An Examination of Firm-Level and Individual-Level Contracts in Buyer-Supplier Relationships

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Stephanie N. Eckerd

Graduate Program in Business Administration

The Ohio State University

2011

Dissertation Committee:

Kenneth Boyer, Co-Advisor

James Hill, Co-Advisor

Karen Donohue

Peter Ward
Abstract

A psychological contract is composed of an individual’s belief regarding the reciprocal obligations that exist between that individual and another entity with which that person is engaged. Psychological contracts are important in many business relationships, such as those between a buyer and supplier. The perceptions held by one individual may not be congruent with those of the other, in which case conflict may arise within the relationship. We introduce to the operations and supply chain literatures a comprehensive view of the theory of psychological contracts, which with few exceptions has largely been omitted from research regarding inter-firm relationships. This research investigates the processes by which individuals manage conflict in inter-firm relationships, and the extent to which decisions at both tactical and strategic levels are influenced by the experience of psychological contract violation. At the tactical level, we seek to understand how the daily operational decisions that individuals make are affected by psychological contract violation, particularly when sub-optimal decision-making is observed. At the strategic level, we consider the circumstances under which relational versus written contractual governance mechanisms are leveraged in response to conflict, and how the experience of psychological contract violation may influence these broader,
firm-level decisions. Our research plan uses two different methodological approaches in investigating these issues. First, to evaluate tactical behaviors, we employ an experiment. The goal of the experiment is to determine specifically how economic decisions made by those in boundary-spanning roles deviate from optimal in response to conflict and how these behaviors are influenced by the experience of psychological contract violation. To this end, we employ a 2x2x2 factorial design in which violation timing, severity, and attribution are investigated. The experiment was accompanied by an exit survey which served to assess the experience of psychological contract violation and related issues of trust and fairness. Data from 295 subjects were included in our analysis. We observe a main effect of severity occurring during the violation, and main effects of time and attribution are evident in post-violation periods. We tie these phenomena to the psychological constructs under study. Second, in order to investigate strategic-level decisions, we propose administration of an industry survey to purchasing and sales managers. The survey will allow us to more broadly characterize types of conflict experienced in inter-firm relationships and the contractual governance mechanisms leveraged in response. Models useful for investigating these issues are developed and discussed, and a survey instrument is presented. The work presented in this dissertation is among the first to incorporate both individual-level and firm-level contracts into an investigation of tactical and strategic conflict response and resolution analysis within buyer-supplier exchange relationships.
Dedication

To Adam, Dad and Mom

Thank you for everything.
Acknowledgments

I am sincerely grateful to Dr. James Hill, who devoted tremendous time and energy towards being my mentor, and provided guidance and encouragement throughout my program. I am also greatly appreciative of Dr. Kenneth Boyer, whose confidence in my abilities and willingness to keep pushing me that extra mile has undoubtedly made me a stronger scholar.

My appreciation goes to Dr. Karen Donohue and Dr. Peter Ward. Dr. Donohue has provided invaluable advice and feedback throughout the dissertation process. Dr. Ward, as both committee member and department chair, has provided unwavering support and guidance. I am grateful to them both for their time and efforts.

I would also like to thank the other faculty members, staff, and fellow PhD students at the Department of Management Sciences. For a variety of reasons too numerous to mention, these folks have helped me to succeed in this program. In particular, I would like to thank Dr. W.C. Benton, Dr. John Gray, Dr. Andrea Prud’homme, Laurie Spadaro, Dr. Kurt Hozak, Dr. Sean Handley, Dr. Toyin Clottey, Jurriaan De Jong, and Claire Senot.

Thank you to Drs. Barb and Jim Flynn for their continued support. Special acknowledgement goes to Dr. Adam Eckerd for his tireless efforts supporting me through this program, while with great success completing his own PhD.
Vita

2002.................................................................B.S.  Business Administration, Strayer University

2006.................................................................M.B.A., Wake Forest University

2006 to present...............................................Graduate Research and Teaching Associate, Department of Management Sciences, The Ohio State University

Publications


Fields of Study

Major Field: Business Administration

Minor Field: Quantitative Psychology
Table of Contents

Abstract ........................................................................................................................................ ii
Acknowledgments.................................................................................................................. v
Vita.......................................................................................................................................... vi
Publications.............................................................................................................................. vi
Fields of Study ....................................................................................................................... vii
Table of Contents .................................................................................................................... viii
List of Tables .......................................................................................................................... xii
List of Figures ......................................................................................................................... xiv
Chapter 1: Research Overview ............................................................................................ 1
  Introduction and Research Question ...................................................................................... 1
  Overview of Research Methodology and Analysis............................................................... 6
  Key Findings and Contribution .............................................................................................. 7
Chapter 2: Literature Review.................................................................................................. 9
  Firm-level Contracts Governing Supply Chain Relationships.............................................. 9
  v
List of Tables

Table 1: Variables relevant to buyer and supplier profitability calculations ............... 37
Table 2: Experimental Design ......................................................................................... 51
Table 3: Guidelines for data exclusion .............................................................................. 58
Table 4: Summary statistics for ordering behavior in each of the treatment groups ....... 61
Table 5: ANCOVA results for buyer ordering behavior during the era of violation;
dependent variable is deviation from optimal during era of violation ....................... 64
Table 6: Regression results for buyer ordering behavior during the era of violation;
dependent variable is deviation from optimal during era of violation ....................... 66
Table 7: ANCOVA results for buyer ordering behavior during the concluding era;
dependent variable is deviation from optimal during concluding era ....................... 69
Table 8: Regression results for buyer ordering behavior during the concluding era;
dependent variable is deviation from optimal during the concluding era ................... 73
Table 9: Factor analysis of the psychological contract violation construct ................. 76
Table 10: Regression results for psychological contract violation on treatment condition
variables and controls ................................................................................................. 78
Table 11: Regression results for buyer trust in the supplier on treatment condition
variables and controls ................................................................................................. 80
Table 12: Regression results for buyer's assessment of supplier fairness on treatment condition variables and controls ................................................................. 82
List of Figures

Figure 1: General problem structure ................................................................. 6
Figure 2: Governance Structure and Transaction Dimensions, from Williamson (1979) 12
Figure 3: Level and perspective of contracts, adapted from Rousseau (1995) .......... 21
Figure 4: Optimal order quantity for maximizing expected profit given different buy-back prices offered by the supplier ............................................................... 38
Figure 5: Depiction of eras and associated variables ........................................... 40
Figure 6: Main effects analysis of buyer's deviation from optimal order quantity during the concluding era, separated by Early and Late Time treatments ...................... 70
Figure 7: Main effects of buyer's deviation from optimal order quantity during the concluding era, separated by External and Reneging Attribution treatments .......... 70
Figure 8: Interaction effects of time to violation and attribution on buyer's change from optimal order quantity during the concluding era ...................................... 71
Figure 9: Optimal order quantity summary for Major and Minor treatments, compared to mean demand .................................................................................................. 87
Figure 10: Model of mediation ......................................................................... 104
Figure 11: Model of moderation ....................................................................... 104
Figure 12: A model of the moderating effect of social contracts on the relationship between psychological contracts and written and relational contracts ........................... 134

Figure 13: A model of the moderating effect of reputation on the relationship between psychological contracts and written and relational contracts ......................................... 136

Figure 14: A model of psychological, written, and relational contracts using the transactional cost framework .......................................................................................... 138
Chapter 1: Research Overview

Introduction and Research Question

In a seminal work by Macaulay (1963: 61), we find the following statement made by a purchasing agent regarding inter-firm relationships: “One doesn’t run to lawyers if he wants to stay in business because one must behave decently.” This quote emphasizes the unwillingness of many firms to rely on the strict letter of the law in settling disputes with supply chain associates. In a personal interview I conducted with a Senior Analyst at a global healthcare company, one such example was revealed. The firm had recently undertaken a relationship with a relatively new supplier in the United Kingdom. The contract, about a year old, specified a particular lead time but the supplier was turning around shipments of goods faster, much to the purchaser’s delight. However, the supplier was operating outside another term of the agreement, and while the issue was not critical it was nonetheless brought to the supplier’s attention for remedy during a regularly scheduled conference call. The supplier responded that perhaps some give-and-take was appropriate due to the expedited lead times they had been delivering on. The purchaser agreed, and this verbal modification of terms was maintained until the contract was up for
renegotiation and both terms updated accordingly. Of course, this doesn’t mean that legal measures are unheard of. For example, supply management vendor i2 Technologies recently sued Oracle for alleged patent infringement (and in 2008 SAP settled a similar lawsuit with the same vendor). We note, however, that it does appear to be the exception rather than the norm, and opens up an interesting question as to how and why firms choose to leverage different types of contracts as coping mechanisms in their disputes with supply chain partners.

Research investigating ongoing governance of buyer-supplier relationships primarily focuses on two key mechanisms: written, or explicit, contracts and relational contracts. The written contract has limited foresight and is incomplete in specifying the details governing a transaction. When a firm leverages written governance mechanisms, it entails a reliance on formal dispute resolution processes, third-party arbitration, installment of financial penalties, or enforcement of termination clauses (Williamson, 1979; Ryall and Sampson, 2009). The relational contract instead establishes mutual expectations and understandings towards governing inter-firm interactions. Relational governance mechanisms imply an effort by both parties to work in unison towards resolving issues as they arise within the relationship. They are typically modeled as social processes promoting norms aimed at prioritizing the relationship and that strive to achieve mutually agreed-upon goals (Poppo and Zenger, 2002). These norms are often manifested as a willingness of both parties to adapt to changes and seek bilateral approaches to problem solving, expectations of continuity of the relationship, and information exchange that facilitates the process and enables construction of mutual goals.
(Poppo and Zenger, 2002). Both the written and relational contracts are operationalized at the level of the firm. However, an important element missing from the majority of the extant literature investigating issues of governance involves the influences of the *individuals* managing these inter-firm relationships. Our research attempts to fill this gap by investigating a third type of governance contract present in relationships: the psychological contract.

Psychological contracts are those reciprocal obligations perceived by an individual involved in a relationship (Morrison and Robinson, 1997; Robinson and Morrison, 2000). Adaptations to relationship expectations develop over time and are idiosyncratic to a particular relationship; they are assumed to be mutually agreed upon but are not always so. The perceptions held by one party may not be congruent with the perceptions of the other party, in which case conflict may arise within the relationship. When conflict occurs, the relationship becomes salient to the individuals managing it, and the opportunity for employing a governance mechanism arises. Information regarding the conflict is first cognitively assessed by the individual in relation to the terms of the psychological contract existing with the other party (Morrison and Robinson, 1997). When these contracts are violated, they tend to arouse sentiments of anger, betrayal, and frustration with the overall relationship (Robinson and Morrison, 2000). These sentiments are evident in subsequent actions taken by the individual; it has been observed in some situations that when emotional reactions to a violation are high it is more likely that litigation will follow (Kaufmann and Stern, 1988; McLean Parks and Schmedemann, 1994). As the orientation of the psychological contract is at the level of the individual
(Rousseau, 1995), we believe it offers a unique vantage point from which to examine the use of various governance mechanisms in buyer-supplier relationships. While the domain of the psychological contract literature to date has primarily centered on employee-employer relationships, previous literature has provided empirical evidence of the existence and impact of a psychological contract between buyers and suppliers (Pavlou and Gefen, 2005; Kingshott and Pecotich, 2007; Hill, Eckerd, Wilson, and Greer, 2009). In this research effort, we propose that psychological contract violation can help to explain a manager’s preference for and utilization of one governance mechanism over another. This has been an important and as yet unresolved issue in the marketing, operations, and supply chain management literatures (Lusch and Brown, 1996; Handley and Benton, 2009).

In our examination of the literature assessing psychological contract violations as they pertain to the ongoing management of buyer-supplier relationships, we recognize there is a paucity of research that incorporates the phenomenon to this context. As such, we considered it prudent in our current investigation to undertake both strategic and tactical-level viewpoints. To that end, we include not only an examination of the broader, firm-level effects influenced by psychological contract violations, but also seek to specify on a much more granular level the impact of violations on an individual’s decision-making behavior. We consider these to be critical and complementary facets towards understanding specifically how psychological contract theory plays out in terms of biases exhibited by individuals in the decisions they make on behalf of their organizations. Particularly where these decisions depart from expected optimal decisions according to
established operations models, our need to deeply understand the causes and possible remedies is vital. Together, the two themes – strategic and tactical - we pursue in this ambitious research endeavor attempts to accomplish all of this.

Our general research proposition is to investigate the psychological processes by which managers respond to conflict in an inter-firm relationship, and how these processes influence subsequent governance decisions at both strategic and tactical levels. This fundamental structure of the problem is represented visually in Figure 1. Given the richness of the problem at hand, we have decomposed the general problem into two more specific problem statements that we wish to investigate in this research.

Research question 1: How is specific economic decision-making behavior at a tactical level affected when a supply chain partner fails to meet established expectations, and to what extent are behaviors influenced by experience of psychological contract violation?

Research question 2: Under what circumstances does a firm employ relational versus written contractual governance mechanisms in response to conflict, and how does the psychological contract between the individuals managing the relationship effort influence these strategic-level decisions?
Overview of Research Methodology and Analysis

The purpose of our research effort is twofold. First, we wish to determine how those in boundary-spanning roles respond to violations of relationship expectations in their tactical, day-to-day operational roles. We evaluate the magnitude of psychological contract violation given a variety of conflict sources, and relate the impact of violations on a very specific decision-making behavior. Second, we want to understand how psychological contract violations affect the overall governance decisions of the firm, given that these firm-level decisions are largely dictated by the individuals engaged in daily management of the inter-firm relationship. We employ two distinct methodological approaches in our investigation of these questions.

The first approach, a laboratory experiment, provides the information necessary for understanding specific decision-making behaviors. We employ a 2x2x2 factorial design in which the timing of, severity of, and attribution for a violation are investigated for their effect on a buyer’s ordering behavior. The experiment was accompanied by an exit survey which served to assess the experience of psychological contract violation as
well as related constructs of trust and fairness. Data from 295 subjects were included in our analysis. We employed both analysis of covariance and hierarchical regression analysis in our evaluation of the data collected. By coupling the operational data we acquired from the laboratory-executed repeated decision-making task with the perceptual data obtained via administration of the exit survey, we are able to relate decision-making behaviors to the theoretically-driven psychological phenomenon causing them.

We propose to achieve the second objective by means of an industry survey. The goal of the survey is to determine potential moderating or mediating influences of psychological contract violations on contractual governance mechanism enforcement choices. A manager may decide to leverage written contract governance mechanisms, such as formal dispute resolution processes, or relational contract governance mechanisms, such as joint problem solving initiatives, as the firm’s overarching response to conflict within the relationship. To this end, we provide a literature review culminating in the development of several models, and a survey instrument appropriate for testing the hypothesized relationships.

**Key Findings and Contribution**

Our work contributes to the field of behavioral operations and supply chain management, defined as “the study of human behavior as it impacts the performance and management of operations” (Donohue and Siemsen, 2011). In our laboratory study, we reveal how decision biases emerge from psychological contract violations and assess the factors that
specifically contribute to this phenomenon. We observe a main effect of severity occurring during the violation, and main effects of time and attribution occurring during post-violation periods. These factors are observed to be associated with suboptimal ordering patterns - decisions that negatively impact the profitability of the participant’s hypothetical firm in the long-run. We tie these phenomena to the psychological constructs under study. In particular, severity and attribution are associated with heightened experience of psychological contract violation, decreased trust in a supplier, and lower assessment of partner fairness.

Our proposed industry survey will assess on a strategic level decisions regarding the ongoing management of supply chain relationships that have been subjected to a violation. We seek to determine whether psychological contract violations serve as a moderating or mediating construct in the relationship between the type of conflict and the contractual governance mechanism employed in resolution to that conflict. We incorporate a variety of general relationship conditions considered important in the psychological contract violation literature, such as the longevity of the inter-firm relationship and the tenure of specific personnel engaged in managing the relationship, to help us determine characteristics which lend themselves more frequently to experiences of violation. Our industry survey will also assess key outcomes resulting from the strategic decisions employed, to include relationship continuity and satisfaction.
Chapter 2: Literature Review

Firm-level Contracts Governing Supply Chain Relationships

Previous research involving governance of buyer-supplier relationships focuses on two key mechanisms: the written contract and the relational contract. Written contracts tend to play a critical role in the early stages of an inter-firm exchange relationship by providing in some detail the essential rules and regulations for acceptable behavior (Poppo and Zenger, 2002), such as the creation of routines for inter-firm coordination and clarification of each member’s responsibilities (Handley and Benton, 2009). Safeguards against undesirable behaviors and outcomes are built into written contracts, and this serves as an act of prudence on behalf of managers attempting to navigate a new relationship (Ring and Van de Ven, 1994).

As the partnership evolves, cooperation and reputation emerge as more important indicators of the behavioral norms governing the exchange relationship (Poppo and Zenger, 2002). Trust is established (Tsai and Ghoshal, 1998), and partners rely on earned reputations of trustworthiness in making economic decisions regarding the firm (Granovetter, 1992). This forms the basis for unwritten expectations and the informal
agreement that a partner will act in a manner that is congruent with shared goals and values – the relational contract.

The written and relational contracts offer different perspectives regarding how partners might decide to handle conflict within the relationship. In some instances, for example, it is possible to enforce verifiable, written contract terms through a third-party; whereas in other situations it is not feasible or even desirable to take such an aggressive route. Generally speaking, it is assumed that the written contract forms the foundation of relationship expectations in the nascent stages of development and the relational contract provides a more flexible, adaptable means of interacting in subsequent phases (Gundlach and Achrol, 1993). Here we take a more in-depth examination of these two types of contracts, and how they contribute to the ongoing governance of buyer-supplier relationships.

