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Organizational Communication and Individual Behavior: Implications for Supply Chain Risk Management

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Abstract

Risk is a significant issue for supply chain managers. Not only must they contend with multiple dimensions of risk in decision making, they must reconcile decision making with broader organizational interests. This study examines the influence of organizational communication regarding supply chain risk on individual decision-making strategies and the perceptions of risk. A multi-stage experimental design is applied, in which decision makers make decisions across three dimensions of risk and adjust their risk-taking behavior after being presented with organizational communication regarding supply chain risk levels. The relationship between organizational communication and the perceptions of supply chain risk is then explored after decision makers are allowed to adjust their supply chain strategies. The results suggest that decision makers adapt sourcing strategies in response to organizational communication regarding supply chain risk. Specifically, they make riskier decisions when the organization communicates improvements in supply chain risk levels. However, when given specific instructions to reduce risk, they do not adjust their supply chain strategies.

Keywords: behavioral supply chain management, organizational communication, risk perceptions, risk compensation, safety stock, reliable sourcing, disruptions, behavioral experiment, seemingly unrelated regression

Introduction

Risk management is a critical concern to supply chain professionals, and in recent years it has taken on an even greater significance. For example, the global automotive industry has faced a 30% increase in the number of disruptions from 1,300 in 2016 to nearly 1,700 in 2017 (JLT Specialty, 2018). Such disruptive events can have a sizeable impact on production. This was the case when Ford Motor Company suspended its F-150 production following a fire at a supplier facility, the result of this suspension delayed production and led to 7,000 workers being temporarily laid-off (Shaban, 2018). One of the largest challenges to managing the risk of such a disruption is that future risk levels are uncertain leading individuals (e.g. supply chain professionals) to engage in different risk-taking behavior(s) based on their individual perceived risk. For instance, Apple Inc. increased their inventories from $4.4 to $7.6 billion in anticipation of potential tariffs with China, despite reassurances from political officials that such (potential) tariffs would not impact Apple directly (Kharpal, 2018). As another example, it was recently reported that Caterpillar Inc., and their suppliers, are not investing in additional facilities for production despite high demand, principally due to concerns regarding a potential downturn (Aeppel & Singh, 2018). Taken together, the already complicated landscape of managing a supply chain's risk is further challenged when one considers the impact that an individual's perception of risk has on their decision(s) for managing such risk.

A sizeable body of literature exists that explores supply chain risk management strategies from a myriad of perspectives (Chopra & Sodhi, 2004; Kleindorfer & Saad, 2005; Tang, 2006; Sodhi, Son, & Tang, 2012). Much of the emphasis is (understandably) on risk management at an organizational level, with little work addressing individual risk-taking behavior, despite individual risk-taking behavior having been identified as an important driver of supply chain risk

(Cantor & Macdonald, 2009; Cantor, Blackhurst, & Cortes, 2014). The present study extends prior behavioral research by examining the connection between organizational communication and individual risk-taking behavior(s) in a supply chain context. The interaction between organizational level initiatives and individual behaviors is important when considering how to motivate organizational change (Gattiker & Carter, 2010; Gattiker et al., 2014). Much of the influence organizations have on individuals can arise from the manner in which individuals interpret organizational cues to make inferences that shape behavior. The behavioral perspective is thus valuable in exploring the relationship between organizational initiatives and individual behaviors in managing supply chain risk.

Research that uses a behavioral operations perspective to explore the relationship between disruptions and decision making has been identified as an important area for future study (Macdonald & Corsi, 2013). The perspective enables the testing of real-world decision-making in experimental settings that can isolate deviations from rational decision-making behavior and that allows new dimensions of individual decision making to be explored (Gino & Pisano, 2008; Sodhi & Tang, 2014). Understanding human behavior, judgment, and decision making is an important step in advancing supply chain management theory (Tokar, 2010). This is particularly germane, as individuals change their risk seeking behavior based on their perceptions of risk (Zsidisin & Wagner, 2010). Hence, understanding how different organizational communications impact individual perceptions of risk, and therefore individual behavior, contributes to the limited behavioral supply chain management literature on risk perceptions and uncertainty (Kull, Oke, & Dooley, 2014).

This research adds to the literature on supply chain risk in three ways. First, it bridges gaps in the extant research on supply chain risk management at an organizational level (e.g., Zsidisin et al., 2004; Braunscheidel & Suresh, 2009) and at an individual level (e.g., Cantor & Macdonald, 2009; Cantor, Blackhurst, & Cortes, 2014). Second, by exploring how organizational communication impacts individual behavior, it identifies how firms influence individual risk-taking behavior through communication and policy changes. This builds on prior work that has called for additional research from a behavioral operations perspective on disruptions and decision making (Macdonald & Corsi, 2013) and the determinants of risk perceptions in sourcing decisions (Kull, Oke, & Dooley, 2014). Third, it presents and tests the theories of risk compensation and risk homeostasis, finding that risk compensatory behavior occurs in a supply chain, yet risk homeostasis does not. As such, it presents the theoretical perspective of risk compensation to explain the connection between organizational and individual risk-taking behaviors. Understanding how organizational communication regarding risk can influence individual behavior can inform the development and implementation of effective strategies for communicating and managing supply chain risk.

LITERATURE REVIEW

Supply Chain Risk Management and Risk Perception

Supply chain risk, defined as "the likelihood of an adverse and unexpected event that can occur and either directly or indirectly result in a supply chain disruption" (Garvey, Carnovale, & Yeniyurt, 2015, p. 619), is an important dimension of supply chain management (Hult, Craighead, & Ketchen Jr, 2010; Bode et al., 2011). Extant literature explores the causes of, and mitigation strategies for, supply chain risk management from several perspectives (Chopra & Sodhi, 2004; Kleindorfer & Saad, 2005; Tang, 2006; Sodhi, Son, & Tang, 2012). Much of the literature emphasizes managing risk at an organizational level. Despite this emphasis, "defined risk tolerance levels are rarely communicated effectively throughout the firm" (Kwak & LaPlace, 2005, p. 693). Moreover, it is supply chain employees who are responsible for understanding and processing risk levels/factors and for making and taking action on recommendations (Zsidisin & Wagner, 2010; Cantor, Blackhurst, & Cortes, 2014). They can be "caught off guard" but are the ones who must respond to supply chain disruptions (Wagner & Bode, 2008, p. 307). Supply chain managers also face short-term financial incentives to underestimate risks, which can lead to greater costs over the long run (Chopra & Sodhi, 2014). Recognizing the antecedents to risk perceptions among supply chain managers can increase the efficacy of risk management strategies.

Given the importance of both the organizational and individual perspectives on supply chain risk decision making, it is important to reconcile the two by identifying the influence of organizational communication on individual decision making. Recent research has indicated that supply chain managers' risk perceptions are a major consideration in developing risk management strategies and has suggested that future researchers should explore the determinants of such risk perceptions (e.g. Hajmohammad & Vachon, 2016). Cantor, Blackhurst, and Cortes (2014) found that individuals are more willing to pursue a new disruption mitigation strategy under the conditions of high risk. Combining this result with how perceptions of risk can change individual risk-taking behavior suggests that different perceived levels of risk can influence individual risk-taking behavior (Sitkin & Pablo, 1992). Perceptions of risk can motivate supply chain personnel to adjust risk mitigation/management strategies (Zwikael & Sadeh, 2007; Ellis, Shockley, & Henry, 2011; Cantor, Blackhurst, & Cortes, 2014). Furthermore, an individual's perception of (firm) risk is dependent on the flow of organizational communication (Fearne, Hornibrook, & Dedman, 2001). However, the literature base on risk perceptions remains scant (Kull, Oke, & Dooley, 2014). Taken together, this suggests that research that furthers our understanding of how individuals make decisions and evaluate risk based on organizational communication is of importance.

