performance (2)

Q35 What is your primary concern about a video monitoring system?

- ☐ Privacy issues (1)
- ☐ Distrust of data safeguards/protocol (2)
- ☐ Difficulty establishing contextual accuracy when evaluating pilot actions (3)
- ☐ Other (4) _____

Q36 To what extent would you withhold beneficial discretionary behaviors, as described above, if a video system is installed?

- ☐ Much Less (1)
- ☐ Less (2)
- ☐ The Same (3)
- ☐ More (4)
- ☐ Much More (5)

Q27 What is your current position?

- ☐ Captain (1)
- ☐ First Officer (2)
- ☐ Furlough (3)

Q28 What was your primary flying background before this airline?

- ☐ Military (1)
- ☐ Civilian (2)

Q29 Is this the only airline you have flown for?

- ☐ Yes (1)
- ☐ No (2)

Q30 What is your gender?

- ☐ Male (1)
- ☐ Female (2)

Q31 How old are you?

- ☐ 29 or younger (1)
- ☐ 30-39 (2)
- ☐ 40-49 (3)
- ☐ 50-59 (4)
- ☐ 60 or older (5)

Appendix C

This appendix describes the posting of the survey on the pilots web forum and subsequent interaction with the membership.

I initially posted the following:

“Hi, my name is Pat Heflin, and I am conducting the final stages of a doctoral dissertation on surveillance in the cockpit. I am a furloughed (company) pilot, being sponsored by the Air Force for my PhD. The link below will direct you to a survey that will take approximately 15 minutes to complete. There are some sensitive questions, but I assure you the responses will not be shared with the union or the company, and will only be reported in aggregate in academic journals. Your participation is completely voluntary and I appreciate your time and assistance in helping me research this important topic.”

I posted the link and left it overnight. When I returned to the forum the next day, I had approximately 80 views, and four people had posted responses directly on the forum. Two responses were positive and supportive, saying they completed the survey and wishing me good luck. Two of these responses, however, were very negative and challenged my underlying motives and the nature of the research, and openly suggested I might be aligned with management. One particular wanted to know my sources of funding, any affiliation with “any video surveillance companies”, and my hypotheses. As calmly as I could, I posted this reply:

“I appreciate your concerns and understand the environment with management. I can assure you this is only an academic study about behavioral responses to monitoring. I am not affiliated with any company, and I receive no financial support for this research. I just want to emphasize the voluntary nature of this survey and the fact that your responses will be completely anonymous.”

One person who had posted a negative comment seemed satisfied, but chose not to participate in the survey. The other person again challenged the nature of the survey itself, and suggested the company might be able to track respondents through IP addresses. At this point, several other members posted in support of the research and survey, and a short discussion ensued about how unlikely the suggestion about IP addresses was and how it would not be admissible in a court of law.

It seemed like the initial negative posts stalled the response rate somewhat, for a period of about one day. I was concerned about posting too much information in order to avoid establishing an emotional frame before respondents took the survey. Once the supportive posts were made, the response rate resumed and it took approximately two weeks to achieve the final response rate. In retrospect, I would have included a request to send a private message to me if there were concerns. The public broadcasting of angst by a few members could have seriously impacted the response rate.

Appendix D

Alternate and Supporting Empirical Analyses

I also explored if state reactance mediates the effect of perception of threat on the dependent variables. Following Baron and Kinney (1986), I used the causal steps mediation analysis for each system predicting the two dependent variables.