Written Contracts

Written contracts form the basis of nearly all exchanges. It makes sense that the complexity (simplicity) of the contract matches the complexity (simplicity) of the transaction. As such, an important consideration involves defining what makes a transaction complex. Williamson’s (1979, 2005) transaction cost theory points to three key dimensions for characterizing an exchange: 1) uncertainty; 2) frequency; and 3) asset specificity. The more transactional complexity associated with a particular economic exchange, as assessed by increased uncertainty, greater frequency of exchange, and larger
investments in assets specific and deployable only to that relationship, then the more involved the governance structure for managing it should be. Classical contracting represents the lowest form structure, followed by neoclassical contracting, and finally relational contracting (Williamson, 1979). The catch, identified in transaction cost theory, is that at some point excessive complexity results in overly excessive transaction costs (those costs associated with achieving transactional coordination and mitigating transactional risk), and these costs are simply too high for firms to reasonably incur. For example, take an exchange characterized by extraordinarily high uncertainty; specifying a contract detailed enough to cover every possible risk associated with such unforeseen circumstances would entail time and costs venturing into the realm of impossible, and almost certainly unreasonable. Therefore, there are bounds to the lower-form (written) governance structures that higher form (relational) governance structures intend to compensate. Williamson (1979) provides a framework matching governance structures with commercial transactions, presented here in Figure 2. We discuss classical and neoclassical in the following paragraphs, and address relational contracting in the next section.
At the foundation of transactional governance structures is classical contract law, wherein discrete contract transactions are enforced (MacNeil, 1978). There are two characteristics pertinent to the implementation of a classical contract law system: 1) presentation, or the ability to deal with future conditions as if they were unalterable from the present; and 2) the concept of discreteness, in which the terms of exchange are limited to the exact subject matter of the contract (i.e. money for goods), with no personal involvement of the parties to the exchange, and no history of past or promise of future exchanges (MacNeil, 1978; Williamson, 1979). There are several means by which to enforce these concepts of presentation and discreteness, including irrelevancy and substitutability of the identities of the contracting parties and the careful prescription of

---

**Table: Investment Characteristics**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Nonspecific</th>
<th>Mixed</th>
<th>Idiosyncratic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent</td>
<td>Classical Contracting</td>
<td>Neoclassical Contracting</td>
<td>Relational Contracting</td>
</tr>
<tr>
<td>Occasional</td>
<td>Neoclassical Contracting</td>
<td>Neoclassical Contracting</td>
<td>Neoclassical Contracting</td>
</tr>
</tbody>
</table>

---

**Figure 2: Governance Structure and Transaction Dimensions, from Williamson (1979)**
remedies for nonperformance (made possible since every future manifestation of the contract is delineated) (Williamson, 1979). Limited applicability of the classical contract system is widely recognized, however, according to MacNeil, “some discreteness is present in all exchange transactions and relations” (1978: 856).

A discrete transaction is, by definition, quite rigid. Flexibility can only be achieved by limiting the quantity of goods purchased within a single transaction (MacNeil, 1978). However, given any number of reasons (such as limited suppliers for a good or a preferred source for a particular good) the frequency of transacting with that given supplier would certainly increase, thereby threatening the “discrete” nature of the exchange. It is generally recognized that the majority of contract types are not this clean and contained – discrete - in nature (Williamson, 1979). This realization, that “the world is complex [and] that agreements are incomplete” (Williamson, 1979: 238), thus illuminates the need for a different kind of contracting scheme, one which acknowledges the uncertainties of the world in which we operate.

This variation from the purely classical leads us to neoclassical contract law, wherein we recognize a need to adopt some flexibility into those contractual relations occurring over the longer term (MacNeil, 1978). Thus, the neoclassical system relaxes the strict and generally unobtainable limitations of presentation and discreteness called for by the classical system. In accordance with Llewellyn (1931: 736 – 737), we view contracts at this level as providing “a framework which never accurately reflects real working relations, but which provides a rough indication around which such relations vary, an occasional guide in cases of doubt, and a norm of ultimate appeal when the
relations cease to in fact work.” This notion of “contract as framework” still provides important dispute process measures, but recognizes the need for flexibility in day-to-day business exchanges.

MacNeil (1978) identifies several mechanisms applied to American contracts for achieving this flexibility: 1) the use of standards, such as ISO 9000 certification for assessing the quality of manufacturing processes in the automobile industry; 2) direct third-party determination of performance, such as experts who draft contract content or perform arbitration services in the event of a dispute; 3) one-party control of terms; 4) compensation of costs equivalent to that assumed by the provider (perhaps to include an additional fixed or variable fee); and 5) agreement to agree, a largely “pointless” and “meaningless” (p. 870) technique for filling in contractual gaps. Regardless the form, classical or neoclassical, one aspect that tends to strongly differentiate these written contract mechanisms from the relational ones to be discussed next, are the methods employed for settling disputes.

Dispute resolution in classical and neoclassical contracting is fairly well-specified as to the procedures involved and the parties overseeing them. Firms leveraging written governance mechanisms demonstrate a reliance on formal dispute resolution processes, third-party arbitration, installment of financial penalties, or enforcement of termination clauses (Williamson, 1979; Ryall and Sampson, 2009). These tactics are directly tied to terms of the written contract and leave little room for misspecification or negotiation.
Despite their ubiquity and usefulness in some exchange transactions, our previous discussion illuminates the fact that in many instances, written contracts are incomplete – often by necessity. While the neoclassical contracting system represents a valiant effort to incorporate contracts of ever-increasing duration and complexity, it has itself been displaced by a system of relational contracting, characterized most prominently by its focus on the relationship in its entirety (MacNeil, 1978; Williamson, 1979). In other words, where the neoclassical system fills in gaps by using the original contractual agreement as reference point, the relational contracting system eschews this document in favor of a more holistic approach – one that considers “the entire relation as it had developed to the time of the change in question” (MacNeil, 1978: 890). Williamson (1979) originally intended the relational contracting mode to represent hierarchies, or vertical integration, but does acknowledge MacNeil’s (1978) point of view which recognizes that the bounds of those engaged in ongoing relations are continually broadening (Williamson, 1985; 1991). Recent work has defined governance of a relational nature to apply “when the continuity of the relationship is of significant value… [when] partners are bilaterally dependent in a nontrivial way, and their identities matter significantly” (Mesquita and Brush, 2008).

Relational governance is defined as a set of “informal agreements and unwritten codes of conduct that powerfully… influence the behaviors of firms in their dealings with other firms” (Baker, Gibbons and Murphy, 2002: 39 – 40). These agreements take the
form of various norms designed to encourage and reward behaviors associated with meeting obligations and promises established in the context of the relationship. These norms are identified in various sources as flexibility, solidarity, mutuality, and role integrity (MacNeil, 1980; Heide, 1994; Poppo and Zenger, 2002; Gundlach and Achrol, 1993). Each of these norms elicits a different relationship-building behavior, the behaviors reflecting a congruence of interests, shared goals, and common values, and is aimed at preserving the ongoing relationship. Additionally, when considering mechanisms employed to resolve inter-firm conflict from a relational contracts perspective, we can look to these norms of behavior for guidance.

Flexibility represents a willingness of the parties to “make adjustments in the ongoing relationship to cope with changing circumstances” and to “work out a new deal [rather] than hold each other to the original terms” (Heide, 1994: 80). Leveraging a norm of flexibility implies valuing the ongoing relationship first and foremost, and with that accepting the dynamic nature of ongoing events and the requirement that both parties be ready, willing, and able to facilitate a bilateral pursuit of modifications to the original contractual agreement as a result.

Solidarity emphasizes the uniqueness and extraordinary value of the relationship at hand. To maintain such a valued relationship, it is considered important that one party not unilaterally leverage control over another (Heide and John, 1992); that decisions are made collectively and in a way that facilitates a message of “we are in this together.” The norm of solidarity in action implies a “bilateral approach to problem solving” wherein the parties demonstrate a “commitment to joint action” (Poppo and Zenger, 2002: 710).
Generally speaking, the norm of mutuality embodies a sense of fairness in the distribution of gains earned within the context of the partnership (MacNeil, 1980). Mutuality does not imply that the divisions are necessarily equal, but only that they are perceived by both parties as adequate given what each firm is contributing to the relationship. Mutuality is the “extent to which contractual monitoring of individual transactions is tempered by trust” (Gundlach and Achrol, 1993).

Role integrity implies a much more diverse set of responsibilities adopted by those managing the relationship (Gundlach and Achrol, 1993). Role integrity is often reflected as a construct of information sharing, in that the range of information provided between the parties typically implies a more frequent and informal means of communicating (Poppo and Zenger, 2002; Heide and John, 1992; Lusch and Brown, 1996). Information sharing at this level entails skills, proactivity, and commitment, beyond that required in more simple, discrete transactions (Gundlach and Achrol, 1993). Moreover, the information that is shared is potentially of a more sensitive, or private, nature, and helps to define the short and long-term goals of the firms involved (Poppo and Zenger, 2002). Information sharing of this degree makes the parties somewhat vulnerable to one another as a result.

Once again, the difference between written and relational contracts is particularly important where disputes are concerned, as the mechanisms employed for dealing with these instances of conflict vary across governance types (Heide, 1994). It is argued that “most disputes, including those that under current rules could be brought to a court, are resolved by avoidance, self-help, and the like” (Galanter, 1981, as quoted in Williamson,
This implies some leveraging of relational contracting; the parties value the ongoing relationship which provides sufficient incentive to seek remedies outside written contractual enforcement. As we pointed out in the introduction, however, this tendency may embody *most* but certainly not *all* disputes. After all, few relationships forgo the use of written contracts entirely, and informal relations and unofficial norms inevitably develop; these two contracts coexist and should be considered together (Blau and Scott, 1962). Thus, even where nonintegrated firms have worked closely together and developed relational contracts of substance, some shocks may be severe enough to warrant reneging on relational terms and cause one or both parties to prefer enforcement of written contract mechanisms instead (Klein, 1996; 2000). This brings us to a critical question we evaluate in this research, which is under what conditions does a firm decide to implement one contractual governance mechanism over another? Our sense is that this is driven, at least to some extent, by the degree of psychological contract violation experienced by the individuals managing the inter-firm relationship. This psychological contracts viewpoint has not been previously adopted in the literature specific to buyer-supplier relationships. We turn next to a description of the psychological contract, and then explore the phenomena of its violation.

**Individual-level Psychological Contracts**

Psychological contracts consist of the beliefs that individuals have regarding reciprocal obligations between themselves and another. Psychological contracts are in large part a
reflection of the fact that contracts are subjective (Rousseau, 1989). For example, as a procurement analyst for a government agency, I managed many high-dollar, multi-year contracts that were categorized as cost-reimbursement. This type of contract, frequently awarded in research and development efforts characterized by high levels of technological uncertainty, is by definition incomplete. As the contract is executed, there exist certain obligations or promises which are explicit, such as an obligation to provide regular cost reports produced by an appropriately sanctioned cost accounting system. Other obligations are developed out of the context of the relationship, such as a sense of good faith that the contractor will provide an honest assessment of the work being conducted. As another example, a small business specializing in building custom-order tools and equipment must make decisions regarding after-sales support that may extend beyond those contractually specified, but is critical to the firm’s reputation in his limited circle of predominantly local clients. In the U.S. and other developed countries, these increasingly service-oriented economies place strong emphasis on a facet like goodwill, which make situations like those exemplified here even more commonplace.

In both of the aforementioned examples, the purchaser and the seller each develop their own perceptions regarding the more subjective aspects of the agreement. The contractor, for instance, may perceive to be due the 40 hours of billable time the contractor estimated, despite having only worked 30 hours, if a full 10 of those hours were conducted on a government holiday and thus in the contractor’s mind payable at double-time. The obligation as perceived by the government contracting officer may not be congruent with that, however. The purchaser of a piece of equipment worth half a
million dollars may believe to be entitled to 24-hour on-call service for a full six months after the sale is made. After all, the purchaser had many choices regarding where to procure from, and selected the small local company predicated on their close proximity and presumably intricate customer relationships. However, the producers of that equipment may perceive a different arrangement as reasonable for their limited-resource business.

Psychological contracts have been discussed in the organizational behavior literature for several decades. Argyris (1960) used the term to describe unwritten expectations that develop between employees and their firms over time. Schein (1980: 24) noted that psychological contracts are a powerful determinant of behavior in organizations. Schein defined psychological contracts as an extension of the social contract; he importantly identified that individuals “never operate in a social vacuum” (1980: 41). Rousseau’s (1995) work carefully parsed out the difference between social and psychological contracts along two dimensions. First, the psychological contract occurs at the level of the individual, whereas social contracts are experienced by groups. Second, the perspective differs with regards to the two contract types, where a psychological contract maintains a “within” perspective thus reinforcing its highly subjective nature, and the social contract with its “outside” perspective is readily observable by non-members of the group to which it specifically pertains. These relationships are depicted in Figure 3, adapted from Rousseau (1995). Although important differences exist between social and psychological contracts, Schein’s (1980) observations are relevant in that social and psychological contracts strongly influence
how other relationship aspects are interpreted. As such, it is important that we, as supply management scholars, incorporate psychological contracts as part of our analysis of supply chain relationships.

Figure 3: Level and perspective of contracts, adapted from Rousseau (1995)

One critical aspect of psychological contracts as it pertains to our current research is its relationship to schemas. Psychological contracts aid in the individual’s development of schemas, or mental models, which describe the characteristics defining a relationship (Rousseau, 2001, 2003). These schemas help people to organize information, and allow them to make predictions regarding future interactions (Rousseau, 2003). In this way,
psychological contracts permit the holder to “fill in the gaps” absent in other types of contracts governing the relationship. Unfortunately, this gap-filling exercise is also subjective and inherently flawed, often resulting in a mismatch between psychological contract holders as to the terms of their agreement. Moreover, adaptations to relationship expectations develop over time and are likely idiosyncratic to a particular relationship, thus complicating relationship dynamics. Ultimately, the perceptions held by one individual may not necessarily be congruent with the perceptions of the other individual, in which case the psychological contract may be perceived as violated. Much of the work in the arena of psychological contracts assesses such instances of violation, as does the work we are conducting here. We will explore the literature evaluating psychological contract violations in greater detail in the following section.

The supply chain management literature is relatively light on references to the psychological contract, although several authors have suggested its applicability to that context (Ring and Van de Ven, 1994; Rousseau, 1995). Blancero and Ellram (1997) report the results of an exploratory study investigating the usefulness of organizational justice and psychological contract theories in developing guidelines towards forming lasting and reciprocal strategic supplier partnerships. Blancero and Ellram do not adapt constructs directly from the existing psychological contract literature, but rather speak to conceptual similarities only. From an empirical study of firms in the motorized vehicle industry, Kingshott and Pecotich (2007) demonstrate the positive effects of psychological contract on trust and commitment within the overall relationship. Finally, Hill and Eckerd (2011) explore a model of antecedents to a healthy psychological contract between
supplier and buyer. The findings of this study show trust, ethical integrity, and commitment to be central factors contributing to a supplier’s perception of positive psychological contract. The link between trust and psychological contracts is further explored later in this chapter.

Psychological Contract Violation

As previously discussed, much of the work in the psychological contracts arena focuses on violations of these individual-level psychological contracts. When the psychological contract is violated, it means that the violated party has perceived insufficient fulfillment of the obligations expected from the other party. It is particularly harmful because through the notion of reciprocal exchange, the violated person believes promises-in-kind to have already been delivered. As such, the promise of future benefits to be received goes beyond that of mere expectations, and represents failure of the partner to deliver on promises that have already been “paid for” (Rousseau, 1989). This characterization has implications regarding the consequences of violations. First, psychological contract violations tend to be intense; reactions to a broken promise often encompass sentiments ranging from anger to betrayal (Robinson and Rousseau, 1994). Second, violations erode trust. In business relationships, trust speaks to the integrity of an individual, their motives, and behavioral consistency (Robinson and Rousseau, 1994). Finally, previous studies in the employee-employer domain have demonstrated a link between psychological contract violation and reduced work contribution by the employee, even to
the point of exiting the firm and leveraging a lawsuit against the firm (Robinson, 1996; Robinson and Morrison, 1995; Robinson and Rousseau, 1994). Clearly, the impact surrounding a violation of the psychological contract can be quite severe.

Psychological contract violations can be further categorized by origin, and these origins have implications on the severity of the consequences experienced. Rousseau (1995) categorizes violations as either inadvertent, disruption, or breach. An inadvertent violation is one in which the contract partner was willing and able to follow through on their obligations. However, due to a mismatch in the beliefs regarding the terms of the contract, the partner provided something other than what was expected. Rousseau (1995: 112) describes this occurrence as “divergent interpretations made in good faith.” A disruption of the psychological contract results when the partner is willing but simply unable to fulfill the terms of the contract. In a supply chain context, a disruption may be illustrated by adverse weather conditions preventing a delivery of goods as promised. Finally, a breach represents the most severe of violations, and is defined by a partner who is able but unwilling to follow through on promises. More recent work in the psychological contracts literature has identified the latter condition as reneging (Morrison and Robinson, 1997; Robinson and Morrison, 2000), a term that perhaps more adequately captures the directly harmful nature of the offense.
Trust

The relationship between trust and psychological contracts is a closely intertwined one. When one enters into a psychological contract with another, the general expectation is that the reciprocal obligations will indeed be fulfilled. In essence, one has at least some degree of confidence that the other party will follow through on promises. This notion of vulnerability to another individual’s actions, which are beyond control of the trusting person (or trustor), is a common theme of much of the early literature on trust (Deutsch, 1958; Rotter, 1967; Zand, 1972).

Hosmer (1995: 393) develops a parsimonious definition of trust derived from the organizational theory literature: “Trust is the reliance by one person… upon a voluntarily accepted duty on the part of another person…to recognize and protect the rights and interests of all others engaged in a joint endeavor or economic exchange.” This definition emphasizes that the trustor makes herself vulnerable to the actions of the other party (the trustee), and is confident that the other party will not defect on duties due primarily to a sense of benevolence or loyalty. A competing definition is proposed by Mayer, Davis, and Schoorman (1995: 712), in that trust is the “willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party.” Again, evident in this definition is the vulnerability assumed by the trustor, this time emphasizing to a greater extent the lack of control mechanisms available to the trustor. This definition fits well to a model of psychological contracts, where
oftentimes the terms of the agreement are implicitly defined, and are almost always
unwritten. However, whichever definition is employed, where trust differs from
psychological contracts is in regards to the reciprocal nature of the relationship, as trust
makes no assumptions regarding reciprocality of partner actions.

The concept of trust can be tied to the phenomenon of psychological contract
violation, as well. When trust leads to a pattern of behavior resulting in positive
outcomes, then trust is self-reinforcing and leads to increased trust (Granovetter, 1985;
Mayer et al., 1995). However, when trust leads to negative outcomes, the trustor
downwardly adjusts perceptions of the trustee (Boyle and Bonacich, 1970; Mayer et al.,
1995). Ring and Van de Ven (1992: 488), drawing on works from management and
sociology, describe trust as a multifaceted construct consisting of “confidence or
predictability in one’s expectations” and “confidence in the other’s goodwill.” These
facets relate conceptually to the dimensions of psychological contract violation defined
previously: when predictability in one’s expectations break down, we witness an
inadvertent or disruptive violation of psychological contract terms; when the other’s
goodwill fails to be realized, we observe an act of perceived reneging. Similar to
experience of psychological contract violation, mistrust represents an affective reaction to
negative outcomes, as it pulls into question the integrity of the partner and leads to
uncertainty in assessments regarding future actions and intent (Zhao, Wayne,
Glibkowski, and Bravo, 2007).
In dyadic exchange, the entities involved are typically concerned with a fair allocation of rewards in relation to the inputs provided. This has been expanded upon as a theory of distributive justice, which pertains to the fair allocation of rewards (Homans, 1961). Formulaically, distributive justice can be represented by the following:

\[
\frac{\text{Buyer's Profits}}{\text{Buyer's Investments}} = \frac{\text{Supplier's Profits}}{\text{Supplier's Investments}}
\]

Profits signify rewards less costs, where rewards are those benefits received in the exchange and costs are the burdens, risks, or opportunity costs associated with earning those rewards. Investments in this equation are the unique attributes brought to the exchange by the buyer and the supplier, such as skills, reputation, quality, experience, and industry associations. The relative comparison explicit in the equation is actually complicated by the fact that the buyer’s perception of his and the supplier’s profits and investments is not necessarily equivalent to the supplier’s perception of these terms. Furthermore, each term consists of multiple attributes that must be weighted, and different parties may assign differing weights to them. For example, are the supplier’s years of experience or general reputation a more valuable investment?