Biases that impact risk perceptions can lead to suboptimal risk management strategies (Markman & Krause, 2016). For example, perceived risk can bias the supplier selection process (Hada & Grewal, 2013), and individuals can be overly reliant on signals while neglecting the underlying characteristics of a system (Massey & Wu, 2005). Collectively, these findings suggest that individuals may be making suboptimal risk management decisions by being too reliant on organizational signals regarding risk rather than adjusting their behavior based on a rational assessment of changing conditions. This is particularly ironic, as a key factor in developing a resilient supply chain strategy is the ability to interpret supply chain risk and to restructure and adapt operations accordingly (Ambulkar, Blackhurst, & Grawe, 2015; Pettit et al., 2016). Notably absent from the research on risk perceptions is work on the influence of organizational communication and policies on organizational-level risk perceptions (i.e., C-suite level opinions) and their impact on individual (i.e., supply chain analysts, managers) decision making in a supply chain context.

Risk Compensation

Perhaps the most prominent theory used to explore the impact of risk perceptions on individual behavior resulting from exogenous factors is the theory of risk compensation (RCT) (Peltzman, 1975). RCT explores how individuals increase (or decrease) their risk-taking levels as a result of exogenous influences (e.g., changes in regulatory behavior or individual perceptions of risk). Specifically, it suggests that as individuals perceive the level of risk to increase, they seek to decrease their level of risk exposure and vice versa (Trimpop, 1996). For example, rather than lowering the incidence of fatalities and injuries, laws mandating seat belt use have been shown to have negligible impact, presumably because drivers, feeling more secure, adopt riskier driving behaviors (Richens, Imrie, & Copas, 2000). Similarly, when Sweden switched from driving on the right to the left side of the road in 1967, the number of accidents significantly decreased rather than increasing, possibly due to the increased perceptions of risk due to the change. However, as individuals became accustomed to the new system, accident levels returned to "normal" (Wilde, 1998).

Why an individual would seek safety in the presence of increased risk is intuitive. However, why they would want to *increase* their level of risk exposure when it is low is somewhat counterintuitive. Theorists have posited that this is due to a construct implicit within the human condition called risk homeostasis (RH) (Wilde, 1982), which suggests that individuals change their risk behavior in response to changes in their perceptions of risk to revert to a baseline (desired) level of risk.

Although some firms establish groups to promote risk awareness and communication within their organizations (Kaplan & Mikes, 2012), risk tolerance levels are rarely communicated effectively throughout the organization (Kwak & LaPlace, 2005). Intentionally communicated messages about risk, such as those associated with quality assurance, have been shown to lead to changes in individual perceptions of risk (Fearne, Hornibrook, & Dedman, 2001). Moreover, the research on the relationship between organizational risk management and individual risk-taking behavior has yielded somewhat provocative findings. In one such study, an organization that introduced the use of safety hardware in logging operations caused workers to be *more* reckless. The study noted that "the equipment changed the injury distribution, reducing injuries to areas directly protected by the equipment but increasing other injuries" (Klen, 1997).

The organizational risk management strategy to reduce risk was, in part, undermined by higher levels of individual risk-taking behavior.

Risk perceptions are important for SCM (Cantor, Blackhurst, & Cortes, 2014; Ambulkar, Blackhurst, & Cantor, 2016), according to the literature, but little, if any, research has been conducted in the supply chain management field that examines whether or not RCT and RH apply or whether they can facilitate an understanding of the employee decision-making process under exogenous risk-level changes. Of particular value is to learn how organizational communication changes individual behavior, and how RCT and RH can impact supply chain employees' decisions regarding the level of risk in their SC strategies. As firms communicate a higher (lower) level of risk, we anticipate that this will change the behavior of individual employees leading to compensatory behavior for different perceived risk levels to accommodate their own risk preferences.

HYPOTHESIS DEVELOPMENT

Risk compensation theory argues that "we all change our behavior in response to some changes in perceived . . . risk" (Hedlund, 2000, p. 82). The differences that emerge between an organization and an individual in terms of risk perceptions and preferences can create asymmetries. This creates a situation whereby the decision makers' risk-taking behavior is aligned with their own interests and risk perceptions rather than those of the organization. This is due in part to the relationship between a person's risk-taking behavior in the context of their environment, as risk preferences change based on an individual's social environment (Chou & Nordgren, 2017). This effect is captured by exploring the compensatory risk-taking behaviors of supply chain managers in response to organizational communication. Risk perceptions influence risk-taking behavior (Sitkin & Pablo, 1992), and exogenous factors, such as organizational communication, change an individual's baseline risk (Hoffmann, Post, & Pennings, 2013). Different organizational communications regarding risk can therefore create changes in the perceived level of risk for individuals, thereby motivating them to engage in risk compensation and "rebalancing" their risk-taking behavior. As indicated by Cantor, Blackhurst, and Cortes (2014), individuals are more willing to pursue a new disruption mitigation strategy under conditions of high risk. Accordingly, we hypothesize the following:

> *H_1: Supply chain employees will increase the risk of their supply chain strategies by decreasing safety stock levels when the organization has a low level of historical risk compared to when the organization has a high level of historical risk.*
>
> *H_2: Supply chain employees will increase the risk of their supply chain strategies by sourcing from less reliable locations when the organization has a low level of historical risk compared to when the organization has a high level of historical risk.*

This relationship is expected to also hold for communicated risk. As individuals perceive a lower level of risk, they will compensate by increasing the risk of their supply chain strategies. Organizations have used communication regarding risk levels to influence individual perceptions of risk (Fearne, Hornibrook, & Dedman, 2001). Institutional antecedents to risk compensation can be borne out and subsequently manifested in employee behavior (Zhu & Yang, 2016). Massey and Wu (2005) showed that individuals react primarily to signals rather than to the environmental system that creates such signals. This matches the argument that "the perception of risk, rather than actual risk influences the SDR [Supply Disruption Risk] decision-making process" (Zwikael & Sadeh, 2007, p. 66). Similarly, Wichmann et al. (2016) found that soft tactics (consultation and inspirational appeals) are more effective than hard tactics (legitimating and coalition) or rational persuasion in influencing individual behavior, suggesting that organizational communication regarding risk levels, rather than objective observations of risk, might have a greater impact on behavioral change in supply chain strategy. Institutional support from an employee's organization can lead to decisions that are more in line with the organization's strategy (Chou & Nordgren, 2017). Furthermore, communication of impending risk can influence risk-taking behavior. This research suggests that communicating something highly probable (i.e., high impending risk) leads to safer behavior and that communicating something of low or moderate probability (i.e., low or medium impending risk) leads to a negligible, if any, effect on risk-taking behavior (Fallah Zavareh, Mamdoohi, & Nordfjærn, 2017). Taken together, this suggests that an organization's communication of risk levels can significantly augment how an employee responds thereafter. Thus, we hypothesize the following:

H_3: Supply chain employees will increase the risk of their supply chain strategies by decreasing safety stock levels when the organization communicates that there is a low level of risk compared to when the organization communicates a high level of risk.

H_4: Supply chain employees will increase the risk of their supply chain strategies by sourcing from less reliable locations when the organization communicates that there is a low level of risk compared to when the organization communicates a high level of risk.

A model of the relationships between organizational communication and individual risk-taking behavior is shown in Figure 1.