Table 9
Causal Steps Mediation Analysis

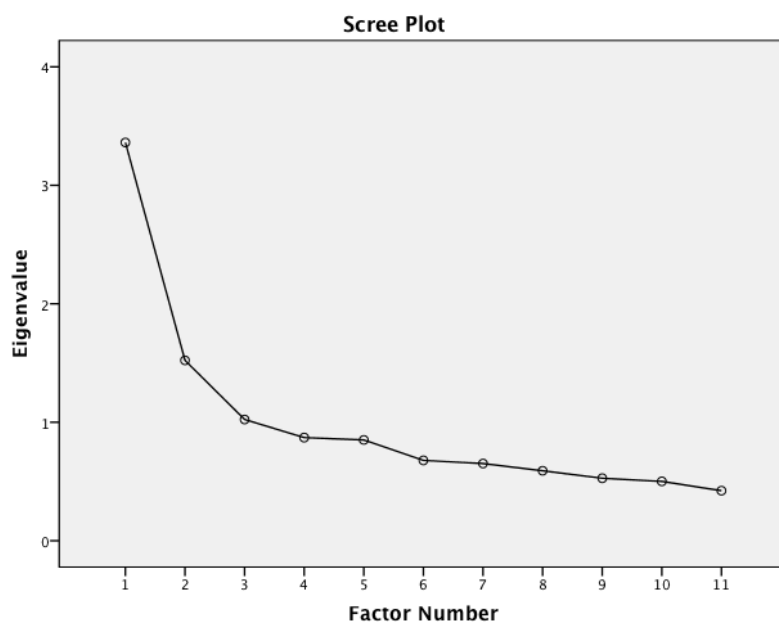
ACARS (Indirect Resistance)					ACARS (Malicious Compliance)				
Predictors	DV	b	t	p	Predictors	DV	b	t	p
<i>Model 1 (Step 1)</i>					<i>Model 1 (Step 1)</i>				
Threat Perception	Indirect Resist.	.051	n.s.	n.s.	Threat Perception	Malic. Comp.	.008	n.s.	n.s.
Black Boxes (Indirect Resistance)					Black Boxes (Malicious Compliance)				
Predictors	DV	b	t	p	Predictors	DV	b	t	p
<i>Model 1 (Step 1)</i>					<i>Model 1 (Step 1)</i>				
Threat Perception	Indirect Resist.	.104	n.s.	n.s.	Threat Perception	Malic. Comp.	.023	n.s.	n.s.
FOQA (Indirect Resistance)					FOQA (Malicious Compliance)				
Predictors	DV	b	t	p	Predictors	DV	b	t	p
<i>Model 1 (Step 1)</i>					<i>Model 1 (Step 1)</i>				
Threat Perception	Indirect Resist.	.245	3.70***	.000	Threat Perception	Malic. Comp.	.008	n.s.	n.s.
<i>Model 2 (Step 2)</i>									
Threat Perception	Psych. Reactance	.748	16.7***	.000					
<i>Model 3 (Step 3)</i>									
Threat Perception	Indirect Resist.	.074	.741	n.s.					
Psych. Reactance		.414	4.16***	.000					

* p<.10; ** p<.05; *** p<.01

The only evidence of mediation was in the model for FOQA and indirect resistance, and the results indicate partial mediation. The first step in Baron & Kinney's mediation technique, that threat perception predicts the respective dependent variable, does not meet significance criteria in the other five analyses. This is somewhat surprising, given that state reactance significantly predicts each dependent variable and threat perception and state reactance are so highly correlated. With this underwhelming support for mediation across control systems, further exploration of moderated mediation will add little explanatory value to the models and is not warranted.

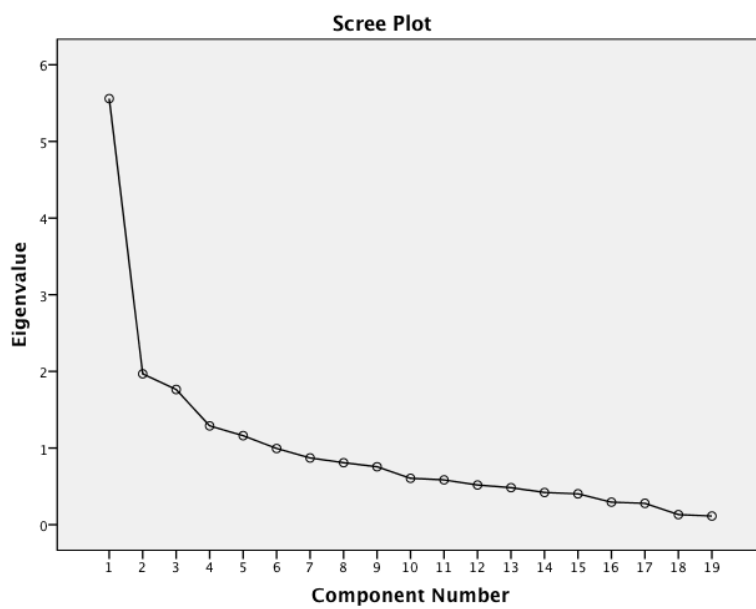
The Principal Component Analysis for the Dependent Variable Items resulted in three components with eigenvalues over 1.0, but the third is just slightly over 1.0. Figure 5 shows the supporting Scree Plot, a graphical depiction of the component distribution.