In the case where equality in the above relationship fails to hold, one of the parties experiences an injustice or unfavorable inequality. Homans (1961) briefly addresses the relationship between distributive justice and satisfaction, proposing that the party
disadvantaged in a situation of inequity will experience feelings associated with dissatisfaction; specifically, he becomes angry. Adams (1965) elaborates greatly on this theory of inequity. While most of his discussion centers on the relationship between an employee and employer, he is careful to note that the rules he outlines are “relevant to any social situation in which an exchange takes place… for between all there are expectations of what is fair exchange” (Adams, 1965: 276). Applicability of the issue of fairness to inter-firm exchanges is supported in the economics literature. Even for a profit-maximizing firm, concerns of fairness are relevant if supply chain partners actively work to avoid and possibly even punish perceived unfair transactions (Kahneman, Knetsch, and Thaler, 1986a).

Adams (1965) defines inequity as a situation in which one person’s perceived ratio of outcomes to inputs is either less than or greater to another entity’s ratio of outcomes to inputs. In the situation of a buyer and supplier, inequity thus occurs in the following scenarios:

\[
\frac{O_B}{P_B} < \frac{O_S}{P_S}, \quad \frac{O_B}{P_B} > \frac{O_S}{P_S}
\]

Where outcomes \(O = \sum o_i\), and inputs \(P = \sum p_i\), and B and S are subscripts denoting the buyer and supplier, respectively. Clearly, it is evident that when one party to the exchange experiences a disadvantageous inequity, the other experiences a favorable inequity. Adams (1965) further sets forth two general postulates regarding inequities: first, inequity causes tension, and that tension is proportional to the magnitude of the inequity; and second, a party will seek to reduce or eliminate the inequity and any
associated tension. A variety of means exist by which a person can attempt to restore balance to the ratios of outcomes to inputs, but most useful for our purposes is the method of a person altering his inputs. Change to the inputs on one side of the equation typically has the effect of altering the outcomes on the other side of the equation. Thus, when a buyer lessens his inputs to the exchange relationship (i.e. orders less), it has the effect of lessening the outcomes to the supplier (i.e. the supplier earns less as a result of this particular exchange).

It is also worth noting two other interesting and relevant consequences of inequity to the buyer-supplier relationships discussed in our research. The first is one entity leaving the field, or otherwise terminating the exchange relationship under evaluation. This is certainly not possible, or even profitable, under all scenarios of inequity, but is a possibility to be considered nonetheless. If the situation exists that a buyer has many environmental alternatives from which to source a particular product or service, it is true that this buyer may resolve an inequity by leaving the exchange relationship entirely. The other mechanism of interest is when one party “acts on” the other party (Adams, 1965). This entails some attempt to alter the perceived outcomes or inputs of the exchange partner, or forcing the exchange partner out of the relationship. In a buyer-supplier situation, we can view enforcement of written contract terms through legal means as an attempt to “act on” and thereby alter the disequity observed.

In the economics literature, evidence for these postulates is provided. For example, laboratory experiments employing the ultimatum game demonstrate a willingness of subjects to decline offers that are perceived as unfair (Guth, Schmittberger,
and Schwarz, 1982). This is contrary to (then) presiding economic thought, which states that the recipient should be willing to accept any positive offer. As noted by Kahneman et al. (1986a: 290), “the resistance to unfairness exhibited in this experiment is of the type that might deter a profit-maximizing agent or firm from seeking to exploit some profit opportunities.” Further experiments in this area show that not only is there a resistance to unfairness, but that given the opportunity participants make decisions consistent with punishing unfair allocators and rewarding fair ones (Binmore, Shaked, and Sutton, 1985). As proposed by Kahneman et al. (1986a), the relationship between these experimental results to the realm of buyer-supplier transactions suggests that supply chain partners may be willing to punish unfair business partners by, for example, taking their business elsewhere.

Additionally, some contributions specific to buyer-supplier domains have emerged. Price assessments are common in this context and, similar to fairness evaluations, involve comparative analyses. Price inequity in particular has been demonstrated to be a very important factor in causing subjects to view situations as less fair (Huppertz, Arenson, and Evans, 1978). Huppertz and his colleagues (1978) found the common hypothetical response of subjects facing a high price inequity circumstance was to abandon the exchange opportunity (i.e. leave the store in the retail scenario proposed). These research findings lead to the inevitable question regarding what factors contribute to a sense of price fairness (or unfairness), as price-setters who are conscientious of fairness will want to take these factors under consideration while still maintaining a profit-maximizing objective. The principle of dual entitlement (Kahneman, Knetsch, and
Thaler, 1986b) sets forth one such explanation: price increases initiated by a firm that serve to maintain a profit for that firm that is comparable to the historically achieved profit point are generally considered fair. However, if a price increase is perceived to lead to an increased profit for the firm, it is generally considered unfair.

Explanations focusing solely on price judgment are incomplete. As Xia, Monroe, and Cox (2004: 2) point out: “such a price comparison is a necessary but not sufficient condition for price unfairness perceptions to occur.” Additional factors, including but not limited to information regarding price levels, previous transaction history, reputation of the partner firm, trust, and general social norms are all expected to influence perceptions of price unfairness (Xia et al., 2004). For example, in addition to the quantitative factor of relative profit, a theory of “inferred motive” is also presented in the literature, offering a more qualitative perspective on the price fairness issue (Campbell, 1999). Building on the concept of attribution theory, Campbell (1999) demonstrates that the intentions behind a price increase, whether they are to take advantage of customers or for justifiable reasons, have an effect on the perceived fairness of the decision. A price increase that is a result of managerial discretion is likely to be perceived as less fair than one that is driven by external and uncontrollable cost increases (Vaidyanathan and Aggarwal, 2003; Bolton, Warlop, and Alba, 2003).

Consideration of the behavioral reactions surrounding price unfairness mirror Adams’ (1965) postulates regarding restoration of equity. The goals of behavioral reactions to price inequity are generally two-fold, in that purchasers have a need to protect themselves both financially and psychologically. These reactions range from “no
action” to “self-protection” to “revenge”, and the specific tactic employed is largely dependent on the emotions aroused by the price transgression (Xia et al., 2004). Lesser violations associated with less powerful emotions may escape under the radar of a purchaser, eliciting no remedial actions. However, more egregious offenses in pricing levels are bound to be associated with increasingly severe negative emotions, and a stronger desire to restore equity and even punish a perceived offender (Xia et al., 2004). Often, buyers will engage in negative word-of-mouth due to the ease and low cost of this activity. Other, more aggressive actions include the legalistic remedies previously discussed.

Conclusion

In this chapter, we explored the governance literature beginning from a high-level contracts perspective. We then explicated how individual-level psychological contracts fit into the relationship management picture and presented an argument for incorporating a psychological contracts viewpoint to the buyer-supplier relationship literature. At the individual level, we discussed how concepts of trust and fairness factor into the development of business relationships, and can affect the decisions made within the context of those relationships. In the next chapter, we focused on those individual-level phenomena first. We improved our understanding of how these various psychological constructs influence the tactical, day-to-day decisions managers are responsible for. In Chapter 4, we broadened the scope to include those firm-level governance structures that
provide the foundation for longer-term, strategic-level decisions that take place within inter-firm relationship management. This approach followed a top-down, bottom-up investigation of the issues we are interested in, one that we believe tells the most cohesive story and follows the most logical research structure.
Chapter 3: The Influence of Psychological Contract Violation on Economic Decision-Making Behavior: A Laboratory Experiment

Introduction

The goal of our experiment is to determine specifically how people occupying boundary-spanning roles react to conflict in inter-firm relationships. To achieve this, we investigate how and why people alter their decision-making behavior within a supply chain management context when their supply chain partner fails to meet expectations. The research involves an experiment of between subjects design, in which participants are randomly assigned to a treatment. Participants meet for one session, approximately one hour in length, where they are asked to assume the role of a buyer of floral goods. The model employed is that of a buy-back incentive contract, a common form of returns policy offered in supply chain relationships (Cachon and Terwiesch, 2006). It is attractive to suppliers because it provides an incentive for buyers to carry more inventory than they might otherwise, particularly when the product is perishable or at a high risk of obsolescence or demand saturation (Padmanabhan and Png, 1995). The supplier accomplishes this by agreeing to share the buyers’ risk of unsold goods at the end of each period, in this case by buying back some or all of the goods each period. Under this
scenario, the buyer’s decision is the quantity of goods ordered in a period. As floral goods are perishable, unsold goods cannot be held over in inventory for sale in a later period. However, the supplier is identified as having access to a secondary market in which these goods can be offered. The role of the supplier is programmed to provide a buy-back price for all unsold goods in each period. Economic rationality suggests that buyers will order the expected optimal order quantity intended to maximize profitability. Our expectation is that buyers will systematically deviate from these order quantities, the magnitude of that deviation depending on the treatment condition to which they are randomly assigned. These treatment conditions reflect various theoretically proposed antecedents to the psychological factors introduced in Chapter 2: psychological contract violation, trust violations, and fairness concerns. We present a three-factor design (2 x 2 x 2), where the independent variables include information regarding the cause of the violation (external or reneging), the degree of severity of the violation (minor or major), and the time to violation during the course of the experiment (early or late). In total, there are eight possible treatment groups (see Table 2 later in this section for a summary of the experimental design).

Hypothesis Development

Economic rationality states that buyers should order the expected optimal order quantity intended to maximize profitability. For a buy-back incentive contract, the calculations used to derive optimal order quantities are somewhat complex. While we review the
model in detail here, a summary of the buyer’s optimal order quantity, given the parameters of this particular experiment and different possible buy-back prices, is shown in Figure 4.

The details of the model we describe here are found in Cachon and Terweisch (2005). The foundation of the buy-back contract is grounded in the newsvendor model, wherein demand is uncertain and there is only one production / purchase opportunity. The buyer’s decision is what quantity to order to most profitably serve demand. If too much is ordered, then inventory is left over at the end of the selling period and must be disposed of, typically at a loss. If the buyer orders too little, then some demand goes unsatisfied, for which there are lost revenues as well as some potential lost customer goodwill. The decision is not a trivial one, and the newsvendor model was developed to aid managers in discovering the profit-maximizing order quantity. By defining $C_u$ as those costs associated with inventory underages, and $C_o$ as an inventory overage cost, we can express the profit-maximizing order quantity as a function of those variables in an equation known as the critical ratio:

$$F(Q) = \frac{C_u}{C_o + C_u}$$

When the supplier offers a buy-back incentive, the underage cost ($C_u$) remains unchanged for the buyer. However, the overage cost ($C_o$) is affected in that some “credit” is offered back to the buyer for shipping unsold goods back to the supplier (less any associated shipping costs). This serves to decrease the cost of inventory overages, and therefore encourages higher order quantities from the buyer.
Finally, we are interested in expected profit for both the buyer and the supplier. We define the variables used in these calculations in Table 1. The profits are calculated as follows:

\[ \pi_B = [(r - c) * d] - [(c - b + h) * v] \]
\[ \pi_S = [u * (c - p)] - (b * v) + (s * v) \]

Our values assume the following: 1) all prices and costs are static; 2) all units returned to the supplier are salvageable; and 3) demand is normally distributed. Original shipping costs to the buyer are incorporated in the purchase cost, c.

Table 1: Variables relevant to buyer and supplier profitability calculations

<table>
<thead>
<tr>
<th>u</th>
<th>Units purchased by buyer</th>
</tr>
</thead>
<tbody>
<tr>
<td>c</td>
<td>Purchase cost per unit to buyer</td>
</tr>
<tr>
<td>p</td>
<td>Production cost per unit to supplier</td>
</tr>
<tr>
<td>b</td>
<td>Buy-back price per unit offered to buyer from supplier</td>
</tr>
<tr>
<td>v</td>
<td>Inventory, in units, leftover at end of period</td>
</tr>
<tr>
<td>s</td>
<td>Salvage value per unit available to supplier</td>
</tr>
<tr>
<td>r</td>
<td>Retail price per unit charged by buyer</td>
</tr>
<tr>
<td>d</td>
<td>Demand, in units, each period</td>
</tr>
<tr>
<td>h</td>
<td>Cost to buyer to return ship leftover inventory</td>
</tr>
</tbody>
</table>
In the experiment we conduct, our expectation is that buyers will systematically deviate from optimal order quantities, depending on the treatment condition to which they are randomly assigned. The treatment conditions imposed reflect various theoretically proposed antecedents to the psychological constructs explored in this research. The supplier’s buy-back pricing decision can be described as occurring within three distinct eras (an era defined as a contiguous group of periods). There is an initial buy-back pricing era, those periods wherein the buy-back price is stable and favorable to an arrangement of cooperation between the buyer and supplier. We denote the buy-back price during this initial era as $b_1$ and the buyer’s order quantity as $Q_1$. This is followed by

---

1 The original graph used colored line differentiators instead of the gradient lines shown here.
an era of violation wherein the supplier deviates from this historically honored buy-back price. The buy-back price during the era of violation is denoted as $b_2$ with subscripts “l” or “s” depending on whether the severity of the violation is major (large) or minor (small), respectively. The buyer’s order quantity is denoted by $Q_2$. Finally, there is a concluding era during which the supplier returns to the buy-back price honored during the initial era for the remaining periods of the experiment. We denote the buy-back price as $b_3$ and the buyer’s order quantity as $Q_3$ during the concluding era. The optimal order quantities for the initial, violation and concluding eras are $Q^*_1$, $Q^*_2$ (with subscript indicating severity), and $Q^*_3$, respectively. These eras and the associated variables of $b$ and $Q^*$ are illustrated in Figure 5. Our first two hypotheses concern the latter two eras: the era of violation and the concluding era.
Various conditions are found to elicit violation in employee-employer relationships. From this literature, we develop a set of conditions reflecting various theoretically proposed antecedents to the psychological constructs of interest in our research. The time to violation, severity of violation, and violation attribution are each explored in relation to their capacity to contribute to experience of psychological contract violation, decreased supplier trust and decreased fairness assessments. We also address how these psychological processes affect decision-making behavior.
We examine the impact of violations occurring either early or late in the relationship. Trust in inter-firm relationships takes time to develop. Early in the relationship, trust levels are low and incongruence opportunities are high. Violations at early stages are cognitively less surprising because of the uncertainty defining the terms of the relationship, compared to later in the relationship when some sense of stability of interactions has been established (Lewicki, McAllister, and Bies, 1998). Longer relationship durations build a performance history, wherein observations of interactions over time allow an individual to make probabilistic beliefs regarding future interactions (Doney and Cannon, 1997). A history of cooperative behavior contributes to a sense of reciprocal obligations, and hence formation of a psychological contract (Rousseau and McLean Parks, 1992). Increased length of relationship is also observed to decrease the social distance between partners, which in turn is proposed to facilitate perceived inequities due to an assumed personal nature of the relationship (Pritchard, 1969). Previous literature has defined social distance by purchase frequency, and confirms that in retail exchange relationships, high interaction frequency makes consumers more sensitive to situations of perceived unfairness, particularly when the price inequity is high (Huppertz, et al., 1978). In a laboratory investigation employing a prisoner’s dilemma game, Bottom, Gibson, Daniels, and Murnighan (2002) find also that late violations impart stronger, more emotionally charged reactions than early violations. Moreover, an individual’s response to such a violation may involve lessening their own contributions.
towards maintenance of the relationship (Robinson, 1996). In our 20-period experiment, early violations are those occurring in periods four through six, and late violations are those occurring in periods 11 through 13. We modeled our designation of times representing early versus late violations as comparable to the duration treatments implemented in Bottom et al. (2002). Specifically, we expect to see late violations associated with greater deviations from optimal ordering quantities, greater experience of psychological contract violation, and lower buyer evaluations of supplier trust and fairness.

**Severity of Violation**

The size and importance of actions causing violation impact the experience of the violation. In particular, larger, more important occurrences increase the saliency of the event, and hence the discrepancy between what was promised and what was provided is more evident (Morrison and Robinson, 1997). We model a violation as either minor or major. A minor violation is defined as the supplier offering a slightly lower buy-back price for the period’s unsold goods, in this case 80% of the historically honored price. A major violation is defined as the supplier offering an appreciably lower buy-back price for the unsold goods in a period, in our experiment this is represented as 20% of the historically honored price. Mathematically, these deviations are expressed as:

\[
\begin{align*}
    b_{2s} &= .80 \ b_1 \\
    b_{2l} &= .20 \ b_1
\end{align*}
\]

42
Major decreases in the buy-back price are not only larger in size, but also represent a larger negative impact on the buyer’s profit, and so are more important. The magnitude of the discrepancy in outcome increases the intensity of the violation experience (Morrison and Robinson, 1997), with major departures carrying the potential to generate “strong emotional reactions” (Bottom et al., 2002). This affective element is compounded by experience of perceived unfairness when the evaluator experiences disadvantaged inequity (Xia et al., 2004). Additionally, larger magnitudes of discrepant behavior may trigger immediate collapses in trust, whereas minor discrepancies can oftentimes be overlooked (Jones and George, 1998). Violations of egregious nature, because of their tendency to be particularly salient and harmful, are more prone to affect in-role performance (Zhao et al., 2007). When adverse emotional reactions are intense, coping mechanisms are typically sought out (Bougie, Pieters, and Zeelenberg, 2003). In our examination of severity of violation, we expect that major violations will be associated with heightened experience of psychological contract violation, lower evaluations of supplier trust and fairness, and lead to greater deviations from optimal order quantities.