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Insert Figure 1 about here
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The concept of risk homeostasis suggests that compensatory behavior reduces the perceived level of risk and returns the individual toward a baseline level of desired risk. This has led to much of the controversy surrounding risk compensation theory (Robertson & Pless, 2002). Instead of seeking to return to a baseline level of risk, individuals may simply react to a perceived level of risk and make decisions based on those perceptions. Risk homeostasis, however, suggests that people "adapt their behavior in order to keep a subjective level of risk"

(Brémond, Dommes, & Engel, 2018, p. 62). Accordingly, it would also suggest that after adapting to different levels of risk, an individual's subjective level of risk should return to a baseline desired level independent of the changes in risk that led to compensatory behavior.

If risk homeostasis exists, two things should occur after individuals are provided with the opportunity to adjust their risk level. First, the individual's perceptions of risk should return to a homeostatic level that is independent of the change in the risk. That is, once individuals have been given an opportunity to change their behavior in response to risk, their perceptions of risk associated with their behavior should return to preferred levels and thus be equivalent across different levels of communicated risk. For example, if a supply chain employee perceives an increase in risk and compensates by increasing safety stock levels, his or her perception of risk after adjusting the strategy should be the same as before the risk increased. Similarly, if the employee perceived a decrease in risk and reacted by adopting a more aggressive (i.e., less reliable) sourcing strategy, his or her overall perception of risk should be the same after adjusting the strategy. Second, if an employee changes strategy to adopt a different level of risk, his or her perceived risk should also change. The amount of risk that employees perceive should be associated with how much they adapted their strategy to accommodate new levels of risk. It follows that the more employees engage in risk compensation (e.g., the more they adjust their supply chain strategy to decrease risk by increasing safety stock or using more reliable sourcing), the lower their perceived level of risk will be after making the change. In other words, the more the employees change their behavior, the more their perceptions of risk should change. We therefore propose a paired set of hypotheses to test for the presence of risk homeostasis:

H_5: After supply chain employees are provided with an opportunity to compensate for changes in risk levels, their perceptions of risk associated with their supply chain strategies will revert to a default level.

H_6: The extent to which supply chain employees change their strategies to reduce risk is related to decreases in their perception of risk.

A model of the test of risk homeostasis is shown in Figure 2.

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EMPIRICAL METHOD

Experimental Design

Experimental designs can offer unique ways to explore behaviorally focused research questions (Eckerd & Bendoly, 2011; Schaltenbrand et al., 2016). The data were collected using a scenario-based role-playing experiment that was designed using a process for good vignette design (Rungtusanatham, Wallin, & Eckerd, 2011). Specifically, the respondents were asked to assume an *a priori* defined role and were presented with common and experimental modules in which they were asked to make decisions in response to a variety of scenarios. The process of designing and validating the experiment included a predesign stage involving the identification of key issues related to supply chain employee risk taking by three academics familiar with the domain of the study. The design stage itself involved the development of the common and experimental modules, and the post-design stage included a review of the experimental design and the use of manipulation checks on the final sample to verify that the manipulations were effective.

The experiment was embedded into Qualtrics and used random assignment to experimental conditions. The experiment consisted of both a common and an experimental module, to which respondents were randomly assigned. In the experiment, a common module initially presented all respondents with a scenario in which they were asked to assume the role of a supply chain manager and to select an initial sourcing strategy (Appendix A). Specifically, they were asked to decide what percentage of products to source from two or more suppliers, what percentage of products to source from reliable locations, and how many weeks of safety stock to carry. These variables are similar to those used in the previous research (Tomlin, 2006; Schmitt, 2011; Cantor, Blackhurst, & Cortes, 2014) and establish a baseline measure of risk across multiple supply chain domains. Multiple measures of supply chain risk were used since different risk-taking behaviors are possible in different contexts (Weber, Blais, & Betz, 2002). This also allows for more robust assessments of how decision making is influenced by communication. Similar approaches have been used in previous research on risk perceptions and behavioral responses of supply chain personnel (Zsidisin & Wagner, 2010).

Respondents were instructed that their performance would be evaluated based on their ability to keep costs low and that they should also minimize the risk of a disruption to the supply chain. They were also told that each 10% increase in the percentage of products sourced from multiple suppliers or reliable locations or additional week of inventory would result in a cost of $10,000. This ensured that respondents had to make a tradeoff between risk reduction and cost and is representative of the tradeoffs made by individuals when the costs of supply chain risk management are immediate and transparent yet the benefits are long term and uncertain. According to Chopra and Sodhi (2014, p. 73), "Investment in additional facilities to mitigate the effect of rare disruptions is a real cost, while the savings from avoided costs of disruptions are hypothetical until a disruption occurs"; hence, the cost of a disruption was not provided.

The experimental module consisted of communication from upper management regarding the organization's historical and communicated risk (Appendix B). Historical risk is defined as the number and percentage of suppliers experiencing a supply disruption and has two levels, low (26 suppliers, 5% of supply base) and high (104 suppliers, 20% of supply base). Communicated risk is a binary measure of whether the organization had communicated that it had been successful or unsuccessful in its efforts to manage supply chain risk. It is characterized as being low and decreasing (0) or high and increasing (1). The respondents were randomly assigned to one of the four (2 x 2) treatments. In light of the communication, they were asked to update their sourcing plans along the same dimensions as before (multiple sourcing, reliable sourcing, and safety stock). The amount by which respondents *changed* their decisions after being presented with the experimental module was the basis for the variables used to test the hypotheses.

All the respondents were also presented with a second common module in which a new requirement that sourcing plans must have at least 80% of products sourced from multiple suppliers. After this, the respondents were again asked to update their supply chain decisions. This is referred to as a mandated risk change. The second common module and the experimental module were presented in random order, and the communication order was used as a control variable. From an organizational standpoint, communications regarding what we refer to as communicated, historical, and mandated risk are common mechanisms available to senior management to interact with their employees with respect to supply chain risk decisions.

Sample

The target population was supply chain employees. The respondents were recruited via the Prolific online crowdsourcing platform (prolific.ac) developed at Oxford University. Prolific was designed specifically for crowd-sourcing academic research and explicitly informs users that they are participating in research (Palan & Schitter, 2018). The sample was recruited from Prolific's panel based on initial selection criteria (current employees over the age of 18 of for-profit and not-for-profit companies, tax-exempt or charitable organizations, local, state, or federal government employees). Based on these criteria, Prolific identified 11,373 eligible participants who were in their online panel. The participants were offered $8.04 per hour (as suggested by Prolific) based on the anticipated time to complete the experiment, yielding 657 completed responses. Because Prolific did not have a panel specific to supply chain employees, responses were subsequently filtered to include only those whose primary job responsibilities were in operations, logistics, procurement/purchasing/supply management, or production, reducing the sample size to 190 responses from supply chain employees. Two further reductions were then used to verify the quality of the responses. Respondents were eliminated if they did not follow the instruction to have at least 80% of products sourced from multiple suppliers (61 responses), as directed midway through the survey. Additionally, responses that took less than three minutes to complete were eliminated (6 responses), as it suggested that respondents were not fully reading or participating in the study. Due to a significant overlap between these categories, this reduced the sample size by 62 additional responses, leading to final sample size of 128 responses. Of these, 72 were subjected to low communicated risk (56% of the sample of 128 observations), 63 were exposed to low historical risk (49%), and 68 (53%) received management's communication regarding risk prior to the risk mandate. The groupings can thus be considered to be approximately balanced.

To control for omitted variables, the respondents were randomly assigned to the experimental treatments. This serves to "remove any correlation between the observed and unobserved characteristics of program participants" (Cameron & Trivedi, 2005, p. 50). To control for the effects of risk propensity more specifically, two additional approaches were used. First, the respondents' initial decisions regarding the percentage of products for which they used multiple sourcing were used as a proxy for their risk propensity in a supply chain context. Individuals with a higher percentage have a lower level of risk propensity and vice versa. Second, as described above, the dependent variables of changes in the use of reliable sources and safety stock following experimental manipulations are measures of changes in respondents' baseline levels of risk. The initial level of risk includes influences due to risk propensity; thus, dependent variables that measure change effectively isolate the effects of risk communication from a respondent's risk propensity.