Figure 5



The Scree Plot for the PCA for all variables is shown below:

Figure 6



This paper is informed by Social Identity Theory (SIT), which says that individuals tend to categorize themselves and others in groups, (Hogg & Terry, 2000). I also draw aspects from Identity Theory, with foundations in sociology, which refers more to the idea of “chronic identity salience”, which indicates that the most salient identity of many might motivate behavior (Hogg, Terry, & White, 1995). By using the strength of company identity in the model, I am aligning most closely with the ideas of SIT, where the intensity that individuals have categorized themselves with a particular entity (in this case, the company) is predicted to moderate behavioral reactions. Alternatively, an Identity Theory lens might analyze the most salient of the organizational identities, in place of the strength of a particular identity. As a sensitivity check of the findings moderated by identity strength, I ran the same models by selecting a subsample of those pilots who identify most with the company. 66 of 217 survey respondents scored higher on the OID scale for the company than for the union or the profession (30.5%). A sample size of 66 provides a power of .65 for a small effect size, indicating these results should be interpreted with some caution.

Table 10A
Models Predicting State Reactance (ACARS System)

Variables	1	2	3	4
<i>Control Variables</i>				
Age	-.114	.153	.254***	.242**
Gender	.135	-.063	-.051	-.058
Flying Background	-.166	-.115	-.193***	-.187***
Crew Position	-.071	.186	.241**	.234**
Job Satisfaction	.015	-.006	-.002	.001
Trait Reactance	.016	.120	.034	.036
Perception of Threat		.856***	.822***	.812***
Justification is Safety			-.294***	-.311***
Threat x Safety				-.061
<i>adj R²</i>	-.046	.653	.727	.726
<i>F</i>	.524	119.87***	16.77***	.752
<i>ΔR²</i>		.640	.070	.003
<i>df</i>	59	58	57	56
<i>N</i>	66	66	66	66

* p<.10; ** p<.05; *** p<.01

Standardized coefficients are reported.

Table 10B

Models Predicting State Reactance (Black Boxes)				
Variables	Model			
	1	2	3	4
<i>Control Variables</i>				
Age	-.198	-.083	-.019	-.031
Gender	.280**	.192	.215*	.225*
Flying Background	-.006	-.033	-.014	-.047
Crew Position	-.031	.082	.130	.087
Job Satisfaction	.049	-.003	.005	-.008
Trait Reactance	.051	-.054	-.061	.016
Perception of Threat		.484***	.510***	.553***
Justification is Safety			-.168	-.145
Threat x Safety				-.187
<i>adj R²</i>	.026	.235	.249	.261
<i>F</i>	1.29	17.14***	2.07	1.92
<i>ΔR²</i>		.202	.024	.022
<i>df</i>	59	58	57	56
<i>N</i>	66	66	66	66

* p<.10; ** p<.05; *** p<.01

Standardized coefficients are reported.

Table 10C

Models Predicting State Reactance (FOQA System)				
Variables	Model			
	1	2	3	4
<i>Control Variables</i>				
Age	-.166	-.002	-.024	-.029
Gender	.087	.002	-.001	.034
Flying Background	-.016	.009	.011	-.023
Crew Position	-.049	.010	-.006	-.031
Job Satisfaction	.140	.072	.067	.036
Trait Reactance	.033	-.054	-.047	-.123
Perception of Threat		.644***	.617***	.668***
Justification is Safety			-.049	-.093
Threat x Safety				.306***
<i>adj R²</i>	-.048	.358	.348	.429
<i>F</i>	.508	38.22***	.150	9.09***
<i>ΔR²</i>		.378	.002	.080
<i>df</i>	59	58	57	56
<i>N</i>	66	66	66	66

* p<.10; ** p<.05; *** p<.01

Standardized coefficients are reported.

Table 11A
Models Predicting Indirect Resistance & Malicious Compliance (ACARS System)

DV	Model				Model			
	1	2	3	4	1	2	3	4
	Indirect Resist.	Indirect Resist.	Indirect Resist.	Indirect Resist.	Malicious Comp.	Malicious Comp.	Malicious Comp.	Malicious Comp.
Variables								
<i>Control Variables</i>								
Age	.325**	.309*	.249	.250	.021	-.004	.040	.040
Gender	-.257**	-.238*	-.239**	-.253**	-.149	-.120	-.119	-.115
Flying Background	-.120	-.143	-.157	-.183	.121	.085	.095	.105
Crew Position	.413***	.403**	.371**	.378**	-.056	-.071	-.074	-.050
Job Satisfaction	.039	.041	.118	.139	-.152	-.149	-.205	-.213
Trait Reactance	.226*	.228*	.241**	.218*	.362***	.365***	.367***	.364***
State Reactance		-.139	-.181	-.436		-.218*	-.187	-.097
ID w Company			-.221	-.224*			.162	.163
React x ID				.272				-.272
<i>adj R²</i>	.136	.142	.172	.166	.091	.125	.134	.120
<i>F</i>	2.71**	1.39	3.09*	.166	2.08*	3.35*	1.57	.074
<i>ΔR²</i>		.018	.039	.008		.045	.021	.001
<i>df</i>	59	58	57	56	59	58	57	56
<i>N</i>	66	66	66	66	66	66	66	66

* p<.10; ** p<.05; *** p<.01

Standardized coefficients are reported.