Violation Attribution

In our experiment, the supplier provides one of two messages along with the departure from historically honored buy-back price. This message ascribes the violation to either reneging or external causes, by which we investigate attribution effects (Rabin, 1998). The causes relate conceptually to the origins of violation described in Chapter 2. In the
external event condition, the supplier cites an unexpected and temporary increase in transportation costs that forced the alternate pricing behavior. In the reneging condition, the message indicates a temporary shortage of supplier funds available for buy-back purchases, and that the supplier has “shorted” the buyer in order to fully reimburse one of the buyer’s competitors. The second scenario indicates a situation which is managerially determined and somewhat ambiguous, as compared to the first scenario which entails a cost increase due to external and presumably uncontrollable activities. When representatives are viewed as in control of and intentionally perpetuating a perceived discrepancy, then it is likely to be evaluated as less fair than those externally attributed events (Bolton et al., 2003; Vaidyanathan and Aggarwal, 2003). Purposeful reneging also is reportedly associated with stronger negative emotions than an exogenously determined event that is perceived as unintentional, unforeseeable, and uncontrollable (Morrison and Robinson, 1997). Trust is likely more damaged in a situation involving reneging, since one of the key tenets of trust as described by Hosmer (1995) is a sense of benevolence or loyalty between partners. By outwardly denying a historically honored benefit to the buyer, the supplier is negating the role of benevolence in the relationship, and thus eroding trust. Finally, in employee-employer contexts, adequate explanations are shown to reduce retaliatory behaviors; with “adequate” being somewhat loosely defined across research efforts, but typically operationalized in terms of length, clarity, legitimacy, and reasonableness of the explanation provided (Shaw, Wild, and Colquitt, 2003). As such, in our experiment we expect to see greater deviations from optimal where the attribution provided is reneging in nature. We anticipate reneging attributions will be associated with
greater experience of psychological contract violation and lower levels of trust and
fairness ascribed to the supplier by the buyer.

Hypotheses

We predict that certain treatment conditions will be associated with more significant
deviations from optimality in the buyer’s ordering decisions. Consistent with the eras
described previously, we evaluate the buyers ordering decisions in two distinct
hypotheses. In Hypotheses 1, we assess the ordering decisions made while the violation is
actually occurring, or those decisions made during the era of violation. This captures the
immediate-term effects of a supplier violation on buyer ordering behaviors. In
Hypotheses 2, we assess ordering decisions made subsequent to the supplier-induced
violation, in this case during the concluding era. In this hypothesis, we capture the long-
term effects of violations on the ordering behaviors of buyers. Formally, we state our
hypotheses as follows:

**Hypotheses1**: During the era of violation, the buyer’s average order quantity ($Q_2$) will
deviate from optimal ($Q_{*2l or s}$).

a. Order quantities will deviate from optimal more in the late time to violation
treatment than in the early time to violation treatment.

b. Order quantities will deviate from optimal more in the major discrepancy
treatment than in the minor discrepancy treatment.
c. Order quantities will deviate from optimal more in the reneging attribution treatment than in the external attribution treatment.

**Hypotheses 2:** During the concluding era, the buyer’s average order quantity \(Q_3\) will deviate from optimal \(Q^*_3\).

a. Order quantities will deviate from optimal more in the late time to violation treatment than in the early time to violation treatment.

b. Order quantities will deviate from optimal more in the major discrepancy treatment than in the minor discrepancy treatment.

c. Order quantities will deviate from optimal more in the reneging attribution treatment than in the external attribution treatment.

Essentially, Hypotheses 1 and 2 predict a greater negative reaction from the buyer resulting from certain treatment conditions. This reaction is manifested as a lower-than-optimal order quantity – one more closely approximating uncoordinated activity between the buyer and supplier, rather than the coordinated activity called for by the buy-back contract scenario. So far as we know, previous literature has not parsed out the immediate term and longer-term effects of a violation experience, as we are doing here. We capture the direction and absolute magnitude of these deviations in this experiment. In the literature review sections, we described in detail the theoretical bases for our predictions of suboptimal behavior. Hypotheses 3 through 5 contribute further to our understanding of the suboptimal decision-making behavior by directly tying the treatment conditions
assessed in this experiment (time to violation, severity of violation, and violation attribution) to the elements of psychological contract violation, trust, and fairness. These elements are captured through an exit survey, explained in greater detail in the section describing Procedures, Instructions, and Software.

**Hypotheses 3:** The treatment conditions of time to violation, severity of violation, and violation attribution will exhibit the following relationships with psychological contract violation:

- a. Late violations will be associated with greater feelings of psychological contract violation than early violations.
- b. Major violations will be associated with greater feelings of psychological contract violation than minor violations.
- c. Violations attributed to reneging will be associated with greater feelings of psychological contract violation than violations attributed to external causes.

**Hypotheses 4:** The treatment conditions of time to violation, severity of violation, and violation attribution will exhibit the following relationships with the buyer’s trust in the supplier:

- a. Late violations will be associated with less trust in the supplier than early violations.
b. Major violations will be associated with less trust in the supplier than minor violations.

c. Violations attributed to reneging will be associated with less trust in the supplier than violations attributed to external causes.

**Hypotheses 5:** The treatment conditions of time to violation, severity of violation, and violation attribution will exhibit the following relationships with the buyer’s assessment of the supplier’s fairness:

a. Late violations will be associated with less perceived fairness of the supplier than early violations.

b. Major violations will be associated with less perceived fairness of the supplier than minor violations.

c. Violations attributed to reneging will be associated with less perceived fairness of the supplier than violations attributed to external causes.

Taken together, the two groups of hypotheses (Hypotheses 1-2 and Hypotheses 3-5) represent a unique combination of questions that attempts to seek information of both an economic and psychological nature, respectively. Hypotheses 1 and 2 look specifically at the economic decisions made by individuals, in this case their ordering decisions over time. The remaining hypotheses investigate the psychological processes at play regarding
those decisions. The uniqueness of this design has implications for the methods we employ. The next section discusses these methods in detail.

Method

*Design*

A particular conflict scenario may or may not elicit an experience of violation of the psychological constructs under study. We examined the literature to help us determine the underlying dynamics of these phenomena, as initially identified in the hypotheses development above. Conflict may be attributable to various sources and assume varying degrees of severity (Hunt, 1995). Factors contributing to perceived violation include whether the source of the conflict was purposeful (reneging) or due to no fault of the partner (external) (Robinson and Morrison, 2000), the size of the realized discrepancy (Morrison and Robinson, 1997), and the length of the relationship (Robinson, 1996). We focus on evaluation of these factors in our investigation, thus employing a 2x2x2 independent factorial design. We employ the lens of the newsvendor model to examine this problem. The newsvendor model has been leveraged in previous experiments investigating systematic deviations from profit-maximizing decisions (Schweitzer and Cachon, 2000; Katok and Wu, 2009).
Experimental Treatments

Buyers were randomly assigned to a treatment condition specifying time to violation, degree of deviation in buy-back price, and attribution. The eight treatments, their associated parameters and expected optimal order quantities are all summarized in Table 2. Static parameters applying to all of the cells include the following: a purchase price of $35 per unit; retail price of $55 per unit; zero lead times; production and salvage values of $16 and $15 per unit, respectively; return shipping of $3 per unit; and, average demand of 400 units with standard deviation of demand of 200 units. A single demand pattern was generated in advance and identically administered in each of the treatment groups to avoid any confounding effects of different demand streams between subjects or groups. This was deemed particularly important in this experiment, as the periods of violation needed to be strategically designed to ensure that the buyer did indeed have units left over to return to the supplier, and thus felt the full impact of the lower buy-back price provided.

The expected optimal order quantities are rounded for ease of exhibition, as instructions were provided graphically rather than formulaically. The actual expected optimal order quantities are 454 for the initial and concluding eras for all treatments, and 414 for a minor violation and 338 for a major violation during the era of violation.
Table 2: Experimental Design

<table>
<thead>
<tr>
<th></th>
<th>Major (Optimal order during violation = 340)</th>
<th>Minor (Optimal order during violation = 410)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>External</td>
<td>Reneging</td>
</tr>
<tr>
<td>Early Violation (periods 4-6)</td>
<td>n = 39</td>
<td>n = 38</td>
</tr>
<tr>
<td>Late Violation (periods 11-13)</td>
<td>n = 39</td>
<td>n = 37</td>
</tr>
</tbody>
</table>

For all groups, optimal order quantity before and after violation = 450

Data Analysis and Methods

Data collected during the experiment study were analyzed using factorial analysis of covariance (ANCOVA), supplemented with linear regression analyses for clarity in interpretation of the findings as well as for substantiating the theoretical arguments framing the results. All analyses were conducted in the statistical software package PASW Statistics 18 (SPSS). We also conducted factor analysis of the questionnaire items for psychological contract violation, and an index of these items was utilized in subsequent analyses.
Participants reported to a computer laboratory at the Fisher College of Business at a designated date and time to begin the experiment. An introductory presentation was delivered, during which the following information was conveyed.

1) A brief description of the newsvendor problem with specific focus on ordering strategies in both decentralized and centralized supply chains, and an introduction to buy-back policies with emphasis on the benefits of coordination.

2) The buyer’s specific role during the experiment and training on how to maximize expected profitability.

3) A preview of the screens the software iterates through during the experiment, and the specific actions required by the buyer on each of the screens.

A critical goal in any experimental situation is for the experimenter to reduce as much as possible any “noise” in the procedures employed. Ideally, all participants in all groups are treated identically. The importance of using the same words, and even the same intonations, is not to be overlooked (McGuigan, 1978). Proper procedure, in accordance with McGuigan, is to limit the number of randomly occurring extraneous variables, such that error variances are reduced. Along this vein, we made every attempt to keep the introduction process as consistent as possible. Every session was held in the same computer lab. The same experimenter introduced each session, reading aloud from a script. The slide presentation was shown with an overhead projector, and printed copies of the slides were available at each workstation for reference along with scrap paper.
Copies of the introduction script and accompanying slide presentation are provided in Appendices A and B, respectively.

In the introduction the buy-back incentive contract was explained in as simplistic of terms as possible because, as noted earlier, the underlying calculations are fairly complex. Participants, regardless their education and experience, would likely not possess the technical competency to conduct these calculations unaided and in a timely fashion. As such, participants were provided a decision support mechanism in the form of an illustrative graph (shown previously in Figure 4) which demonstrates the optimal order quantity expected to maximize profitability given the particular parameters of the experiment and potential buy-back prices. The graph, and how to use it, was explained in detail to buyers during the introduction of the experiment. It was included in the hard copy of the slides provided at each workstation, and a copy of the graph was projected on the overhead screen throughout the duration of the experiment.

Buyers were informed that they were randomly partnered with a supplier, and that the supplier session consisted of undergraduate students at another (unnamed) leading business institution. After the introduction was completed, buyers were asked to wait while the experimenter “coordinated” with the supply group. To accomplish this, the experimenter feigned use of a mobile device to communicate with the proctor of the supply group that the information session was complete and the buyers were ready to begin submitting order quantities. After a brief delay, the experimenter announced that an “all clear” message was received from the supply group, indicating they too were ready to begin with the experiment.
The software used for this experiment was created specifically for the effort. It is an Excel-based program written in Visual Basic, consisting of a three screen sequence repeating through 20 order periods. The screens are:

1) An order decision screen

2) Demand realizations and calculation of lost demand or extra inventory

3) A summary of the history of ordering decisions and outcomes as the experiment progresses

Buyers are walked through these screens during the introduction, and screen shots are provided on the accompanying slide presentation and handout (Appendix B). Uniformly distributed random delays of (5, 20) seconds are programmed to occur at points where the supplier is expected to be reviewing the data for that period and making decisions about buy-back pricing. Upon completion of the 20 order periods, a summary screen detailing the buyer’s cumulative earned profit is shown, and the buyer is then directed to complete the exit survey, also administered within the same Excel-based program.

Once buyers begin the experiment on their computers, they make ordering decisions over a set number of periods that is consistent with their treatment condition (i.e., either through period three or ten). These decisions establish a baseline of the subject’s ordering behavior, as well as help to instill a sense of the reciprocal obligations between the buyer and supplier. During these initial rounds, the supplier offers a consistent buy-back price for all units returned that coordinates a relatively high order quantity from the buyer. At a predetermined point in the experiment (i.e. either period
four or eleven), the supplier then deviates from the historically honored buy-back price, and unexpectedly offers a lower buy-back price for items returned. This results in a higher supplier profit at the buyer’s expense. The supplier presents one of two messages along with the deviation in behavior. In the purposeful reneging condition, the message indicates a temporary shortage of supplier funds available for buy-back purchases, and that the supplier has shorted the buyer in order to fully reimburse one of the buyer’s competitors. In the external event condition, the supplier justifies the deviation in buy-back pricing by citing a temporary increase in transportation costs due to adverse weather conditions. The deviation occurs for three consecutive periods, after which the supplier reverts to honoring the initial buy-back price for the duration of the experiment.

In summary, our experiment captures the initial ordering decisions of the buyer (initial era behavior). We then impose a violation of relationship expectations by temporarily altering the buy-back price, and observe the buyer’s ordering behavior during this violation era. Finally, we return the buy-back price to that which was originally honored, and once again observe the buyer’s subsequent ordering behavior in the concluding era. In addition, three control variables were included as part of our design. The first two, gender and international student status, are included as previous literature has suggested that psychological contracts, trust, and fairness may be experienced differently by different types of individuals (Tallman and Bruning, 2008; Thomas, Fitzsimmons, Ravlin, Au, Ekelund, and Barzantny, 2010). In terms of the undergraduate students employed in this experiment, these two variables represent the most substantive ways in which our students vary. A final control variable, average order quantity prior to
the supplier-induced violation, was used to control for each individual’s overall systematic variations in ordering behavior across all periods of the experiment.

Before buyers left the laboratory, they were asked to respond to an exit questionnaire. This survey was designed to assess various theoretical causalities for any extraordinary non-coordinating behavior exhibited by the subject. We assessed the participant’s perception of psychological contract violation in reaction to the supplier-induced violation from expectations. These four questions are adapted from Robinson and Morrison (2000), and each response is recorded on a seven-point scale ranging from “strongly disagree” to “strongly agree.” We also assessed how the subject rates his/her supplier on fairness and trustworthiness with questions derived from Bottom et al. (2002). These single-measure items were recorded on a seven-point scale ranging from “not at all” to “very much.” General demographic data were also collected, and are summarized in the following section pertaining to Participants. The complete set of survey questions is provided in Appendix C.

Participants

The primary data source for these experiments was undergraduate business students from the Fisher College of Business. The specific students recruited were those taking an introductory course in operations management. As such, all participants had been previously exposed to the concepts of supply chains, buyer-supplier relationships, the newsvendor problem, and coordination tactics. This facilitated the ability of participants
to make informed decisions during the experiment, and served to minimize any possible frustration felt by not understanding the task at hand. Brief (5 minute) recruitment sessions were held in-class during mid-April, and the college’s web-based course management system was used to provide additional information and a session sign-up link (see Appendix D). Students who participated in the experiment were awarded nominal compensation for their time, in the form of course extra credit. Due to the fact we offered course credit for participation and in adherence with the guidelines of responsible research practice, we also offered an alternate extra credit assignment for those unable or unwilling to participate in the laboratory experiment. Details of this alternate assignment are found in Appendix E.

A total of 304 undergraduates participated in our experiment sessions, which were conducted between May 7th and May 21st, 2010. Each individual participated in just one session. From this pool, the data from 295 participants was used in our analyses. While it is never desirable to eliminate observations from analysis, there are some instances where individual records clearly should be excluded; such as when subjects do not understand the task or are engaged in inappropriate communication or collusion (Croson, 2002). The specific rules we employed for exclusion are summarized in Table 3. The rules applied are necessarily arbitrary (Horowitz, McConnell, and Quiggin, 1999), but in all cases, the data were carefully examined and removed prior to any analysis (Croson, 2002). In all, observations from nine participants were eliminated from analysis. Four of our buyers provided responses indicative of inappropriate communication or collusion, with an unusual number of order quantities close to or exactly matching the applied demand.
stream. Three of the buyers placed order quantities well below average demand throughout the entirety of the experiment, thus suggesting the buyers either did not understand the task at hand, or did not exert an honest effort towards the task. Finally, one buyer was eliminated from the analysis due to exceptionally high ordering behavior (99,999 units), and one buyer was removed for orders that wildly oscillated between extremely low (orders of zero units) to extremely high (in the thousands). Ultimately, data from over 97% of the participants were retained for analysis.

Table 3: Guidelines for data exclusion

<table>
<thead>
<tr>
<th>Rule Employed</th>
<th>Number Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least ½ order &lt;= 200</td>
<td>3</td>
</tr>
<tr>
<td>3+ orders exactly match demand</td>
<td>1</td>
</tr>
<tr>
<td>5+ orders within 5 units of actual demand</td>
<td>1</td>
</tr>
<tr>
<td>7+ orders within 10 units of actual demand</td>
<td>1</td>
</tr>
<tr>
<td>9+ orders within 20 units of actual demand</td>
<td>1</td>
</tr>
<tr>
<td>Other, as specified in Section 3.3.5</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9</strong>*</td>
</tr>
</tbody>
</table>

* 9 observations dropped from 304 total.

Demographically, 58% of our participants were male, and 42% female. Nineteen percent of the participants identified themselves as international students. These students originate from a variety of countries, including China (41.1%), South Korea (32.1%), and India (10.7%). Two participants each originate from Indonesia and Taiwan, and one participant from each of Denmark, Japan, Malaysia, Sierra Leone, and Togo.
In our experiment, we ask students to make decisions in accordance with their role as the buyer of floral goods for an upscale grocer. Their decisions directly impact the profitability of the hypothetical firm for which they work. As such, it is important that the subjects be provided incentive to take their role seriously and make decisions in much the same way as they would if the situation were real. This helps to establish validity of the experiment we are conducting. During the session introduction, we explain the incentive scheme utilized in this experiment - a lottery system designed to reward good performance. One respondent from each of the eight sessions was drawn at random, where the odds of a particular respondent winning the lottery were proportional to his or her end-of-game profits. Winners of the lottery received a cash incentive in the form of a gift card emailed out several weeks following administration of the final session. The lottery incentive is a common form of payment in economic-based experiments (Croson, 2005; Schweitzer and Cachon, 2000).

Psychological theories form the fundamental basis of our investigation. Due to this strong psychological component, we found it necessary to deceive our buyers regarding the characterization of their supply chain counterpart. Had we used human suppliers, we either would have lost control of the independent variables we sought to investigate, or been required to provide scripts to the suppliers (which in and of itself is a form of deception). By programming the supplier’s role, we were able to conserve our sample size and achieve greater scope from our investigation than would otherwise have been the case. Deception is not unfounded of experiments conducted in our field (see Niederhoff, 2007), and is pervasive in the organizational behavior literature (see Bottom
et al., 2002; Lount, Zhong, Sivanathan, and Murnighan, 2008; Schweitzer, Hershey, and Bradlow, 2006). In keeping with the requirements of responsible research conduct, we debriefed all subjects as to the true nature of the experiment. This debriefing document is provided in Appendix F.