Measurements

Supply chain risk mitigation involves a variety of different approaches (Talluri et al., 2013), including increasing capacity or inventory; building redundancy in the supply base and in production; increasing responsiveness, flexibility, and capabilities; and aggregating demand (Chopra & Sodhi, 2004). In this research, three mechanisms for managing risk are explored: (1) multiple sourcing, (2) sourcing from geographically reliable locations, and (3) using inventory buffers/safety stock. These mechanisms are consistent with prior research on risk management and disruptions. For example, Schmitt (2011) found that sourcing redundancy and inventory policy lead to improvements to service levels following a disruption. Tomlin (2006) identified the use of multiple suppliers and inventory policies for managing risk. Cantor, Blackhurst, and Cortes (2014) differentiated between low and high levels of risk based on whether a company's supply base was "eighty percent U.S. based suppliers and twenty percent foreign suppliers" or the reverse.

As described previously, the respondents were initially asked to identify the percentage of products in a division to be sourced from multiple suppliers as opposed to a single supplier (X_0), the percentage of products to be manufactured in geographically close locations with relatively strong and reliable infrastructure (Y_0), and the number of weeks of safety stock to carry (Z_0). The variable X_0 is also used as a measure of individual risk propensity. Variables X_1, Y_1, Z_1, and X_2, Y_2, Z_2 represent the values of the variables following the communication of risk (communicated, historical) for each of the four treatments and of the mandated risks, respectively. Each is further denoted by ‘ or * depending on whether the respondents first received the communication regarding risk or of the mandated risk. Risk compensation was measured in terms of changes in risk (i.e., $\Delta Y_1' = Y_1' - Y_0'$). The research design is summarized in Figure 3.

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Insert Figure 3 about here
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At the conclusion of the experiment, the respondents were also asked, “How much risk of supply disruption do you feel that the strategy you selected for your division has?” The question was framed using a 5-point response format (1 = no risk, and 5 = significant risk) to measure the risk that participants felt following all communications and changes to their sourcing plans. Several additional control variables were used as part of the experimental design. The respondents were asked to identify the number of years they had been working in their current occupation, the number of employees in their organizations, and the industry in which they operated; the latter two were used to control for the impact of firm size and industry. They were also asked which functional area they were associated with to control for potential organizational micro-cultures that might affect responses and whether their firm was global or domestic in nature to control for the corresponding effects on sourcing strategy.

Validity Testing and Interpretability

Following the methods suggested by (Bachrach & Bendoly, 2011), several tests of validity and approaches to increase the interpretability of the findings were used. Manipulation checks were used to determine if participants responded to the different experimental conditions as expected. To evaluate the communicated risk manipulation, the respondents were asked at the end of the experiment, using a 5-point response format (very little risk to very high risk), "How much risk of supply disruptions did upper management communicate your company had over the last year?" The responses indicated a significant difference in the perception of management's risk communication ($t = 8.71$, $p < .001$). To evaluate the manipulation for historical risk, respondents were asked "What is the percentage of suppliers with a disruption reported for last year?" The options were either less than 10% or greater than 10%. The respondents had a statistically significant difference in their responses regarding the historical risk level ($t = 7.71$, $p < .001$). Based on these results, the respondents were considered to have responded differently based on treatment conditions.

To enhance the interpretability of each of the measures, values of Δ were scaled based on the standard deviation of the measures based on the initial response at T_0. The results can thus be interpreted as a 1-unit increase in Δ being equal to an increase of 1 standard deviation for that variable within the original sample. This linear scaling allows comparisons between measures to be made, without affecting the statistical significance of any of the econometric models.

Econometric Method

After cleaning the data, we used a "seemingly unrelated regression" (SUR) approach to evaluate the relationships. By design, the dependent variables are conceptually related. That is, each of the compensation behaviors across Y and Z might be related, and we argue that a composite risk level emerges based on an individual's aggregate behavior. Accordingly, hypotheses H_1-H_4 are tested to explore the relationship of different types of communicated risk to risk behavior using a SUR approach. This technique can capture the inherent interconnectedness of the two operationalizations of risk (i.e., the standard errors should necessarily be correlated across the two models; thus, for comparison purposes, they are simultaneously estimated). To test hypotheses H_5 and H_6, two ordinary least squares (OLS) regressions are used to identify and test the efficacy of the risk homeostasis hypothesis.

Step 1: Seemingly unrelated regression. To test hypotheses H_1-H_4, SUR was used to estimate the effects of historical and communicated risk on the riskiness of supply chain decisions. As noted above, the two measures of riskiness are related, and each comprises a distinct dependent variable. To test hypotheses H_1-H_4 the method chosen must allow for a simultaneous estimation of a system of equations whereby the error terms are necessarily related. The estimation of two distinct regressions separately would not correctly capture the interdependence between the error terms. A SUR (Zellner, 1962; Zellner & Huang, 1962; Zellner, 1963) was therefore used to test the hypotheses. This approach essentially estimates a feasible generalized least squares regression whereby the variance-covariance matrix is augmented to capture the interdependencies between the error terms. Accordingly, the following system of equations was jointly estimated:

$$\begin{aligned}\Delta Y = {} & \beta_{10} + \beta_{11} \textit{Communicated Risk} + \beta_{12} \textit{Historical Risk} + \beta_{13} \textit{Risk Propensity} \\ & + \beta_{14} \textit{Manipulation Order} + \beta_{15} \textit{Years of Experience} + \beta_{16} \textit{Firm Size} \\ & + \beta_{17} \textit{Functional Area} + \beta_{18} \textit{Global} + \beta_{19} \textit{Industry} + \varepsilon_1 \\ \Delta Z = {} & \beta_{20} + \beta_{21} \textit{Communicated Risk} + \beta_{22} \textit{Historical Risk} + \beta_{23} \textit{Risk Propensity} \\ & + \beta_{24} \textit{Manipulation Order} + \beta_{25} \textit{Years of Experience} + \beta_{26} \textit{Firm Size} \\ & + \beta_{27} \textit{Functional Area} + \beta_{28} \textit{Global} + \beta_{29} \textit{Industry} + \varepsilon_2\end{aligned}$$

Where ΔY represents the change to the percentage of reliable sourcing and ΔZ represent the change to the number of weeks of safety stock after the manipulation.

Step 2: OLS regression models. Testing hypotheses H_5 and H_6, corresponds to testing the RCT/RH. In the supply chain context under investigation, the dependent variable gauges an individual's perception of risk based on their choice of supply chain strategy. The question used to capture this, using a 5-point response format (very little risk to very high risk), was "How much risk of supply disruption do you feel that the strategy you selected for your division has?" Traditional OLS regression was used to test the two hypotheses.