Table 11B
Models Predicting Indirect Resistance & Malicious Compliance (Black Boxes)

DV	Model				Model			
	1	2	3	4	1	2	3	4
	Indirect Resist.	Indirect Resist.	Indirect Resist.	Indirect Resist.	Malicious Comp.	Malicious Comp.	Malicious Comp.	Malicious Comp.
Variables								
<i>Control Variables</i>								
Age	.325**	.316*	.261	.262	.025	.019	.077	.059
Gender	-.257**	-.245**	-.242*	-.242*	-.149	-.146	-.149	-.149
Flying Background	-.120	-.121	-.127	-.127	.123	.121	.128	.124
Crew Position	.413***	.412**	.385**	.386**	-.058	-.056	-.028	-.047
Job Satisfaction	.039	.041	.110	.110	-.152	-.152	-.224*	-.249
Trait Reactance	.226	.229	.241*	.240*	.362***	.362***	.350***	.360***
State Reactance		-.044	-.075	-.083		-.013	.019	.249
ID w Company			-.195	-.194			.205	.169
React x ID				.009				-.259
<i>adj R²</i>	.136	.123	.143	.128	.091	.075	.098	.094
<i>F</i>	2.71**	.129	2.35	.001	2.08*	.010	2.47	.010
<i>ΔR²</i>		.002	.031	.000		.000	.034	.010
<i>df</i>	59	58	57	56	59	58	57	56
<i>N</i>	66	66	66	66	66	66	66	66

* p<.10; ** p<.05; *** p<.01

Standardized coefficients are reported.

Table 11C
Models Predicting Indirect Resistance & Malicious Compliance (FOQA)

DV	Model				Malicious Comp.	Malicious Comp.	Malicious Comp.	Malicious Comp.
	Indirect Resist.	Indirect Resist.	Indirect Resist.	Indirect Resist.				
Variables								
<i>Control Variables</i>								
Age	.325**	.336**	.287*	.286*	.021	.015	.073	.068
Gender	-.257**	-.263**	-.265**	-.264**	-.149	-.146	-.144	-.127
Flying Background	-.120	-.119	-.125	-.125	.121	.121	.128	.125
Crew Position	.413***	.417***	.392**	.390**	-.056	-.058	-.028	-.070
Job Satisfaction	.039	.029	.094	.093	-.152	-.147	-.223*	-.253*
Trait Reactance	.226*	.224*	.235*	.234*	.362***	.363***	.350***	.344***
State Reactance		.070	.034	.047		-.038	.005	.074
ID w Company			-.174	-.175			.203	.180
React x ID				-.016				-.326
<i>adj R²</i>	.136	.127	.139	.124	.091	.076	.098	.118
<i>F</i>	2.71**	.348	1.82	.006	2.08*	.094	2.37	2.32
<i>ΔR²</i>		.005	.024	.000		.001	.033	.031
<i>df</i>	59	58	57	56	59	58	57	56
<i>N</i>	66	66	66	66	66	66	66	66

* $p < .10$; ** $p < .05$; *** $p < .01$
Standardized coefficients are reported.

As expected, the results from the subsample for Hypotheses 1 and 2 (Tables 10A, B, and C) are consistent with the results from the overall sample. Hypothesis 1 is strongly supported, and Hypothesis 2 is not supported. Hypotheses 3A,B and 4A,B (Tables 11A, B, and C), however, are much different. Hypotheses 3A and 3B, predicting a relationship between state reactance and the two dependent variables, did not have a significant relationship across the three systems. Hypothesis 4A and 4B, predicting a moderating effect by the strength of company identity on the reactance-behavior relationships, were also not supported for all systems.

These findings informed by identity salience reinforce those reported in the main analysis, where the strength of identity moderated behavioral reactions to reactance. In this sample of those pilots whose highest identity salience is with the company, individuals experience threats and subsequent elevated reactance, but higher identity with the company results in no relationship with behavioral reactions.