Finally, regarding our participant pool, we understand that the use of undergraduate students is often perceived as unrepresentative of the actual knowledge and skills possessed by professionals, thus leading to erroneous research conclusions. However, examinations in the literature have repeatedly shown that this is not the case (Siegel and Harnett, 1964; Burns, 1985). Bolton, Ockenfels, and Thonemann (2010) provide an excellent analysis examining newsvendor decisions across undergraduates, graduate students, and professional managers. We find no reason to believe that the students we used in our investigation would respond differently than any other group of participants. More importantly, as previously addressed, we provide adequate decision support materials such that any technical expertise required to conduct the task of a buyer in this situation is eliminated.

Results and Discussion

In this section, we first statistically analyze the hypotheses, demonstrating either support or a lack of support for each. Then, in the following, we offer a more integrated discussion of the practicality of the results.
Analysis of Hypotheses

Each of our hypotheses is analyzed in turn below. Table 4 provides the average order quantities and deviations from optimal for each of the eight treatment groups.

Table 4: Summary statistics for ordering behavior in each of the treatment groups

<table>
<thead>
<tr>
<th>Severity</th>
<th>Time to Violation</th>
<th>Attribution</th>
<th>Initial Era (Q1)</th>
<th>Era of Violation (Q2)</th>
<th>Concluding Era (Q3)</th>
<th>Initial Era</th>
<th>Era of Violation</th>
<th>Concluding Era</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor</td>
<td>Early</td>
<td>External</td>
<td>426.46 (39.50)</td>
<td>421.69 (54.46)</td>
<td>352.64 (67.97)</td>
<td>23.54 (39.50)</td>
<td>62.36 (67.97)</td>
<td>28.31 (54.46)</td>
</tr>
<tr>
<td></td>
<td>Reneging</td>
<td>External</td>
<td>429.76 (49.90)</td>
<td>386.07 (52.76)</td>
<td>352.50 (65.87)</td>
<td>20.24 (49.90)</td>
<td>62.50 (65.87)</td>
<td>63.93 (52.76)</td>
</tr>
<tr>
<td></td>
<td>Reneging</td>
<td>Late</td>
<td>416.99 (47.30)</td>
<td>420.44 (54.17)</td>
<td>355.57 (95.59)</td>
<td>33.01 (47.30)</td>
<td>59.43 (95.59)</td>
<td>29.56 (54.17)</td>
</tr>
<tr>
<td></td>
<td>Reneging</td>
<td>Late</td>
<td>405.34 (53.81)</td>
<td>401.11 (65.18)</td>
<td>323.40 (86.65)</td>
<td>44.66 (53.81)</td>
<td>91.60 (86.65)</td>
<td>48.89 (65.18)</td>
</tr>
<tr>
<td>Major</td>
<td>Early</td>
<td>External</td>
<td>433.21 (58.90)</td>
<td>413.56 (64.50)</td>
<td>341.66 (65.42)</td>
<td>16.79 (58.90)</td>
<td>-1.66 (65.42)</td>
<td>36.44 (64.50)</td>
</tr>
<tr>
<td></td>
<td>Reneging</td>
<td>Late</td>
<td>436.13 (81.38)</td>
<td>387.63 (66.54)</td>
<td>324.32 (76.30)</td>
<td>13.87 (81.38)</td>
<td>15.68 (76.30)</td>
<td>62.37 (66.54)</td>
</tr>
<tr>
<td></td>
<td>Reneging</td>
<td></td>
<td>408.79 (43.98)</td>
<td>412.12 (60.00)</td>
<td>300.70 (70.31)</td>
<td>41.21 (43.98)</td>
<td>39.30 (70.31)</td>
<td>37.88 (64.00)</td>
</tr>
<tr>
<td></td>
<td>Reneging</td>
<td></td>
<td>417.37 (55.77)</td>
<td>409.39 (72.84)</td>
<td>332.27 (115.67)</td>
<td>32.63 (55.77)</td>
<td>7.73 (115.67)</td>
<td>40.61 (72.84)</td>
</tr>
</tbody>
</table>
**Hypothesis 1**

In Hypotheses 1, we predicted that during the era of violation the buyer will deviate his/her average order quantity from optimal. We assessed this set of hypotheses using a 2x2x2 independent factorial analysis of covariance (ANCOVA), wherein time of, severity of, and attribution for the buy-back pricing discrepancy were entered as independent variables, and the deviation from optimal order quantity during the era of violation was entered in as the dependent variable. The value of utilizing the ANCOVA analysis is in the technique’s ability to statistically control for potentially relevant extraneous variables, thus decreasing our error variance and increasing our opportunity to reject the null hypothesis should it indeed be rejected (McGuigan, 1978). For this research, we assessed the impact of three covariates: gender, international student status, and the average order quantity of the subject during the initializing era. Analysis of variance is generally robust to violations of assumptions, with two exceptions being the assumptions of independence and of homogeneity of variances, particularly when sample sizes are unequal (Field, 2005). We do not violate the assumption of independence. Since our sample sizes vary between groups, we report the results of Levene’s test of equality of error variances for both factorial ANCOVAs. This tests the null hypothesis that the variances of our groups are the same; this test was not significant (p = .235), thus this assumption is satisfied. In both this analysis and the one for Hypotheses 2, we use the general linear model form of analysis of variance, with Type III sums of squares, and interpret the analysis using marginal averages based on estimated cell means (Keppel and Wickens, 2004).
The test of between-subjects effects shows the main effect of severity as well as the three-way interaction between the independent variables as significant (see Table 5). The three-way interaction is omitted from further discussion, as tests of the simple main effects for each level of attribution proved insignificant. Regardless of the timing or attribution for a violation, minor violations are observed to cause significantly lower than optimal order quantities than those associated with major violations. The range for order quantities for minor violations is 58.38 to 82.33 units below optimal. Major violations appear to result in a less severe under-ordering pattern; the range for order quantities for major violations is 4.55 to 30.05 units below optimal. Our analysis also demonstrates significant effects of gender and ordering behavior during the era of violation.\(^3\)

For our test of Hypotheses 1 (and the following Hypotheses 2), we evaluated the effect size, where the effect size is an objective and standardized measure of the magnitude, and therefore importance, of the observed effect (Field, 2005). The effect size \(\eta^2\) is 0.38, which is considered a medium to large effect (Cohen, 1988, 1992). We also examined the power of the test conducted, where power indicates the probability that a test will correctly reject a false null hypothesis. The omnibus power calculation for this test is \(\beta = 0.99\), which represents excellent power for the analysis.

\(^3\) In addition to the formal tests of hypotheses discussed here, we also conducted a factorial analysis of covariance using the treatment conditions as independent variables, and the average order quantity of the subjects during the initial era as the dependent variable. As should be the case, there was no significant difference in the ordering behaviors of subjects during this pre-violation period. Covariates of gender and international student status also proved insignificant.
Table 5: ANCOVA results for buyer ordering behavior during the era of violation; dependent variable is deviation from optimal during era of violation

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (Male = 0, Female = 1)</td>
<td>33334.96</td>
<td>1</td>
<td>33334.96</td>
<td>6.44*</td>
</tr>
<tr>
<td>International status (Not Intl = 0, Intl = 1)</td>
<td>7157.23</td>
<td>1</td>
<td>7157.23</td>
<td>1.38</td>
</tr>
<tr>
<td>Ave initial order</td>
<td>395807.53</td>
<td>1</td>
<td>395807.53</td>
<td>76.51***</td>
</tr>
<tr>
<td>Time (Early = 0, Late = 1)</td>
<td>819.53</td>
<td>1</td>
<td>819.53</td>
<td>0.16</td>
</tr>
<tr>
<td>Severity (Minor = 0, Major = 1)</td>
<td>193802.04</td>
<td>1</td>
<td>193802.04</td>
<td>37.46***</td>
</tr>
<tr>
<td>Attribution (External = 0, Reneging = 1)</td>
<td>2852.27</td>
<td>1</td>
<td>2852.27</td>
<td>0.55</td>
</tr>
<tr>
<td>Time*Severity</td>
<td>193.39</td>
<td>1</td>
<td>193.39</td>
<td>0.04</td>
</tr>
<tr>
<td>Time*Attribution</td>
<td>3564.38</td>
<td>1</td>
<td>3564.38</td>
<td>0.69</td>
</tr>
<tr>
<td>Severity*Attribution</td>
<td>4534.95</td>
<td>1</td>
<td>4534.95</td>
<td>0.88</td>
</tr>
<tr>
<td>Time * Attribution * Severity</td>
<td>20582.30</td>
<td>1</td>
<td>20582.30</td>
<td>3.98*</td>
</tr>
<tr>
<td>Error</td>
<td>284</td>
<td></td>
<td>5173.26</td>
<td></td>
</tr>
</tbody>
</table>

*p ≤ .10  **p ≤ .05  ***p ≤ .01

To aid in interpretation of the findings, particularly regarding the covariates, we conducted a hierarchical multiple regression analysis. The control variables of gender, international student status, and average order quantity of subjects during the initializing era were entered in step one, and in step two we added in the independent variables of time, severity, and attribution. As shown in Table 6, those subjects who are female
(coded 1) order on average approximately 20 units fewer than do males. We also observe a significant effect of the average initial ordering values on the subsequent order values during the era of violation. In general, subjects who placed higher orders during the initial era also placed orders closer to optimal (higher orders) during the era of violation. Our table also clearly shows the relationship between severity of violation and ordering behavior: when the severity of violation is categorized as major (= 1), then the change from optimal is smaller than it is for those experiencing a minor violation. This is actually a significant result in the direction opposite to what we hypothesized. In total, 32.1% of the variation in ordering behavior below the optimal is accounted for by the model hypothesized.

In light of these results, we make the following statements regarding our specific hypotheses regarding order quantities submitted by our buyers during the era of violation:

a. It is not supported that order quantities will deviate from optimal more in the late time to violation treatment than in the early time to violation treatment.

b. It is not supported that order quantities will deviate from optimal more in the major discrepancy treatment than in the minor discrepancy treatment.

c. It is not supported that order quantities will deviate from optimal more in the reneging attribution treatment than in the external attribution treatment.
Table 6: Regression results for buyer ordering behavior during the era of violation; dependent variable is deviation from optimal during era of violation

<table>
<thead>
<tr>
<th>Dependent Variable: Average deviation from optimal during era of violation</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>β</td>
<td>t</td>
<td>β</td>
</tr>
<tr>
<td>Constant</td>
<td>329.11</td>
<td>9.51***</td>
</tr>
<tr>
<td>Gender</td>
<td>19.82</td>
<td>2.18**</td>
</tr>
<tr>
<td>Intl status</td>
<td>11.91</td>
<td>1.04</td>
</tr>
<tr>
<td>Average Initial Order Quantity</td>
<td>-0.71</td>
<td>-8.83***</td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severity</td>
<td></td>
<td>-51.36</td>
</tr>
<tr>
<td>Attribution</td>
<td></td>
<td>6.05</td>
</tr>
<tr>
<td>F</td>
<td>29.28***</td>
<td></td>
</tr>
</tbody>
</table>

*p≤.10  
**p≤.05  
***p≤.01

**Hypothesis 2**

Hypotheses 2 predicted that during the concluding era, the buyer’s average order quantity will deviate from optimal. As before, we assessed this set of hypotheses using a 2x2x2 independent factorial analysis of covariance, wherein time of, severity of, and attribution for the buy-back pricing discrepancy were entered as independent variables, and the deviation from optimal order quantity during the concluding era was entered in as the dependent variable. The impact of the covariates gender, international student status, and the average order quantity of the subject during the initializing era were included as part
of the analysis. We again conducted Levene’s test of equality of error variances, and this test was not significant ($p = .84$) thus satisfying this assumption. As with the previous analysis, we evaluate the effect size and power for this test. The effect size indicates a small to medium effect ($\eta^2 = 0.21$). As the effect size is smaller for this test (and we are using the same $\alpha$-level and identical sample size), it is not surprising that our resulting power is somewhat weaker for this analysis. The omnibus power of this test is $\beta = 0.75$. Cohen’s (1988) guidelines suggest trying to achieve a power of 0.80 or higher, so ideally our sample size would have been larger in the hopes of improving our probability of detecting any additional effects that genuinely exist. As it currently stands, our test represents a more conservative test of Hypotheses 2.

The results of our test of between-subjects effects shows the main effects of time and attribution as significant (please see Table 7). Figures 6 and 7 are presented to accompany this discussion. Time was demonstrated to have a significant main effect on the buyer’s deviation from optimal during the concluding era. However, this occurred in a direction opposite to what we hypothesized; as evidenced by Figure 6, respondents in the early time to violation treatment tended to exhibit greater deviations from optimal than those respondents in the late time to violation treatment. The marginal mean order quantities for the early and late time to violation treatments are 47.51 and 39.35 units below optimal, respectively. Additionally, respondent behaviors associated with our two different attribution treatments demonstrated a significant difference. Those buyers in the external attribution treatment submitted an average order quantity 33.24 units below
optimal. However, those buyers in the reneging attribution treatment placed average order quantities 53.80 units below optimal.

Although not hypothesized, we do find a significant interaction between time to violation and violation attribution. Figure 8 graphically depicts this interaction. It is observed that while reneging indeed leads to greater deviations from the optimal order quantity, the most severe drops (approximately 70 units below optimal) occur when the time to violation is early. This is compared to a drop of approximately 40 units from optimal when the violation occurs late in the experiment.

Finally, we also observe significant effects of the international status of the student, as well as the buyers’ initial ordering behavior (prior to imposition of violation by the supplier). The significance of the initial ordering behavior indicates existence of an overall pattern of ordering behavior among our buyers – those who start the experiment with higher than average order quantities tend to exhibit smaller deviations (or higher than average order quantities) during the post-violation periods, as well.
Table 7: ANCOVA results for buyer ordering behavior during the concluding era; dependent variable is deviation from optimal during concluding era

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (Male = 0, Female = 1)</td>
<td>440.76</td>
<td>1</td>
<td>440.76</td>
<td>0.14</td>
</tr>
<tr>
<td>International status (Not Intl = 0, Intl = 1)</td>
<td>20268.83</td>
<td>1</td>
<td>20268.83</td>
<td>6.39**</td>
</tr>
<tr>
<td>Ave initial order</td>
<td>191087.48</td>
<td>1</td>
<td>191087.48</td>
<td>60.23***</td>
</tr>
<tr>
<td>Time (Early = 0, Late = 1)</td>
<td>17980.96</td>
<td>1</td>
<td>17980.96</td>
<td>5.67**</td>
</tr>
<tr>
<td>Severity (Minor = 0, Major = 1)</td>
<td>684.48</td>
<td>1</td>
<td>684.48</td>
<td>0.22</td>
</tr>
<tr>
<td>Attribution (External = 0, Reneging = 1)</td>
<td>33100.21</td>
<td>1</td>
<td>33100.21</td>
<td>10.43***</td>
</tr>
<tr>
<td>Time*Severity</td>
<td>691.69</td>
<td>1</td>
<td>691.69</td>
<td>0.22</td>
</tr>
<tr>
<td>Time*Attribution</td>
<td>10265.90</td>
<td>1</td>
<td>10265.90</td>
<td>3.24*</td>
</tr>
<tr>
<td>Severity*Attribution</td>
<td>401.67</td>
<td>1</td>
<td>401.67</td>
<td>0.13</td>
</tr>
<tr>
<td>Time * Attribution * Severity</td>
<td>94.64</td>
<td>1</td>
<td>94.64</td>
<td>0.03</td>
</tr>
<tr>
<td>Error</td>
<td>901077.20</td>
<td>284</td>
<td>3172.81</td>
<td></td>
</tr>
</tbody>
</table>

*p ≤ .10  
**p ≤ .05  
***p ≤ .01
Figure 6: Main effects analysis of buyer's deviation from optimal order quantity during the concluding era, separated by Early and Late Time treatments.

Figure 7: Main effects of buyer's deviation from optimal order quantity during the concluding era, separated by External and Reneging Attribution treatments.

Figure 6: Main effects analysis of buyer's deviation from optimal order quantity during the concluding era, separated by Early and Late Time treatments.

Figure 7: Main effects of buyer's deviation from optimal order quantity during the concluding era, separated by External and Reneging Attribution treatments.
Figure 8: Interaction effects of time to violation and attribution on buyer's change from optimal order quantity during the concluding era

Results of a hierarchical multiple regression analysis are shown in Table 8, and aid in interpretation of the findings, especially in regards to the covariates. The control variables of gender, international student status, and average order quantity of the subject during the initializing era were entered in step one, and in step two we added in the independent variables of time, severity, and attribution. International students, who were coded with a value of 1, maintain a greater deviation from the optimal order quantity during the concluding era. (Interestingly, gender is not significant in this analysis, meaning the ordering behavior of females during the concluding era evens back out to the ordering pattern of males.) We observe the same pattern with initial ordering behavior as we did in the analysis for Hypotheses 1; those subjects who made higher orders during
the initial era are found to make significantly higher orders during the concluding era, as well. We also observe that when the violation occurs late in the experiment (= 1), then the change from optimal is significantly smaller than it is for those experiencing violation early in the experiment. We also show that when the attribution provided is reneging in nature (= 1), the change from optimal is significantly greater than for those receiving external attributions. The effect associated with attribution is greater than that associated with time. The model presented here accounts for 21.6% of the variation in ordering deviations below the optimal.

In light of these results, we make the following statements regarding our specific hypotheses regarding a subject’s ordering quantities below the optimal during the concluding era:

a. It is not supported that order quantities will deviate from optimal more in the late time to violation treatment than in the early time to violation treatment.

b. It is not supported that order quantities will deviate from optimal more in the major discrepancy treatment than in the minor discrepancy treatment.

c. It is supported that order quantities will deviate from optimal more in the reneging attribution treatment than in the external attribution treatment.

Although not hypothesized, we do observe a significant two-way interaction between time to violation and attribution for the violation.
Table 8: Regression results for buyer ordering behavior during the concluding era; dependent variable is deviation from optimal during the concluding era

<table>
<thead>
<tr>
<th>Dependent Variable: Average deviation from optimal during concluding era</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>t</td>
</tr>
<tr>
<td>Constant</td>
<td>223.84</td>
<td>8.58***</td>
</tr>
<tr>
<td>Gender</td>
<td>1.14</td>
<td>0.17</td>
</tr>
<tr>
<td>Intl status</td>
<td>23.36</td>
<td>2.72***</td>
</tr>
<tr>
<td>Average Initial Order Quantity</td>
<td>-0.44</td>
<td>-7.28***</td>
</tr>
<tr>
<td>Time</td>
<td>-15.92</td>
<td>-2.38**</td>
</tr>
<tr>
<td>Severity</td>
<td>3.29</td>
<td>0.50</td>
</tr>
<tr>
<td>Attribution</td>
<td>21.12</td>
<td>3.22***</td>
</tr>
<tr>
<td>F</td>
<td>20.24***</td>
<td>13.25***</td>
</tr>
</tbody>
</table>

*p ≤ .10
**p ≤ .05
***p ≤ .01

Hypotheses 3 through 5

In Hypotheses 3 through 5, we predicted that the treatment conditions of time to violation, severity of violation, and violation attribution would exhibit certain relationships with the psychological assessments of psychological contract violation, trust, and perceived fairness. To analyze this set of hypotheses, we employed linear regressions using the treatment condition dummies as the independent variables, and the various psychological assessments separately as the dependent variable. We also included control variables of gender and international student status in each of the analyses.
Factor Analysis of the Psychological Contract Violation Construct

All of the dependent variables are single-measure items except for psychological contract violation, which was measured using four questions adopted from Robinson and Morrison (2000). As such, to best incorporate the psychological contract violation items into our regression analysis, we created a single factor score for this construct using maximum likelihood estimation.