To test hypothesis H_5, the same independent variables represented on the right-hand side of the simultaneous equations above were used with the new dependent variable. To test hypothesis H_6, the same dependent variable was used while the independent variables were the values of risk change (i.e., changes to reliable sourcing and safety stock) used in testing hypotheses H_1- H_4. Hypothesis H_5 thus relates communicated and historical risk to increases in perceptions of risk, having made all adjustments to the sourcing plan, while hypothesis H_6 relates the individual's *actual* changes in risk-taking behavior with their perceptions. The following specifications were estimated to test hypotheses H_5 & H_6:

$$
\begin{aligned}
&H5:\\
&\textit{Post}\ \text{Decision Risk Perception} =\\
&\beta_0 + \beta_1 \textit{Communicated}\ \text{Risk} + \beta_2 \textit{Historical}\ \text{Risk} + \beta_3 \text{Risk Propensity}\\
&\quad + \beta_4 \text{Manipulation Order} + \beta_5 \text{Years of Experience} + \beta_6 \text{Firm Size}\\
&\quad + \beta_7 \text{Functional Area} + \beta_8 \text{Global} + \beta_9 \text{Industry} + \varepsilon\\
&H6:\\
&\textit{Post}\ \text{Decision Risk Perception} =\\
&\beta_0 + \beta_1 \Delta Y\textit{Communicated} + \beta_2 \Delta Z\textit{Communicated} + \beta_3 \text{Risk Propensity}\\
&\quad + \beta_4 \text{Manipulation Order} + \beta_5 \text{Years of Experience} + \beta_6 \text{Firm Size}\\
&\quad + \beta_7 \text{Functional Area} + \beta_8 \text{Global} + \beta_9 \text{Industry} + \varepsilon
\end{aligned}
$$

RESULTS AND DISCUSSION

The econometric analysis was conducted using Stata 15. All summary statistics and pairwise correlations are presented in Table 1.

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Insert Table 1 about here
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Results

Step 1: Seemingly Unrelated Regression

Table 3 presents model fit statistics as well as the overall model. The values of RMSE, R^2, and $\chi 2$ statistics indicate that the models adequately fit the data. Hypotheses H_1- H_4 suggest that decision makers will increase (decrease) their levels of risk when historical (H_1&H_2) and communicated (H_3&H_4) risk are low (high), the underlying premise of risk compensation. Specifically, it was hypothesized that such an effect would manifest itself in the decision maker decreasing (increasing) the percentage of geographically close and reliable suppliers used and decreasing (increasing) the number of weeks of safety stock held. In both models, the coefficients for communicated risk were positive and statistically significant: .2849 ($p <. 05$) and .6321 ($p <. 001$) for reliable sourcing and safety stock, respectively. These results indicate that when communicated risk is low/decreasing as opposed to high/increasing, supply chain employees will decrease their percentage of geographically close and reliable suppliers by approximately 6.122% (or .2849, the coefficient noted above, multiplied by the standard deviation of the corresponding variable from the original sample, as noted in the "Validity Testing and Interpretability" section above) and decrease their safety stock by approximately 1.5 weeks (.6321, the coefficient noted above, multiplied by the standard deviation of the corresponding variable from the original sample, as noted in the "Validity Testing and Interpretability" section above). The results for historical risk, however, were both not statistically significant ($p > 0.1$). Each dependent variable measures a change in individual risk-taking behavior, with a positive value reflecting lower risk. The results thus indicate that as communicated risk *decreases*, individual risk-taking behavior *increases*, providing support for hypotheses H_3 and H_4, but not hypotheses H_1 and H_2. It should be noted that these results were consistent across several control variables, specifically employee years of experience and functional background, firm size, and whether or not the firm is global. Two control variables that were statistically significant ($p < .05$) were whether an employee had lengthy work experience and whether he or she was employed by a firm with more than 10,000 employees. This indicates that more experienced supply chain personnel did not compensate as strongly as others, potentially indicating that they are less reliant on safety stock. Furthermore, individuals from firms with over 10,000 employees decreased the amount they compensated vis-a-vis reliable sourcing.

######################
Insert Table 3 about here
######################

Step 2: OLS Regression Models (Hypotheses 3a&b)

Hypotheses H_5 and H_6 were tested using two different OLS regression analyses. The coefficients for communicated and historical risk were both positive and statistically significant. Hypothesis H_5 tests for the existence of a null effect (i.e., *no* statistical significance of the two independent variables), as predicted by the risk homeostasis perspective. This implies that after being given a chance to compensate, participants still had a higher perceived level of risk from their decisions. However, the relationship between communicated risk and perceived risk following compensation was significant, suggesting that risk homeostasis was not present. This finding is supported by the results for H_6, which suggest that the amount by which a decision maker adjusts his or her behavior (i.e., the amount of risk compensation) was not significantly related to risk perceptions. Taken together, the results suggest no evidence of risk homeostasis. As shown in

Table 4, although the coefficients of each of the two independent variables (changes in risk-taking behavior) were all negative, they were not statistically significant ($p > 0.1$).

######################
Insert Table 4 about here
######################

Robustness Tests and Post-Hoc Analysis. The results as they relate to hypotheses H_1 and H_2 are presented in Table 3. In addition, we present the OLS regression results to check for robustness of the models. In each case, the statistical significance of main hypotheses, overall model fit statistics, and directions of all coefficients were consistent.

To better understand the dynamics of risk compensation, three risk-related relationships were also evaluated. First, it has been suggested that individuals can be overly reliant on local signals, thereby neglecting system-wide characteristics (Massey & Wu, 2005). Understanding system-wide characteristics is useful for developing a resilient supply chain and requires correctly interpreting supply chain risk (Ambulkar, Blackhurst, & Grawe, 2015; Pettit et al., 2016). Accordingly, the sizes of the coefficients for both historical and communicated risk were compared to identify whether they were statistically different. A Wald χ^2 test of the coefficients in the two SUR models that were used to test hypotheses H_1-H_4 indicated a marginally statistically significant difference ($p < 0.1$) between the effects of communication and historical risk on reliable sourcing and a statistically significant effect ($p < 0.001$) on changes in safety stock levels. In each case, communication had a stronger effect.

To determine whether specific types of risk influence risk compensation behavior, the magnitudes of the coefficients of communicated risk relative to using geographically close, reliable suppliers and safety stock were compared. The result of a Wald χ^2 test indicates a statistically significant ($p < 0.05$) difference between the two coefficients, with risk compensation having a greater effect on safety stock than on the use of close, reliable suppliers. The dependent variables were scaled by the standard deviations calculated from the distribution of initial responses (Y_0, and Z_0) so that direct comparisons were possible.

Finally, to determine whether individuals compensate for risk after being given specific instructions to adjust their decisions absent communication regarding risk level, a t-test comparing the means of each variable was carried out. Understanding whether individuals compensate for changes to their risk level based on an organizational mandate can provide useful direction for risk management. The results indicate no statistically significant ($p > 0.1$) risk compensation impact with regard to either the use of more reliable sourcing or safety stock (Table 5). Taken together and with the earlier findings, the results provide compelling evidence that risk homeostasis does not exist in a supply chain management context.

################################
Insert Table 5 about here
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Discussion

The objective of this study was to test for the presence of risk compensation and risk homeostasis among supply chain employees by exploring how organizational communication regarding supply chain risk influences decision-making behaviors. From a behavioral perspective, this is important, as such communication can result in changes to a firm's risk management strategies. The most significant takeaway is that individuals compensate for communicated risk by changing supply chain decisions as they relate to the reliability of sources and the use of safety stock, but having done so, their perceived riskiness of their decisions does not change. Furthermore, communicated risk has a significantly greater impact than does historical risk. Given that risk homeostasis does not occur following compensatory behavior, it is reasonable to expect that the effects of risk communication on individual behavior will endure over time. The communication of organizational risk changes decisions that reflect risk-taking such that when organizations communicate a low (high) level of risk, individuals react by either sourcing from fewer (more) reliable suppliers or having lower (higher) levels of safety stock.

The finding that risk compensation, but not risk homeostasis, occurs following organizational communication of risk suggests that the effects of risk communication remain even after individuals adjust their behavior. It is therefore possible that organizational communication has lasting effects on risk perceptions and thus also on the risk compensation decisions of individuals. This finding also suggests that the amount by which decision makers compensate is not related to their perceptions of risk. Even though individuals engage in risk compensation with regard to reliable sourcing and safety stock levels, they do not perceive a significant decrease in risk after updating their behavior. One potential explanation for this finding might be due to moral hazard, or a situation "in which one person makes the decision about how much risk to take, while someone else bears the cost if things go badly" (Krugman, 2009, p. 55). Because the risks themselves are borne by the organization, but the perceived risk and is felt by the individual making the decisions, this could explain why risk compensation occurs, but risk homeostasis does not.