The variables were observed to correlate well; all of the correlations were significant and none of the correlation coefficients exceeded a value of 0.9. The determinant of the R-matrix was evaluated to test for multicollinearity or singularity; the resulting value of 0.23 is greater than .00001 as is desired. We also ensured that factor analysis conducted on our sample would result in distinct and reliable factors by assessing the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO). Our KMO statistic is 0.83, which indicates that factor analysis is indeed appropriate for these data (Kaiser, 1974). Bartlett’s test of sphericity tests the null hypothesis that the original correlation matrix is an identity matrix. In other words, it tests whether the correlation coefficients are equal to zero, thus implying no relationships between variables. The significant value we achieved on this test (p < 0.001) indicates that R-matrix is not an identity matrix, and therefore factor analysis is deemed appropriate. The final diagnostic performed assesses the residual values, or the differences between the matrix based on the model and the matrix based on our sample of data. Less than 50% of the residual values have an absolute value > 0.05, which is indication of a good model.
Results of the factor analysis show one factor extracted, with factor loadings for each of the four items exceeding 0.40 (see Table 9 for factor loadings). As a final step to the analysis, we conducted a reliability analysis. Corrected Item-Total Correlations assess correlations of the individual items to the total, and values should exceed 0.30. As shown in Table 9, the Corrected Item-Total Correlations for this factor do indeed exceed 0.30. We also evaluated values demonstrating whether removal of any item would result in an improvement to the Cronbach’s alpha score for the overall factor (shown as the Alpha if Item Deleted values in Table 9). We did not observe any substantial gains to be achieved by deleting an item. The Cronbach’s alpha for this construct is 0.94.
Table 9: Factor analysis of the psychological contract violation construct

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor Score (Maximum Likelihood Estimation)</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Construct Cronbach alpha = .94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Corrected Item-Total Correlations</td>
</tr>
<tr>
<td>I feel a great deal of anger toward my supplier.</td>
<td>.89</td>
<td>.84</td>
</tr>
<tr>
<td>I feel betrayed by my supplier.</td>
<td>.93</td>
<td>.89</td>
</tr>
<tr>
<td>I feel that my supplier has violated the contract</td>
<td>.86</td>
<td>.83</td>
</tr>
<tr>
<td>between us.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel extremely frustrated by how I have been treated</td>
<td>.90</td>
<td>.88</td>
</tr>
<tr>
<td>by my supplier.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regression Results

Regressions were conducted using hierarchical multiple regression analysis. The control variables of gender and international student status were entered as Model 1, followed by the predictor variables time to violation, severity of violation, and violation attribution in Model 2. Separate regression models were run using each of the psychological assessment constructs individually as the dependent variable.
The first set of hypotheses, Hypotheses 3, assesses the relationship between the independent variables on psychological contract violation. Both the initial model with control variables significantly improved our ability to predict psychological contract violation, as did our model with the predictors of time, severity, and attribution which was found to be significant. We assessed the assumption of independence of errors with the Durbin-Watson statistic, which is close to 2 indicating the assumption is likely met.

In analyzing Model 2 of Table 10, we observe that there are significant main effects associated with severity and attribution in predicting a subject’s psychological contract violation experience. In addition, Model 2 shows that international student status was also significant. Variance Inflation Factors (VIFs) are all well below 10, and tolerance values well above 0.20; as such, we do not expect multicollinearity to be a problem with this data (Myers, 1990; Menard, 1995). In summary, the results of our analysis show the following in regard to the buyer’s experience of psychological contract violation:

a. It is **not supported** that late violations will be associated with greater feelings of psychological contract violation than early time to violations.

b. It is **supported** that major violations will be associated with greater feelings of psychological contract violation than minor violations.

c. It is **supported** that violations attributed to reneging will be associated with greater feelings of psychological contract violation than violations attributed to external causes.
Table 10: Regression results for psychological contract violation on treatment condition variables and controls

<table>
<thead>
<tr>
<th>Dependent Variable: Experience of Psychological Contract Violation</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standardized $\beta$</td>
<td>t</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.42</td>
<td>-1.85*</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.04</td>
<td>-0.69</td>
</tr>
<tr>
<td>Intl status</td>
<td>0.14</td>
<td>2.40**</td>
</tr>
<tr>
<td>Time</td>
<td>-0.06</td>
<td>-1.10</td>
</tr>
<tr>
<td>Severity</td>
<td>0.15</td>
<td>2.59***</td>
</tr>
<tr>
<td>Attribution</td>
<td>0.12</td>
<td>2.09**</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td>2.96*</td>
</tr>
</tbody>
</table>

*p $\leq$ .10
**p $\leq$ .05
***p $\leq$ .01

The second set of hypotheses, Hypotheses 4, assesses the relationship between the independent variables on a buyer’s trust in the supplier. Again, the initial model with control variables significantly improved our ability to predict trust, as was our model with the predictors of time, severity, and attribution found to be significant. The Durbin-Watson statistic is close to 2 indicating the assumption of independence of errors is likely met.

An analysis of the individual contribution of the predictor variables to the regression model is shown in Table 11. Severity and attribution both make significant
contributions to predicting the assessment of trust made by the buyer in the experiment. As with psychological contract violation, international student status is also significant. Multicollinearity is not considered a problem, as assessed by the VIFs which are all well below 10, and the tolerance values which are well above 0.2. To summarize, the results of our analysis show the following in regards to a buyer’s assessment of trust in his/her supplier:

a. It is **not supported** that late violations will be associated with less trust in the supplier than early violations.

b. It is **supported** that major violations will be associated with less trust in the supplier than minor violations.

c. It is **supported** that violations attributed to reneging will be associated with less trust in the supplier than violations attributed to external causes.
Table 11: Regression results for buyer trust in the supplier on treatment condition variables and controls

<table>
<thead>
<tr>
<th>Dependent Variable: Buyer’s Assessment of Trust in Supplier</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standardized</td>
<td>t</td>
</tr>
<tr>
<td>Constant</td>
<td>36.99***</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.03</td>
<td>0.44</td>
</tr>
<tr>
<td>Intl status</td>
<td>0.13</td>
<td>2.31**</td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td>0.04</td>
</tr>
<tr>
<td>Severity</td>
<td></td>
<td>-0.13</td>
</tr>
<tr>
<td>Attribution</td>
<td></td>
<td>-0.14</td>
</tr>
<tr>
<td>F</td>
<td>2.91*</td>
<td></td>
</tr>
</tbody>
</table>

*p≤.10
**p≤.05
***p≤.01

Hypotheses 5 assess the relationship between the independent variables of time, severity, and attribution on how fair a buyer perceives his/her supplier to be. The initial model with control variables did not significantly improve our ability to predict fairness; however, our model with the predictors of time, severity, and attribution was found to be significant. We judge the assumption of independence of errors to be satisfied as suggested by the Durbin-Watson statistic (value of 2.076).

Table 12 summarizes the individual contributions of the predictor variables to the regression model. Severity and attribution both make significant contributions to predicting the assessment of fairness made by the buyer in the experiment. Neither of our
control variables proved significant in our assessment of supplier fairness. VIFs and
tolerance values suggest multicollinearity is not a concern. To summarize, the results of
our analysis show the following in regards to a buyer’s assessment of supplier fairness:

a. It is not supported that late violations will be associated with less perceived
   fairness of the supplier than early violations.

b. It is supported that major violations will be associated with less perceived
   fairness of the supplier than minor violations.

c. It is supported that violations attributed to reneging will be associated with
   less perceived fairness of the supplier than violations attributed to external
   causes.
Table 12: Regression results for buyer's assessment of supplier fairness on treatment condition variables and controls

<table>
<thead>
<tr>
<th></th>
<th>Dependent Variable: Buyer’s Assessment of Supplier Fairness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
</tr>
<tr>
<td></td>
<td>Standardized β</td>
</tr>
<tr>
<td>Constant</td>
<td>38.74***</td>
</tr>
<tr>
<td>Gender</td>
<td>0.00</td>
</tr>
<tr>
<td>Intl status</td>
<td>0.02</td>
</tr>
<tr>
<td>Time</td>
<td></td>
</tr>
<tr>
<td>Severity</td>
<td>-0.15</td>
</tr>
<tr>
<td>Attribution</td>
<td>-0.20</td>
</tr>
<tr>
<td>F</td>
<td>0.08</td>
</tr>
</tbody>
</table>

*p ≤ .10
**p ≤ .05
***p ≤ .01

Discussion

For the following discussion, we maintain parsimony by separating out evaluations of the behaviors of our participants into the two eras of interest: the era of violation and the concluding era. We further provide clarity to the discussion by relating behaviors associated with the era of violation to issues of fairness, and the relating the behaviors observed in the concluding era to the themes of psychological contract violation and trust.
This division of psychological constructs to the observed economic behaviors provided the most focused and substantive assessment of the results from our experiment.

The Era of Violation

From our analysis of the era of violation, we observed that there was a significant main effect of severity. Interestingly, the results were counterintuitive in that those buyers in the minor violation treatment condition made decisions that deviated farther below optimal than those in the major violation treatment condition. A graphical examination of the optimal order quantities given the two severities of violation may prove useful in understanding what we describe may be occurring (see Figure 9).

As evidenced from the Figure, all participants should be ordering the optimal quantity of 450 units during the initial era. They were educated on optimal ordering during the experiment introduction, and a graph depicting this information was available to them for the duration of the experiment. Our analysis, described previously, indicates that our participant’s average order quantities during this time period did not statistically differ between treatments. During the subsequent era of violation, those buyers experiencing a minor violation would optimally place order quantities of 410 units, and those buyers experiencing a major violation would optimally place order quantities of 340 units. However, note the line indicating the average demand, 400 units, which buyers are told is historically observed for this item. The average demand is lower than the optimal order quantity for those in the minor violation treatment condition, but much higher than the optimal order quantity for those in the major treatment condition. We
contend this is an important detail, in that previous research has identified an anchoring effect associated with the mean demand for an item (Schweitzer and Cachon, 2005; Bolton and Katok, 2008; Bostian, Holt, and Smith, 2008; Lurie and Swaminathan, 2009). The anchoring and adjustment phenomenon (Tversky and Kahneman, 1974) is a heuristic used to reduce otherwise complex tasks that individuals do not possess the capacity to assess, the reliance on which results in well-known systematic errors of cognitive bias.

Relating this phenomenon to the current study, what this essentially implies is that if a participant is in the minor violation treatment, that participant can drop the order quantity below optimal and still achieve close to the mean demand rates to which the participant is anchored. But if the participant is in the major violation treatment, drops below optimal also take the order quantities much farther from the mean demand anchor. Ultimately, it is hence perceived much riskier for buyers in the major treatment to deviate far below optimal than it is for those in the minor treatment, considering the position of mean demand. The outcome, which we observe here, is that those in the minor treatment have more freedom to drop order quantities to a greater extent than those in the major treatment, and these buyers act accordingly. The results are indicative of some interplay between risk aversion (gravitating towards the anchor of mean demand) and retaliatory behaviors (dropping order quantities more than what is rationally dictated by the buy-back price).

It is also interesting to note that in neither of the severity treatment conditions do the average order quantities reach the completely uncoordinated order quantity of 300 units. This indicates that regardless of the treatment, buyers were unwilling to send a
message of complete relationship negation to their supply chain partner. The potential financial benefits of coordinating in future periods appear to take precedence over any immediate losses they were experiencing.

We relate what we have observed with the different treatment conditions to the fairness construct. During the era of violation, we observed that severity of the violation was associated with significantly different ordering behaviors by respondents, in terms of their deviations from optimal. Evaluating the results of our regression analyses in the previous section, we find that the severity treatment condition is significantly associated with lower buyer assessments of supplier fairness. Specifically, when the buyer was in the major violation treatment, he or she identified the supplier as less fair compared to those buyers in the minor violation treatment. Rabin (1993) argues that individuals who perceive they have been treated unfairly will have a desire to punish those who hurt them.

In the pricing arena, empirical evidence demonstrates that prices have an affective quality (O’Neill and Lambert, 2001), and affect is shown to be a powerful determinant of behavior (Frijda, 1986; Lazarus, 1991). Specifically, perceived price increases are associated with increased negative affect and passive consumer behavior modeled as lower purchase intent (Peine, Heitmann, and Herrmann, 2009). This evidence supports the framework proposed by Xia et al. (2004), in that negative affect mediates the relationship between pricing information (a cognitive appraisal) and subsequent consumer behavior. Work in neuroscience supports the notion that a primary emotion like anger (Kemper, 1987) is a fast-activated emotion, and as such occurs much quicker than any cognitive assessment to under-reward (Turner, 2007). Based on the literature
surveyed, we assume that actions derived from fairness assessments are the result of *emotional* biases.

This expression of fairness, however, does not match the magnitude of deviations observed in the buyer’s actual ordering behaviors. If a buyer in the major violation treatment assessed the supplier as less fair, why was this not reflected by a greater deviation from optimal during the era of violation than what we observed from buyers in the minor treatment? We refer once again to our discussion surrounding Figure 9. A buyer may identify his/her supplier as unfair due to the disequity in outcomes achieved during certain periods of the experiment, but be constrained in the quantity of the corresponding order deviation by an anchoring effect on the mean. Our data reveals that indeed those buyers in the major violation treatment are adjusting their order quantities both downward from optimal, as well as downward from the mean. In other words, directionally speaking, their ordering adjustments during the era of violation are indicative of an optimally adverse behavioral response to the violation imposed upon them. However, buyers in the major severity treatment exhibit hesitation in dropping “too far,” which could indicate that the anchor presents a stronger *cognitive* bias than the *emotional* bias associated with sentiments of unfairness on their ultimate decision-making within this particular context. Cognitions and emotions are purported to have independent and nonredundant effects on behaviors (Schwarz, 2000; Sojka and Giese, 1997). Evidence shows that when affect and cognitions move together, that affect strengthens predictions of consumer behavior over and above cognitions, but this relationship decreases as the price discrepancy increases (Peine et al., 2009). Our research is unique in
that it demonstrates in the scenario presented a precedence of cognition over affect when the two forces move in opposing directions.

Figure 9: Optimal order quantity summary for Major and Minor treatments, compared to mean demand

The Concluding Era

First, as observed by the data of post-violation order deviations, there is a main effect of attribution on deviation from optimal. Our analysis of buyers’ decision-making behaviors subsequent to a supplier-induced relationship violation revealed that those violations
attributed to reneging result in greater deviations from the optimal order quantity than violations attributable to external causes. This relationship offers insights into why buyers may elect to make sub-optimal ordering decisions. Reneging represents an affront to the buyer-supplier relationship; the supplier openly admits preference for other buyers. Voluntariness of violations heightens the experience of that violation (Rousseau, 1995). Our buyers can readily observe through the feedback provided to them during the experiment that their supplier, in the periods during which a lower buy-back price is provided, is reaping additional profits at the buyer’s expense. As such, the outcome not only conveys lack of stability but is indicative of a lack of supplier integrity and benevolence, as well. These are conditions prime for degrading trust, and furthermore may lead to a loss of confidence that ongoing reciprocal obligations will be fulfilled (Robinson, 1996). The reaction of our buyers, as conveyed through order quantities placed throughout the remaining periods of the experiment, was to order less than optimally. By ordering less than optimal, the buyer may be demonstrating retaliation against the supplier by the only mechanism available.

Tying our attribution conditions to the exit survey data, we see that an attribution of reneging was indeed significantly associated with both heightened experience of psychological contract violation and a lack of trust in the supplier. Trust in a partner is essential for establishing integrity and eliminating uncertainty (Zhao et al., 2007), and the violation in this instance damaged any trust that had accrued between our buyer and supplier. It is clear that these sentiments experienced by our buyers were manifested in the form of lower order quantities. Specifically, a buyer who received a message of
reneging at the time of violation considered trust to be lacking in the relationship and the terms of the psychological contract to have been violated, and subsequently ordered in a more conservative fashion for the remainder of the game. Due to the attribution of reneging, there appeared to be some hesitation on the part of these buyers to return their order quantities to the same level of their external attribution counterparts.

Second, our analysis of the post-violation order deviations data also revealed a main effect of time to violation. Our expectation was that existence of a cooperative performance history would increase the experience of a violation, result in decreased assessments of trust in the partner, and therefore lead to behaviors that deviated from those expected to achieve optimality under cooperative buy-back conditions. However, observations regarding the relationship between buyers’ ordering behavior and the timing of the violation ran counter to these expectations, in that early violations appear to be related to decreased ongoing buyer effort towards maintaining a cooperative relationship with the supplier.

Relating the order deviations to the exit survey data, we see that time to violation did not show a significant association with the psychological contract and trust variables. This was in contradiction to our expectations, but does correspond with inconsistencies noted in the literature. In Bottom et al. (2002), violations occurring later in the relationship were found to be more damaging than those occurring early. Their logic, and the one we emphasized in drawing our own hypothesis, is that a longer history of interactions allows for development of stronger connections. Bottom et al. (2002) observed that late violations appeared to have both cognitive and emotional reactions,
whereas violations early on lack an emotional component. However, Sitkin and Roth (1993) discuss the notion of generalized value incongruency, under which a violation may stigmatize an individual and prevent trust from ever taking root. Lount et al. (2008) conducted an experiment in which they found early violations to have “devastating long-term consequences”, especially as compared to those violations occurring later.

Analysis of post-violation order deviations revealed a significant interaction of time and attribution. When the violation occurs early in the experiment, the deviation from optimal is greatly exacerbated for those buyers in the reneging treatment condition. One plausible explanation for this is that early in the relationship, the buyer is paying closer attention to supplier activity, thus the early and reneging violation is more salient than a later one (Morrison and Robinson, 1997). Moreover, early periods in the experiment represent a relationship formation stage, and at this point of the relationship insufficient goodwill has been established to mitigate the consequences of a violation. However, as buyers are well into a relationship with their supply chain partner, a positive orientation regarding the relationship history may affect their interpretation of interactions (Robinson, 1996). Individuals tend to engage in selective perception of their environment, filtering out information inconsistent from one’s beliefs and attitudes (Fiske and Taylor, 1984). In this stage of the relationship, partners have built up some good will with one another, and therefore may find they are willing to overlook the type of indiscretions that had such severe effects early on. In our experiment, late violations – whether attributed to external causes or reneging - do not elicit vastly different ordering
responses from our buyers. As such, they appear to be less attuned and sensitive to violations at that point in their relationship life cycle.