The evidence that individual risk-taking behavior can be influenced by organizational communication regarding risk highlights the need to further explore the relationship between organizational initiatives and individual decision making. Firms that are successful in reducing risk might find that communicating such success to their employees actually *increases* organizational risk and counteracts, to some extent, their initial success. Those firms that recognize the impact of organizational communication on risk perceptions and individual risk-taking behavior will thus be better able to effectively manage organizational risk. Further, it is possible that such firms could actively manage the risk-taking behavior of employees through their communications, effectively serving as a costless approach for managing supply chain risk.

While individual risk-taking behavior changed in response to communicated risk, it was not affected by the communication of historical risk. In other words, individual decision makers were not influenced by changes in risk-related metrics relevant to their sourcing plans. This suggests that at the individual level, decision makers are focused on risk at a macro level. For example, they may not be able to reconcile more nuanced organizational level information (or they may not consider it pertinent) in developing unit-level sourcing plans. This result is consistent with the finding that a mandate to decrease risk does not more generally influence risk-related decision making. If individual risk takers exhibit no change in risk-taking behavior due to a mandated risk change, organizations can use these mandates to influence risk-taking behavior. Individual decision makers do not appear to be influenced by specific dimensions of supply chain risk in establishing sourcing plans, but by the communication regarding risk levels.

It is also noteworthy that post-decision perceptions of risk are not related to the mandate regarding the percentage of products to be multiple sourced. While not leading to significant changes in the percentage of products manufactured in less risky environments or the number of weeks of safety stock carried, the mandate alone should have reduced the risk perceived by individual decision makers, but this was not the case. This suggests that at the individual level, perceptions of risk are not influenced by changes over which decision makers have no control. For example, in the case examined, multiple sourcing may not be germane to the context of the individual decision maker.

Conclusion

This research adds to the literature on how organizational initiatives and individual decisions are interconnected (Gattiker & Carter, 2010; Gattiker et al., 2014). Previous research has identified that individual perceptions of risk influence risk-related supply chain management decisions (Zwikael & Sadeh, 2007; Ellis, Shockley, & Henry, 2011; Cantor, Blackhurst, & Cortes, 2014), yet individuals react more strongly to signals they observe rather than to the environment (Massey & Wu, 2005). The present study offers evidence that organizational communication regarding risk influences decisions made by supply chain managers who compensate for changes in organizational risk. While previous research has noted that supply chain employees exhibit individual risk preferences (Cantor, Blackhurst, & Cortes, 2014), the present work extends this by providing a theoretical lens through which researchers can understand the relationship between these preferences and organizational communications regarding risk. Moreover, it highlights the idea that organizational communication regarding supply chain risk can change perceptions of risk at an individual level and thereby individual behaviors. If not carefully managed, such communication can undermine an organization's success. One interesting conclusion is that if a firm wishes to reduce the riskiness of individual decision making to offset high levels of organizational risk, one relatively costless mechanism might be to communicate that risk levels are high, thereby leading to risk-reducing compensatory behavior. The findings provide a valuable theoretical perspective to explain previous suggestions that firms can benefit from "overestimating the likelihood of a disruption" to counter the manager's incentives to underestimate the risks (Chopra & Sodhi, 2014).

The results refute the notion that decision makers exhibit homeostasis in responding to organizational messaging about risk. While decision makers compensate in response to communicated risk, their perceived overall levels of risk having done so are positively related to levels of communicated risk. In other words, as communicated risk increases or decreases, the effect of such communication might persist, even after adjusting decisions to accommodate different risk levels.

Another important contribution that the work makes is to extend the exploration of the behavioral operations perspective in the context of supply chain management. Prior research has called for the application of a behavioral perspective to understand the relationship between disruptions and decision making (Macdonald & Corsi, 2013) and the determinants of risk perceptions in a supply chain context (Kull, Oke, & Dooley, 2014). The behavioral perspective and experimental design employed in this study have also been identified as being underutilized but important in developing supply chain management theory (Tokar, 2010).

The study is not without its limitations. First, the data collected in this research are experimental in nature. While appropriate given the intent to test for causality and to allow random assignment of respondents to control for omitted variables, additional research that validates the findings in other contexts can confirm the findings from this research and extend the understanding of how organizational communication impacts supply chain risk decision making. It is possible that even with random assignment there exists some systematic relationship between responses eliminated due to quality concerns and experimental conditions. Future research that reconciles the results of the behavioral experiment with empirical data on decision makers' changes in risk management strategies following organizational communications would offer particularly rich insights into the relationships between organizational and individual risk-taking behavior. Additionally, while the respondents were all in supply chain/operations-related roles and the data were validated through secondary data collection, no information was available regarding their actual competencies or responsibilities related to supply chain management. Also, no variables, such as gender or cultural/language background, that might have influenced respondent's ability to complete the experiment or their attitudes towards risk were observed.

Several areas of future research remain to be explored. The interaction between individual characteristics and risk communication is an area that can yield additional interesting findings. For example, the amount of experience an individual had was found to significantly decrease their compensatory behavior with regard to safety stock. Other interactions with individual characteristics might provide a better understanding of which individuals are most likely to compensate for changes in risk. While the empirical model took into account whether or not the firm in which the participant works was global or not, future research should explore cross-cultural variations in risk compensation. Additionally, the organizational behavior literature identifies a distinction between "behaviors" and "decisions." In this study, the concepts of behavior and decision making are, largely, used interchangeably. Although the emphasis herein is on *supply chain risk* decision-making behavior, future research should leverage such distinctions to better understand the antecedents and motivations of these supply chain decisions. Additionally, it would be appropriate to connect risk compensation to its financial impact in an experimental setting. Specifically, it would be worthwhile to investigate the potential impact a decision maker's action has on the financial health of the firm and to gauge whether this has an effect on the perception of risk.

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Appendix A: Scenario-Based Experiment Details

You are a supply chain manager of InsideOut Gear, a company which sells outdoor retail gear. You are in charge of the division of performance-wear, which accounts for approximately 5% of your company's products. Your division has struggled financially and so you are facing significant pressure to keep costs as low as possible while at the same time managing the supply chain effectively.

You have been tasked with deciding the sourcing strategy for your division which is based on the

- Percentage of products sourced from two or more suppliers instead of only a single supplier.
- Percentage of products sourced from geographically close locations with relatively strong and reliable infrastructure versus geographically distant manufacturing locations with relatively weak and unreliable infrastructure.
- Number of weeks of safety stock carried to manage any disruptions which occur.

Your performance is based on your ability to keep costs low, but also minimizing the chance of a disruption occurring to the supply chain.

Decision 1: Please identify what percentage of products in your division will have two or more suppliers. All other products will have a single supplier.

Sourcing from multiple suppliers helps to protect against the effect of disruptions, but also costs an estimated $10,000 more for every 10% increase in the percentage of products with multiple suppliers.

Decision 2: Please identify what percentage of products will be manufactured in geographically close locations with relatively strong and reliable infrastructure. All other products will be sourced from geographically distant suppliers with relatively weak and unreliable infrastructure.

Sourcing from geographically close locations with relatively strong and reliable infrastructure helps to protect against the effects of disruptions, but also costs an estimated $20,000 more for every 20% increase in percentage of products manufactured in geographically close locations with stronger infrastructure.

Decision 3: Please select the number of weeks of safety stock to carry.