Third, we observe that regardless whether the violations were minor or major in degree, our participant’s order quantities deviated from optimal approximately equivalently. This finding is somewhat surprising, as it was hypothesized that major violations should be more salient and are certainly more harmful to the buyer, and as such should elicit stronger reactions from that buyer. We suggest one possibility for this result may be due to the context of the decision in regards to violation severity. When the buy-back price changes, there is a concrete, mathematical response to such a deviation; the parameters that are changing are directly related to the calculations associated with buy-back pricing incentives. The decision of what order quantity to place given different buy-back prices is, as such, largely a cognitive one.

Exit survey data related to the severity treatment demonstrates that both experience of psychological contract violations and trust levels are strongly affected by the severity of violation. We believe this discrepancy in sentiments and ordering behavior may be explained at least in part by the buyer’s availability of a mechanism to deal directly with perceived violations related to the severity treatment. Greater deviations in severity evoke a stronger emotional response, but these negative associations with the violation can be tempered with the process in place to adjust order quantities to the newly observed buy-back price. Such established processes exist for many of the decisions made within the operations and supply chain functions, and are aided in practice by technological applications like enterprise resource planning systems. This is unlike the
treatment involving attribution, in which negative sentiments associated with reneging are relational in nature, and there is not a defined and well-known process with which to cope.

Control Variables

In our analyses of the various treatment conditions, we employed two control variables, gender and international student status, which led to some interesting results. We will explore each of these variables in turn.

During the era of violation, we noted that females ordered significantly differently from males. Specifically, all else equal, females tended to order 20 fewer units than their male counterparts during this era. In a study by Eckel and Grossman (1996), women were willing to sacrifice earnings to punish an unfair partner significantly more so than men. This appears to be what we are observing in our own data and experiment. However, we also observe that this phenomenon is grounded in fairness, and the female buyers assessed their suppliers no differently from the male buyers on the fairness construct in the exit survey. Why is it that the females made changes to their ordering behavior during the era of violation consistent with one punishing an unfair partner, but chose not to identify them more strongly as such?

We turn to females’ observed behavior in the subsequent phase for our answer. After the violation ended, females were found to bring their order quantities back up to a level equivalent with the males. Previous literature has uncovered a tendency for females to be at least as likely, and often more likely, to engage in reciprocity (Eckel and
Grossman, 1996). Additionally, these authors found women to be price sensitive. In this situation, once fairness of price is reestablished, it is too costly for the buyer to continue engaging in excessive retaliatory or punishing behavior. Thus, all else equal, the ordering behaviors of men and women restabilize. We sense this has important implications for responses on the survey. The survey, recall, was administered at the end of the ordering experiment. In response to the question regarding supplier fairness, females may be assessing their supplier on the overall or even on the most recent behaviors. In order for us to directly tie the theory that perceived unfairness of the supplier was indeed what caused the difference in deviations from optimal between men and women during the era of violation, we could have administered the survey questions immediately following that era. However, this comes with its own hazard, as it has the potential to introduce demand effects into the experiment thus compromising the validity of the study (Croson, 2002).

The international status of our buyers also revealed some interesting observations. Whereas gender played into ordering behaviors during the era of violation but not the concluding era, international student status was found to affect ordering behaviors during the concluding era but not the actual era of violation itself. Specifically, those buyers who identified themselves as international students placed orders, on average, that were approximately 21 units less than optimal over non-international students. From the survey results, we observe that international students reported significantly increased levels of psychological contract violation. As such, they were more prone to experience sentiments of anger, betrayal, violation, and frustration by the actions of their supply chain partner. These feelings appear to have manifested in the form of lower-than-optimal order
quantities for the remainder of the experiment. However, if this were the case, why did these international students also report increased levels of trust in their supplier? These two assessments appear to contradict one another.⁴ However, an examination of fundamental business practices in China may provide a clue.

Historically in China, business is often conducted without the support of a written contract; relationships are based on sentiments of trust (Si, Wei, and Li, 2008) and higher levels of generalized trust are evident in China versus the U.S. (Buchan and Croson, 2004). This is consistent with the Chinese concept of guanxi, a deep-rooted governance mechanism built on trust and close interpersonal connections resulting in large part from China’s collectivist culture (Gu, Hung, and Tse, 2008). Higher scores on the trust construct in our survey may be reflective of this more general outlook on trust. However, just because our international participants are more prone to express trust in their supplier does not mean they are blind or numb to the effects of a violation in relationship expectations. In fact, as members of a collectivist culture, they are more likely to engage in passive behaviors including loyalty (constructive) and neglect (destructive) in response to such a violation (Thomas, Au, and Ravlin, 2003), and the violation is likely to more profoundly affect these individuals (Brockner, Tyler, and Cooper-Schneider, 1992). In our study, loyalty is demonstrated by high levels of trust in the supplier and neglect is fashioned with the only response available to buyers in this experiment – by lowering their order quantities.

⁴ In attempting to describe the differences observed between international and non-international subjects, we are aware that we are lumping all international students into a common cultural frame. However, given that fully 41.1% of the international students identified themselves as Chinese, and a total of 78.6% of the international students identified themselves as from East Asia, we believe this is a fair representation for our cursory discussion.
While investigations into the nuances of gender and international status were not primary objectives in our study, we are intrigued by the results we have found. The contributions on this front are valuable to understanding key differences in managerial behaviors, and open a fruitful avenue for continued research in these areas.

Conclusion

This experiment was designed to better understand when and how individuals react to violations of relationship expectations within the context of a buyer-supplier exchange. The foundation of work in the operations and supply chain management areas have presented us with many normative models illustrating optimal decisions given various parameters. These models are further grounded in the realm of economics, in which we assume that every actor is rational, and his or her utility is derived from profit maximizing decisions. However, we know from empirical evidence that this is not always the case; literature in many fields has gone a long way in demonstrating other factors that tend to be at play in configuring an individual’s utility function. Some of these factors are derived from considerations of social welfare and psychology.

This work expands on the research in this area. We evaluate a buy-back incentive model of inter-firm coordination, wherein the buyer is implored to order more than he would under uncoordinated circumstances by the supplier’s willingness to buy back unsold goods for some salvage price. The supplier, in this instance, is sharing risk with the buyer. Normative models exist that show, certain parameters given, what the optimal
order quantity should be for the buyer. However, these models tend to shun many of the factors affecting relationships of any kind, inter-firm included. We examine specifically the psychological factors at play, and how the sentiments associated with even minor variations in implied contract parameters can have significant and lasting consequences on the behaviors of the individuals involved. This is an important contribution, because the fact of business is that there exists uncertainty; there are times when obligations will not be met. This investigation helps us to understand the repercussions of such an event in the context of a buyer-supplier relationship.

Our research sought to determine those factors associated with violations of relationship expectations in a buy-back incentive scenario, and to better understand how the buyer copes with such relationship violations. We identified a significant main effect of severity negatively affecting the ordering quantities of our buyers during the era of violation. In the experiment we conducted, those subjected to minor violations were much more comfortable in decreasing their order quantities substantially below optimal as compared to those in the major severity violation treatments. This is potentially a reflection of the anchoring and adjustment heuristic, whereby the buyers were overtly cognizant of the average demand and tentative to deviate too far from this known quantity. In none of the treatments were participants observed to completely negate the value of coordination within the relationship, which would have been manifested through order quantities close to the decentralized optimal, or in this case about 300 units. Buyers in the major severity violation treatment did report higher levels of psychological contract violation, as well as decreased assessments of trust and fairness in regards to their
supplier. This reveals a potentially interesting interplay between cognitive and emotional biases which, to our understanding, has not been explored in the literature to date.

In the concluding era, we revealed an unhypothesized yet interesting interaction effect of time and attribution on the deviation from optimal order quantities. Early violations accompanied with a reneging attribution result in the largest deviations from optimal. Supplier monitoring efforts are likely greater during early periods in the relationship, and so deviations are more likely to stand out as compared to violations occurring later in the relationship. Moreover, we suspect that there is some degree of complacency evident in the later periods. Exit survey data reveal that attributions of a reneging nature were tied to significant feelings of psychological contract violation and decreased trust in the supplier. As the reneging attribution is intended to represent a personal affront to the relationship, these findings panned out as expected.

Finally, we did note some interesting phenomena with two of the control variables included in the analysis. Gender differences in ordering behaviors were observed in the era of violation, and reveal that the women in our sample were willing to deviate more from optimal. This difference was only observable in the short run, however; during the concluding era, the ordering behavior of women was not significantly different from that of the men in the experiment. Moreover, their responses to items on the exit survey assessing the psychological constructs of interest revealed no differences from the responses of the males. International students also exhibited ordering patterns different from non-international students. During the concluding era, these buyers were observed to place orders that were, on average, significantly lower from optimal. In this case, the
ordering pattern can be matched to a difference in levels of psychological contract violation experienced by these two groups of participants, where the international students reported higher levels of this phenomenon. This interesting result may be explained by cultural trends evident in the nationalities of the majority of the international respondents, and certainly provide an avenue for future research in this area.
Introduction

Much of the literature on inter-organizational relationships focuses on antecedent conditions or structural properties of partnerships under different forms of governance (Ring and Van de Ven, 1994). However, this does not define how a relationship functions over time, and misses some of the intermediary stages of relationship growth and development, such as a firm’s or manager’s responses to relationship obstacles and hurdles encountered along the way. Relationship conflict management is one of those largely overlooked areas, particularly in the operations and supply chain management literatures. Dirks, Lewicki, and Zaheer (2009) state that most of the extant literature in this critical area focuses on the processes by which relationships are damaged and the implications of such damage. However, largely absent from the literature is evidence of the processes of relationship repair or dissolution. This is an important and noticeable gap, given that for businesses today, the economy places increased emphasis on the development of ongoing relationships with customers and suppliers, and managing these
relationships requires a new set of skills and presents a new world of challenges (Hayes, Pisano, Upton, and Wheelwright, 2005). Even the best-managed collaborative efforts will experience hiccups in their tenure, due to misperceptions and changing values and concepts of fair play (Dwyer, Schurr, and Oh, 1987). Conflict happens; however, the continued longevity of the relationship hinges on how the respective parties respond to conflicts regarding the terms of their exchange.

Our objective in this research endeavor is to investigate how managers respond when an important supply chain partner is perceived to have violated or damaged the relationship in some way, and if certain responses reliably lead to particular outcomes. Our study attempts to understand why a conflict situation leads to litigation or the leveraging of other written contractual governance mechanisms in some cases, and to the deployment of relational contractual governance mechanisms in others. For example, consider the following court case as described in Zhang, Griffith, and Cavusgil (2006):

“[John Paul Mitchell Systems] manufactures Paul Mitchell hair and skin care products, and [China Distribution and Marketing Inc.] distributes and markets beauty products in China. In December 1996, JPMS entered into a contract with CDM. The contract explicitly restricted sales of Paul Mitchell products to professional hair salons located in China and required CDM to educate and train the hair salons that were selected to sell Paul Mitchell products. In March 1998, JPMS first suspected CDM of engaging in gray market activities when JPMS discovered that retail outlets in the United States possessed several dozen bottles of Paul Mitchell products that JPMS had sold to CDM. After many investigations, including sending representatives to China, in August 1999, JPMS concluded that CDM had engaged in gray market activities of Paul Mitchell products. As a result, JPMS initiated the relationship dissolution.” (pp 92 – 93)
We compare this situation with that of a small Ohio-based contract manufacturer, as learned in a personal interview in 2010. The contract manufacturer outsources production of a particular line of kitchen mixers to a reputable production firm in China, providing all necessary equipment to the Chinese firm, and has been doing business with them for some time. During a regularly scheduled visit to the facility, the owner of the Ohio firm observed that the mixers currently coming off the production line had black casings. The mixers he sold to his client were exclusively produced in blue casings. Discussions with the Chinese manufacturer revealed that they had indeed sought out and accepted business with a new client for mixers and was producing them on the contract manufacturer’s equipment without notification or compensation. While the situation was clearly in breach of the agreement between them, the owner determined that no formal resolution would be sought (including for back-profits due to the owner for sales already conducted), and continued to conduct business with the Chinese firm in good faith that such activities would no longer take place.

Specifically, we take a contracts perspective in our investigation, determining how three different contract governance structures - psychological contracts, relational contracts, and written contracts – work independently and dependently in response to conflict that occurs within the context of a buyer-supplier relationship. The effectiveness of the responses elicited by these different types of contracts will be explored in terms of their ability to repair the relationship and the manager’s satisfaction with the outcome achieved.
Academic interest in the social and psychological variables effecting inter-firm relationship management has gained considerable traction. Ring and Van de Ven (1994) propose that as a relationship endures over time, a breach of commitment is less likely to cause termination due to the powerful influence of social-psychological motivations to preserve the relationship. Trust, shared values, and communication are key factors leading to functional conflict management, in which parties seek amicable resolutions to disagreements (Morgan and Hunt, 1994). However, when escalating written contract complexities and deteriorating personal trust exceeds some threshold level, the relationship is likely to terminate. We evaluate the decision-making process of a contract manager who has encountered a conflict within the buyer-supplier relationship. The role of the psychological contract, the relational contract, and the written contract will be evaluated for how they influence the manager’s response to this situation.

Our contribution with this research seeks to fill a critical void in the literature, by examining the decision-making processes by which managers deal with conflict in key buyer-supplier relationships. By improving our understanding of these processes and the associated outcomes, managers will be better equipped to deal with disputes with their partners in a manner most likely to achieve the desired outcomes. We contribute to the academic literature by extending our theoretical understanding of various governance structures as they apply to conflict management in a buyer-supplier relationship.
Model Development

In Chapter 2 we discuss various ways in which managers might handle the inevitable conflict arising in their relationship with supply chain partners; specifically, we address the written contract and the relational contract as governance mechanisms. We revisit these concepts here first, reviewing the literature to date that assesses the ability of each of these mechanisms to resolve conflict, and when each is likely leveraged. We then return to the idea of the psychological contract, also first discussed in Chapter 2, and propose how this individual-level contract between a manager and the manager’s supply chain partner has the potential to serve as a moderating or mediating construct in the relationship between inter-firm conflict and governance resolution mechanism employed. Following that discussion, we focus on additional factors considered crucial to a thorough investigation of our contracts analysis of conflict resolution. This includes the type of conflict instigating a response, as well as multiple control variables of interest. Finally, we turn our attention to the outcomes of interest in these particular models. The models serving as the focal point of our discussion are shown in Figures 10 and 11.
Written and relational contracts may both prove useful in managing exchange conflict when it occurs. Written contracts, at their point of adoption, may be designed in such a
way as to specify possible contingencies and delineate a plan for resolving these conflict situations. However, there can exist tremendous difficulty in identifying all possible risks, and in many cases firms choose not to invest the time and effort required of this exercise, or simply cannot due to the nature of the specific exchange. One example involves the procurement of engines by the Air Force; early contractual agreements between the Air Force and the firm Pratt and Whitney were less structured, and hence more incomplete, than later-era contracts whose drafters had the benefit of experience behind them (Crocker and Reynolds, 1993). Moreover, as Crocker and Reynolds note, contract completeness also tended to vary depending on the supplier, with Pratt and Whitney subjected to systematically more complete contracts than their competitor, General Electric. In lieu of complete information, a written contract may more generally specify the processes to be adhered to in resolving unforeseen events. One utility of written contracts in this domain is to provide a legal safety net for addressing otherwise irresolvable disputes (Handley and Benton, 2009). Conflict often leads to a renegotiation stage which resolves itself in either supplemental agreements or modifications to the written contract, or relationship termination (Ring and Van de Ven, 1994).

Macaulay, in his seminal 1963 work, acknowledges that disputes are regularly resolved without reference to a written contract; as one purchasing manager interviewed stated: “You don’t read legalistic contract clauses at each other if you ever want to do business again” (p 61). Macaulay notes this notion extends to dealings with other business units as behaviors form a firm’s general business reputation. Evidence exists demonstrating that nearly five decades later this is still the case. For example, recent
empirical evidence has revealed that outsourcing performance hinges on relationship management, and surprisingly not on contractual completeness; this despite the fact that outsourcing teams are investing considerable time and effort into developing complete contracts (Handley and Benton, 2009). In their study of 52 technology development contracts involving 78 unique organizations, Ryall and Sampson (2009) report that the majority of those organizations elected not to pursue legal dispute resolution processes, however, they do find that prior experience in working together often led to more detailed contracts that are prone to include monitoring and penalty clauses. What we take-away from these research findings is that effective relationship management appears to remain of critical importance, but that organizational resources are still devoted to developing more stringent and explicit management documents. When and how these governance structures affect the decision making processes of those managing the relationship is of interest to our current research effort.

The bottom line, of course, is that most firms engaged in inter-firm relations have two clear options available to them when deciding how to respond to conflict: there is almost always some form of written contract, and there exists relational contract mechanisms ready to deploy, as well. Since many firms work to develop both governance structures, when is one mechanism more useful than another, especially in response to episodes of conflict? An evaluation of the literature as it pertains to contracts and conflict follows. There are noticeable gaps involving when a particular governance mechanism is activated in response to conflict of varying types, and multi-faceted assessments of the associated outcomes.
Written Governance Mechanisms

Much of the literature on contractual governance mechanisms, as discussed here, suggests that reliance on written contractual clauses to resolve inter-firm conflict is relatively rare in practice. However, this is not exclusively the case. Investigations have revealed the prevalence of litigation in particular industries, such as aerospace engineering. In an effort to protect their own customer relationships, original equipment manufacturers took their suppliers to court for copyright infringement and patent violations (Rossetti and Choi, 2005, 2008). It has also been interesting for researchers to understand the outcomes associated with litigation. In their research endeavor, Kaufmann and Stern (1988) cull their sample from a listing of terminated lawsuits between commercial entities filed with the United States District Court for the Northern District of Illinois. Based on the 32 cases included in the final sample, the authors find that when the relationship is characterized as relational it tends to mitigate any long-term hostility resulting from the litigation, whereas in cases in which the relationship is absent of such relational norms heightened hostility is reported. Finally, Zhang et al. (2006) focus on international distribution relationships, using information acquired from 19 legal cases occurring over a 20-year period to develop a process framework describing litigated dissolution of such relationships. The impetus of these cases are a variety of noncooperative incidents, such as failure to meet quality standards, price discrimination, trademark or patent infringement, or failure to make payment; common among them,
however, is that all these cases were dissolved through court processes (Zhang et al, 2006).