Carrying more safety stock helps to protect against the effects of disruptions, but it also costs an estimated $10,000 more annually in inventory carrying cost for every additional week of safety stock.

Appendix B: Organizational Communications

Risk Communication

From: Upper Management Team
Subject Line: Supply Chain Risk Excellence (Struggles)*

Our company has experienced great success (major setbacks) in risk management over the last year. Significant changes to our supply chain have decreased (increased) our company's exposure to supply disruptions, supplier failure, and inventory shortages. Some have said we have the lowest (highest) risk in the industry.

We thank every employee for their efforts to minimize risks whenever possible.

Best Regards,
Upper Management Team

Attached to their email was the company's disruption report for the last 2 years.

Firm Disruption Report for the last two years:

Year	2014	2015
Suppliers Experiencing a Disruption	13, 52, or 156**	26 [104]
Total Number of Suppliers	520	520
% of Suppliers with a Supply Disruption	2.5-30%	5% [20.0%]

* Statements in ( ) represent high communicated risk, statements in [ ] represent high historical risk.

** 2014 disruptions were based on the communicated risk from the management team. If the communicated risk was low and decreasing, 2015 had a smaller amount of disruptions compared to 2014 to match the changes in risk management identified in the communication. If the communicated risk was high and increasing, 2015 had a larger amount of disruptions to reflect increases in risk. The values were selected as to show a clear and strong shift in risk (2.5% to 5% for high communicated risk/low historical risk, 10% to 5% for low communicated risk/low historical risk, 10% to 20% for high communicated risk/high historical risk, and 30% to 20% for low communicated risk/high historical risk).

Risk Mandate

After submitting your sourcing strategy, you received the following e-mail from senior management:

From: Upper Management Team
Subject Line: Revisions Required

Our company is starting a new policy to help reduce the likelihood of a disruption to our supply chain. We are enforcing a new policy requiring all divisions to have 80% of their products sourced from multiple suppliers. We noticed your recent plan does not meet this requirement. Please resubmit an updated plan that follows this new policy.

Best Regards,
Upper Management Team

TABLES & FIGURES

TABLE 1:

Correlations and Summary Statistics

Correlations (*p<.05)	1	2	3	4	5	6	7	8	9	10	11
1. ΔReliable Sourcing	-										
2. ΔSafety Stock	0.5163*	-									
3. Communicated Risk	0.1478	0.2900*	-								
4. Historical Risk	0.0299	0.0496	0.0492	-							
5. Individual Risk Propensity	-0.0919	-0.0667	0.0774	0.0167	-						
6. Years of Experience	-0.0897	-0.1605	0.0192	-0.0141	-0.0322	-					
7. Initial Mandate	-0.0064	-0.0777	0.0552	0.0166	-0.0789	-0.0109	-				
8. Firm Size	-0.2022*	-0.1574	0.0501	0.0544	0.0806	0.108	-0.0237	-			
9. Functional Area	0.0983	0.0683	0.0308	0.0879	0.1483	-0.1698	-0.0507	-0.1075	-		
10. Global	-0.058	-0.1399	-0.0561	0.0507	0.1419	0.0453	-0.0757	0.5299*	0.0563	-	
11. Industry	-0.0602	0.0258	-0.1339	0.0593	-0.0767	0.1713	0.0093	-0.0724	-0.1043	-0.02	-
Mean	0.3246	0.3111	0.4375	0.5078	44.5391	6.3906	0.4688	2.3906	5.6563	0.4063	8.0313
SD	0.8677	0.9177	0.4980	0.5019	20.5966	7.1166	0.5010	1.6180	1.6669	0.4931	5.2825

TABLE 3: Regression Estimates for H1-H4

Models[a]	Seemingly Unrelated Regression						Standard OLS (for Robustness)					
	ΔReliable Sourcing			ΔSafety Stock			ΔReliable Sourcing			ΔSafety Stock		
Independent Variable	*B*		*S.E.*	*B*		*S.E.*	*B*		*S.E.*	*B*		*S.E.*
Historical Risk	-0.0778		0.1467	-0.0373		0.1434	-0.0778		0.1685	-0.0373		0.1648
Communicated Risk	0.2849	**	0.1400	0.6321	***	0.1370	0.2849	*	0.1609	0.6321	***	0.1573
Individual Risk Propensity	-0.0056	*	0.0035	-0.0044		0.0034	-0.0056		0.0040	-0.0044		0.0039
Manipulation Order	0.0609		0.1401	-0.1647		0.1370	0.0609		0.1609	-0.1647		0.1573
Years of Experience	0.0010		0.0108	-0.0215	**	0.0105	0.0010		0.0124	-0.0215	*	0.0121
Number of Employees[b]												
500–999	-0.0836		0.2360	-0.3394		0.2308	-0.0836		0.2711	-0.3394		0.2652
1000–4999	-0.1942		0.2404	-0.2606		0.2351	-0.1942		0.2762	-0.2606		0.2701
5000–9999	0.2720		0.3959	-0.0139		0.3872	0.2720		0.4548	-0.0139		0.4448
>10,000	-0.5472	**	0.2234	-0.2616		0.2185	-0.5472	**	0.2567	-0.2616		0.2510
Functional Area[b]												
Operations	-0.1629		0.2417	0.0134		0.2364	-0.1629		0.2777	0.0134		0.2715
Production	-0.0285		0.2897	-0.0810		0.2834	-0.0285		0.3328	-0.0810		0.3255
Logistics	0.1658		0.3263	-0.1272		0.3191	0.1658		0.3749	-0.1272		0.3666
Global	0.0394		0.1825	0.1568		0.1785	0.0394		0.2096	0.1568		0.2050
Intercept	1.1205	**	0.3568	0.8757	**	0.3489	1.1205	**	0.4098	0.8757	**	0.4008

Model fit

	SUR ΔReliable Sourcing	SUR ΔSafety Stock	OLS ΔReliable Sourcing	OLS ΔSafety Stock
Observations	128	128	128	128
RMSE	0.724	0.708	0.832	0.838
R^2	0.300	0.400	0.300	0.400
χ^2(DF) -or- F- DF1, DF2) for OLS	χ^2 54.23(30)**	χ^2 85.10(30)***	F 1.37(30,97)	F 2.15(30, 97)**

***p < .001, **p < .05, and *p < .1.
a. All models were estimated with a control variable for industry; however, due to the large number of possibilities, the results for it were omitted from this table.
b. Categorically coded; therefore, the first is omitted.

TABLE 4

OLS Regression[a] Estimates of Post-Decision Risk Perception (Test of H5)

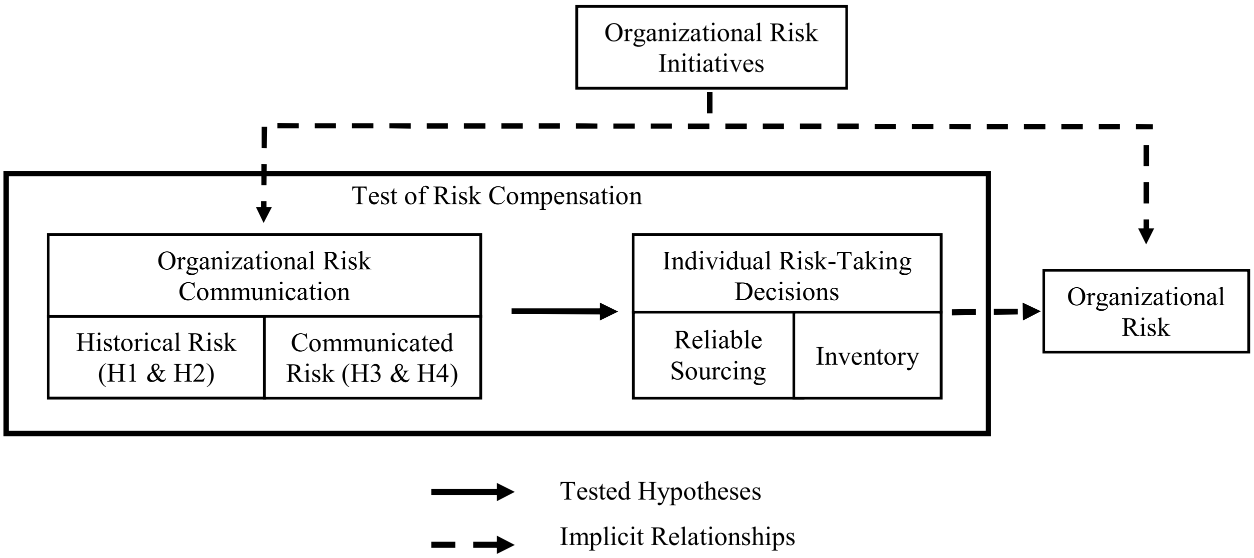
H5 Post-Decision Risk Perception	*B*	*S.E.*	*H6* Post-Decision Risk Perception	*B*	*S.E.*
Communicated Risk	0.3589 **	0.1766	ΔReliable Sourcing	0.0250	0.1269
Historical Risk	-0.0159	0.1850	ΔSafety Stock	0.1665	0.1222
Individual Risk Propensity	-0.0040	0.0044	Individual Risk Propensity	-0.0029	0.0044
Manipulation Order	0.0094	0.1766	Manipulation Order	0.0522	0.1787
Years of Experience	0.0111	0.0136	Years of Experience	0.0154	0.0138
Number of Employees[b]			Number of Employees[b]		
500–999	0.0593	0.2977	*500–999*	0.1060	0.3022
1000–4999	-0.4635	0.3032	*1000–4999*	-0.3935	0.3027
5000–9999	-0.5139	0.4993	*5000–9999*	-0.4965	0.4940
>10,000	-0.0850	0.2818	*>10,000*	-0.0013	0.2887
Functional Area[b]			*Functional Area[b]*		
Operations	-0.0385	0.3048	*Operations*	-0.0611	0.3066
Production	0.1696	0.3654	Production	0.1849	0.3633
Logistics	0.4026	0.4115	Logistics	0.3981	0.4134
Global	0.1492	0.2301	Global	0.0837	0.2300
Intercept	2.3019 ***	0.4499	Intercept	2.2934 ***	0.4624
Model Fit			**Model Fit**		
Observations	128		Observations	128	
RMSE	0.913		RMSE	0.919	
R^2	0.200		R^2	0.187	
F-statistic (DF1, DF2)	.80(30, 97)		F-statistic (DF1, DF2)	.75(30, 97)	

***p <. 001, **p < .05, and *p < .1.
a. All models were estimated with a control variable for industry; however, due to the large number of possibilities, the results for it were omitted from this table.
b. Categorically coded; therefore, the first is omitted.

Table 5: Post Hoc

	N	Mean	SE	*t*	p
ΔMultiple Sourcing$_{\text{Mandated Risk Change}}$	128	1.77**	0.098	18.02	0.000
ΔReliable Sourcing$_{\text{Mandated Risk Change}}$	128	0.001	0.103	0.011	0.992
ΔSafety Stock$_{\text{Mandated Risk Change}}$	128	0.023	0.073	0.333	0.747

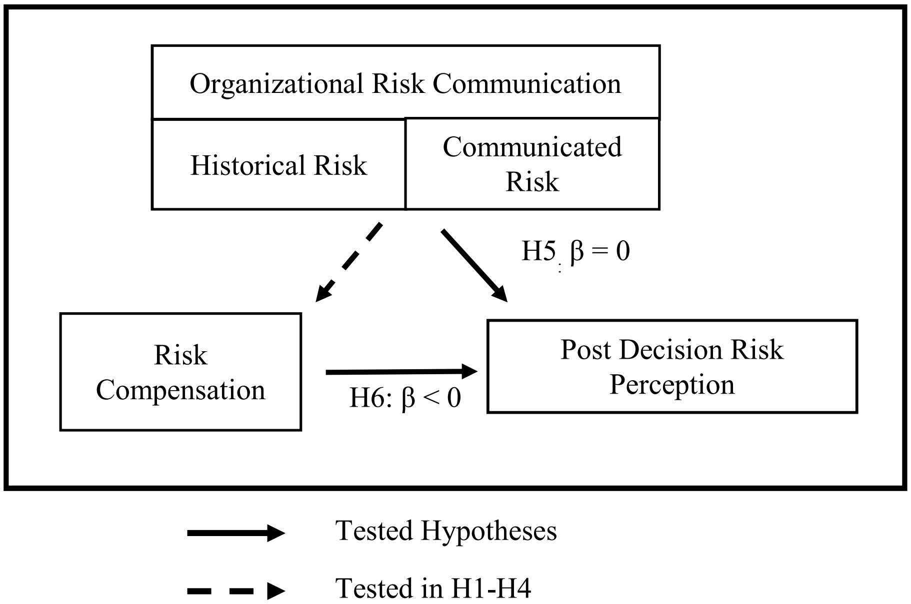
FIGURE 1



Organizational Communication Conceptual Framework

FIGURE 2

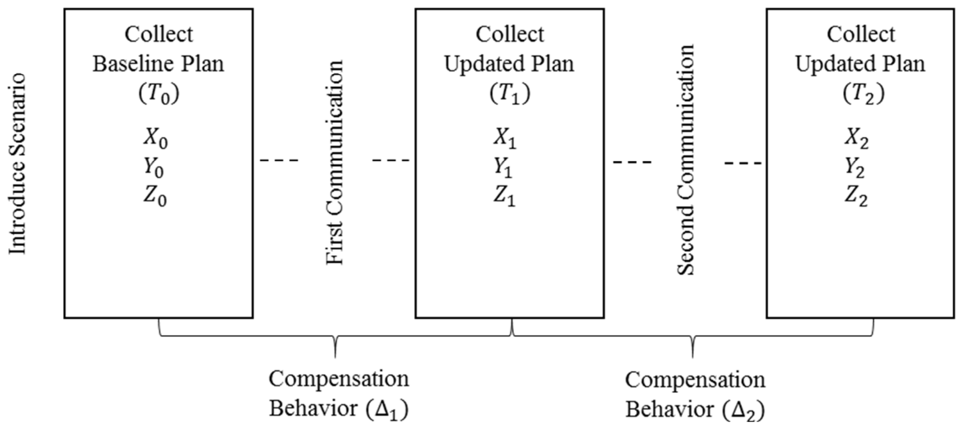
Test of Risk Homeostasis



Risk Communication Model and Hypothesis

FIGURE 3

Experimental Design



1	$\Delta Y_1' = (Y_1' - Y_0')/\sigma_y$ $\Delta Z_1' = (Z_1' - Z_0')/\sigma_z$	2	$\Delta Y_2' = (Y_2' - Y_1')/\sigma_y$ $\Delta Z_2' = (Z_2' - Z_1')/\sigma_z$
2	$\Delta Y_1^* = (Y_1^* - Y_0^*)/\sigma_y$ $\Delta Z_1^* = (Z_1^* - Z_0^*)/\sigma_z$	1	$\Delta Y_2^* = (Y_2^* - Y_1^*)/\sigma_y$ $\Delta Z_2^* = (Z_2^* - Z_1^*)/\sigma_z$

Δ' Risk Communication First
Δ^* Risk Mandate First

1. Risk Compensation Behavior due to Communicated Risk
2. Risk Compensation Behavior due to Mandate