*Relational Governance Mechanisms*

Relational governance mechanisms have been previously evaluated in the literature in several ways associated with conflict. A 2006 study by Griffith, Harvey, and Lusch found that relational behaviors (based on the norms of flexibility, information sharing, and solidarity) were negatively associated with frequency of conflict, where the conflict types were primarily characterized by operational phenomena (i.e. product quality, pricing issues, delivery delays). This provides a good characterization of one benefit of relational techniques employed to buyer-supplier relationships – that it reduces conflict from happening in the first place. Our work differs in that we look at the effectiveness of the use of such techniques in response to conflict that has actually occurred. Using the nomenclature “constructive conflict resolution techniques,” Monczka, Petersen, Handfield, and Ragatz (1998) describe various techniques promoting a joint resolution of conflict between the parties (i.e. relational governance mechanisms), and empirically find that these behaviors tend to result in positive, or “successful,” outcomes, especially as compared to “destructive forms of conflict resolution” such as arbitration. In that research, the frequency of the use of different conflict resolution techniques was assessed as a sweeping assessment to conflict in general, rather than an evaluation of the specific strategies employed as a result of differing conflict types. Similarly, Tomlinson, Dineen, and Lewicki (2004) evaluate a model of relationship reconciliation and trust
reconstruction that focuses primarily on characteristics of any apology offered by the offender (for example, the timeliness and sincerity of the apology) and on the history and future probability of conflict occurring within the relationship. In the policy-capturing experiment employed, the violation condition was represented as either low or high in terms of the associated financial loss, but the scenario itself was identical. The outcome assessed the respondents’ willingness to reconcile the relationship, but did not probe as to the preferred tactics for doing so. Previous research has empirically demonstrated the importance of relational mechanisms in (partially) mediating the effect of manifest conflict on buyer satisfaction; specifically, the interpersonal elements of communication and responsiveness, which mirror closely the norms of role integrity/information sharing and flexibility established in Chapter 2, play a critical role in mitigating the negative effects of conflict in the relationships examined (Humphreys, Williams, and Goebel, 2009). Manifest conflict can take on many forms, however, and more in-depth evaluations of conflict type (and the associated propensity of each to trigger psychological contract violations) may be necessary to determine preference of the use of one governance mechanism over the other.

Finally, perhaps the most closely related work to our own study is by Dant and Schul (1992), who investigate the behavioral mechanisms implemented in conflict resolution processes employed by franchisees in the fast food industry. Specifically, they evaluate when each of four different tactics (problem solving, persuasion, bargaining, and politics) is used in response to conflict characterized by issue size (policy or operational), complexity (assessed on a 6-point scale), and stakes (financial risk in dollars), as well as
the influence of existing relational norms in dictating the specific strategy employed. Ganesan (1993), in a similar study of retail department store chain buyers, shows that a long-term relationship orientation generally leads to the use of problem-solving strategies. The study we propose advances this body of work in several key ways. First, we incorporate a more direct assessment of alternative contractual governance structures, as recommended by Dant and Schul. Second, we introduce the role of a third contractual structure - the psychological contract - in influencing the resolution strategy employed. Third, we broaden the assessment of contextual variables (also recommended by Dant and Schul) examined in supply chain conflict resolution. Finally, we provide a unique categorization of conflict, to include both operational and ethical sources (as elaborated on in the section Additional Factors Influencing the Experience of Violation). We also observe that changes in the business landscape over the past two decades are too numerous to count, and revisiting this important topic in the current environment has merit in and of itself.

_The Role of the Psychological Contract in Determining Resolution Strategy_

We recognize that the choice of strategy implemented may be influenced by the human biases of the manager responsible for the contract. In other words, action may be driven not only by the content of the conflict itself, but also the contract manager’s belief that the partner failed to meet some reciprocal obligation. This violation of the psychological contract intensifies the response beyond that of unmet expectations (Robinson and
Rousseau, 1994), and the extent to which the manager experiences an associated emotional response may influence the resolution strategy employed.

In the psychological contract literature focusing on an employee-employer context, it has been demonstrated that violations not only negatively impact an employee’s intent to stay with their employer, but that they influence actual turnover as well (Robinson and Rousseau, 1994). The supply chain literature has demonstrated some over-arching outcomes associated with psychological contract violations, notably including decreased trust (Kingshott and Pecotich, 2007; Hill et al., 2009). As associated with more concrete behaviors, psychological contract violations have been shown to affect the propensity for buyers of online auctions to offer price premiums to sellers (Pavlou and Geffen, 2005). In this research, we are interested in how manager’s decisions regarding conflict resolution with supply chain partners are impacted by psychological contract violations.

Important to this assessment are factors affecting the experience of psychological contract violation. Certainly, the type of conflict that is experienced will have some bearing on whether a psychological contract violation is experienced or not. While precise definitions of conflict in the literature vary, it is fairly well-substantiated that conflict represents some action by one firm that prevents realization of goals of another firm (Griffith et al., 2006; Hunt, 1995; Ganesan, 1993). Hunt (1995) provides a thorough presentation of functional versus dysfunctional conflict; a conflict is considered functional if the outcome results in long-term benefits to the feuding parties. Whether or
not a conflict is ultimately functional depends on the cause of the conflict, the severity of the conflict, and conflict management technique employed (Hunt, 1995).

We investigate two types of conflict categorized by the underlying cause: operational or ethical. Operational conflicts are those that are directly attributable to production or financial performance. Operational-type conflicts may include such items as: credit terms, inventory levels, product quality, promotional programs, pricing issues, warranty policies, backorders, packaging, and delivery delay (Griffith et al., 2006). Ethical conflict, on the other hand, can be viewed as a deviation from acceptable norms that often results in production or financial performance issues (Carter, 2000). Examples of ethical conflict as it pertains to buyer-supplier domains includes: lying or grossly misleading others during negotiation processes, allowing personal preferences to influence supplier selection or pricing practices, and using backdoor selling techniques or acceptance of kick-backs in exchange for business (Carter, 2000).

Severity of the conflict is deemed important to our investigation of inter-firm conflict resolution. Experience of psychological contract violation is more likely when a discrepancy is particularly salient (Morrison and Robinson, 1997). The size or importance of the discrepancy is one such characteristic increasing saliency. Sometimes referred to as “stakes,” severity in this regard indicates how financially burdensome the conflict event is expected to be (Dant and Schul, 1992). It has been proposed in the literature that high-stakes/high-severity conflict is likely to lead to a higher-investment and riskier resolution strategy because the trade-offs justify the actions (Deutsch, 1969). Empirically, Dant and Schul (1992) affirmed this relationship in their examination of
franchisor-franchisee negotiations, where high stakes issues led to the use of zero-sum political strategies such as third-party arbitration.

In addition to cause and severity, interpretation of a psychological contract breach may be influenced by such factors as whether the perceived conflict was intended or unintended (Gillespie and Dietz, 2009) and the frequency of conflict occurrence (Robinson and Morrison, 2000). It is therefore important we include these factors to our own investigation of psychological contract responses, specifically regarding whether an emotional response predictably leads to activation of one conflict resolution mechanism over another.

The age of the relationship stands to be an important consideration in this research, as length of relationship is proposed to play heavily into assessments of psychological contract violation in employee-employer relationships (Morrison and Robinson, 1997). Anderson and Weitz (1989) demonstrate that older dyads exhibit both inertia as well as many of the hallmarks constituting a high-quality, good working relationship. As such, they are more likely to continue the relationship, based on a sense of operating on “auto-pilot” in addition to established and effective communication routines. Moreover, there are social and psychological costs of embeddedness and friendship working to preserve the relationship over and above the economic benefits of the exchange (Ring and Van de Ven, 1994). This suggests that longer-term relationships are more likely to adopt relational governance mechanisms that result in continuity of the relationship, and the parties involved will be largely satisfied with this outcome.
Our incorporation of an individual-level analysis of relationship management requires that we also assess the length of tenure of the individuals involved in managing the inter-firm relationship. These boundary-spanning individuals tend to have the most first-hand information regarding the details of day-to-day exchange, and as such have a lot of input into how the relationship is managed. Their recommendations for firm-level action are oftentimes the most credible. Therefore, assessing the duration of the specific interpersonal relationship between buying and supplying managers provides insight into the development of the psychological contract between them (Ring and Van de Ven, 1994).

We will also evaluate the impact of environmental alternatives in the decision to employ a particular governance mechanism. When supply chain partners are easily expendable due to the existence of ample replacement partners, it is entirely possible that a manager will be more reluctant to expend the efforts required to undertake a relational governance recovery of the conflict than if the relationship was “locked in” due to absence of alternatives. Examples of lock in situations relevant to buyer-supplier relationships are commonplace. Two such examples include Johnson Control’s proprietary security technology (*Homelink*) for automobiles on which automotive manufacturers are dependent, and Hyundai Motor Company’s long-standing exclusive purchasing agreement with Korean steel manufacturer POSCO (Narasimhan, Nair, Griffith, Arlbjorn, and Bendoly, 2009). Characterized as dependency in Dant and Schul (1992), this construct proved highly influential in dictating the choice of resolution method employed. Reflecting on the gray market examples provided in the section on
Model Development, it is possible that in the Paul Mitchell distributor situation replacements might be found relatively easily, whereas in the situation involving production of kitchen mixers, environmental alternatives capable of conducting that business may not be so readily available.

*Outcomes of Interest*

One of our research objectives involves assessing the relative effectiveness of these two strategies – the deployment of written contract governance mechanisms versus the deployment of relational contract governance mechanisms. We assess effectiveness on two key fronts: 1) continuity of the relationship post-conflict; and 2) the reporting manager’s satisfaction with the conflict settlement reached.

The first outcome of interest in our model is whether the repair attempt was successful or resulted in termination of the relationship. Previous research has shown relational behavior to improve satisfaction (Griffith et al., 2006), outsourcing performance (Handley and Benton, 2009), communication (Cousins and Menguc, 2006), and long-term commitment (Gundlach, Achrol, and Mentzer, 1995). Monczka et al. (1998) found that the avoidance of destructive forms of conflict resolution techniques led to partnership success, although these authors did not investigate the process by which these resolution techniques were employed, nor did they specifically evaluate contract modification or supplementation. As such, our investigation will attempt to determine whether leverage of relational contract governance mechanisms is more likely to result in
relationship repair, and not termination. Alternatively, we expect remedies relying on written contract governance mechanisms to end unfavorably, with relationship continuity less likely and termination more probable.

The second outcome of interest evaluates the manager’s satisfaction with the resolution outcome. It is noted that even in instances where the relationship is terminated, this may be perceived as the best possible, even a satisfactory, outcome available for those particular supply chain partners at the point of time in question. As such, it is important to assess manager satisfaction as a separate construct from the outcome status previously discussed.

The Survey Instrument and Administration

To best evaluate the research objectives outlined in this chapter we propose employment of a survey, which should allow for adequate assessment of the antecedents of deployment of varying governance approaches and the associated outcomes in their ability to repair the relationship. Use of surveys in operations management is common, but there are still drawbacks to this approach. Dillman’s Tailored Design Method (2000) is a useful guide for those intending to conduct sample survey research, and is employed in our own survey design and administration efforts. Adherence to the procedures delineated in this manual can assist the researcher in improving both the quality of the survey and the response rate achieved, thereby achieving more meaningful results that may be generalized to the population under study. In today’s information age, survey
response is a problem plaguing researchers in many fields as industry representatives are inundated with survey requests and the inclination to respond is decreasing overall. A recent comparison of internet versus paper surveys shows some advantages to conducting surveys over the Web, including cost advantages, a tendency towards fewer missing responses, and automated coding of data (Boyer, Olson, Calantone, and Jackson, 2002).

Selection of an appropriate sampling frame is a key consideration in survey administration. For our research purposes, it is not necessary or even desirable that we focus on any single industry in particular. We do, however, want to target respondents who are knowledgeable in the aspects of inter-firm relationship management. A potential source of respondents meeting this criteria and available to us for our study is a local chapter of the National Contract Management Association (NCMA), for which we have already obtained approval to survey its approximately 500 members. NCMA is a professional association (http://www.ncmahq.org/) providing a variety of tools, events, publications and other resources to contract managers, as well as a way to connect with other professionals in the community. The association has members from both the public and private sectors, thereby affording a unique opportunity to examine relationship management characteristics across organizational structure, as well.

The survey will be designed to assess either an operational or ethical conflict, or both, as identified by the respondent. We will request information regarding the nature of the conflict as well as other variables relevant to the conflict event as discussed in the previous section. Experience of psychological contract violation will be gauged through a series of questions well-established in the literature, and that ask questions pertaining to
emotions of anger, disappointment, and the like that the respondent experienced in response to the conflict episode. Assessment of the strategy used to respond to the conflict will be revealed through a series of items constructed to represent the two alternatives of relational contract governance mechanisms and written contract governance mechanisms. Outcome items will ascertain whether the end result of this conflict was termination or continuity of the relationship, as well as a report of the manager’s satisfaction with the final outcomes of the conflict’s resolution. The survey will be qualitatively critiqued by industry and academic experts and pilot tested prior to full-scale administration. Measures for the survey will be culled from the literature to the extent possible as it is preferable to use scales for which reliability and validity have already been demonstrated (Flynn, Sakakibara, Schroeder, Bates, and Flynn, 1990). An in-depth discussion of the survey constructs and potential or probable sources for the related survey items follows. A draft survey in its current form is provided in Appendix G.

Our first set of questions asks the respondent to characterize the relationship with the supply chain partner on several items: the types of firms engaged in the exchange (for-profit, not-for-profit, or government), the length of the relationship, and the length of that particular manager’s personal involvement in the relationship. We also ask a series of questions characterizing the competitive environment, specifically so we can assess the degree of environmental alternatives available to both the buyer and supplier. These items were adapted from Heide (1994).
The next set of questions characterizes the conflict. Currently, we have depicted conflict as either operational or ethical. Examples of operational conflict include a late delivery, missed payment, or product quality issue. Ethical conflict may be instigated by the use of obscure contract terms, exaggerated or misleading statements, or preferential treatment. The operational issues are adapted from Ganesan (1993) and the ethical issues are derived from Carter (2000). It may be necessary to direct survey subjects to think of an example of one or both of these types specifically, so that each conflict group is adequately represented in our final data set. We also characterize the conflict in terms of severity (adopting a financial assessment as employed in Dant and Schul, 1992), intentionality, and frequency of conflict.

Psychological contract questions are adapted from Robinson and Morrison (2000), and are similar to those utilized in our experiment. The first set of questions assess whether or not the respondent senses that the psychological contract has been breached. In other words, has the partner failed to meet reciprocal obligations that were promised to the respondent? These questions also ascertain the respondent’s perceived compliance or failure towards meeting his/her obligations to the partner. The second set of questions assesses perceived violation of the psychological contract. These are the emotions registered when a breach of significant importance occurs in the relationship.

Another group of questions will determine the conflict resolution tactic employed by the respondent in regards to this specific conflict situation, be it written contractual governance mechanisms or relational contract governance mechanisms. While there is a great deal of literature assessing the degree of contractual complexity and the degree to
which relational norms exist, there appears to be a paucity of research assessing which of these two were actually leveraged in response to a specific, given situation. Therefore, new scales will be developed to capture actual deployment of these governance mechanisms. Williamson (1979) and Ryall and Sampson (2009) provide a foundation for deriving various means of leveraging the written contract. Gundlach and Achrol (1993: 147) suggest that formal procedures and third party involvement are to be considered anti-relational governance mechanisms. The set of questions defining relational norms are to be adapted from Gundlach and Achrol (1993) and Heide and John (1992). These items relate to the norms of solidarity and flexibility. These particular norms are those most directly associated with conflict resolution, where flexibility allows for adaptation to unforeseen events and solidarity implies a commitment to joint problem-solving (Poppo and Zenger, 2002).

Finally, questions regarding the outcome in terms of continuity of the relationship and the respondent’s satisfaction with the process, outcome, and overall relationship are also assessed. Satisfaction questions are common in the literature; ours are derived from Cannon and Perreault (1999). In addition to the above, we intend to include multiple control variables in our model, to include firm size and industry, among others.

The primary method for analyzing data collected from this survey will be structural equation modeling (SEM). Use of SEM will allow us to appropriately evaluate our model, which requires both path analysis and factor analysis, in a single, powerful technique.
Conclusion

The experiment (Chapter 3) was designed to capture how decision-making behaviors at a tactical level change in response to conflict and how violations of the psychological contract can be mapped to these changes in behavior. We do recognize there is a bigger picture involved in understanding the broader, more comprehensive relationship between the psychological contract, held by individuals, and the written and relational contracts held at the level of the firm. To better understand these relationships, and the potential moderating or mediating effect of psychological contract violation on firm-level decisions resulting from conflict, we propose to conduct a survey. The survey will additionally benefit our overall research plan in three key ways. First, the survey will be administered to industry professionals, a viewpoint meant to increase the generalizability of the findings from the laboratory experiment. Second, by using a mixed-method approach, we offer stronger evidence demonstrating the effects of psychological contracts in buyer-supplier relationships. Finally, the survey has a strategic orientation and a much broader footprint than the experiment. Additional factors we intend to capture in the survey include length of the partnership between firms, tenure of the individuals managing the relationship, and outcomes of the conflict situation to include relationship continuity and overall satisfaction.

The potential contribution of our survey is two-fold. First, we are beginning to fill a critical void in the literature, by examining the decision-making processes by which managers deal with conflict in their key supply chain relationships. Through an enhanced
understanding of these processes, industry leaders can be better prepared to appropriately cope with relationship conflict in a manner conducive to achieving overarching relationship goals.

We also contribute to the academic literature by building a comprehensive theoretical model of contractual governance structures in the context of their application towards conflict resolution in buyer-supplier relationships. This model, so far as we are aware, is the first to incorporate all three types of contractual structures present in buyer-supplier domains: the firm-level written and relational contracts, and the individual-level psychological contract.
Chapter 5: Conclusions and Extended Research Plan

Introduction

This research program was introduced to contribute to the body of behavioral operations and supply chain management literature, for which there has recently been increased enthusiasm. We take an in-depth analysis of buyer-supplier relationships, specifically the processes by which managers respond to conflict in these relationships. We seek to improve our understanding of conflict resolution strategies on two fronts: on firm-level governance decisions, and on the individual-level day-to-day tasks required of the manager of the exchange. By introducing a research program that evaluates the implications of conflict at both a strategic level and a tactical one, we hope to provide a comprehensive picture of conflict and its consequences. The research is structured around a contracts perspective, wherein our contribution is to incorporate a theory of psychological contracts to the more well-known frameworks of written and relational contracts.

The research presented in this dissertation provides a complete analysis of the psychological contract construct as it applies to tactical decision making in a supply chain
environment. We also provide a detailed agenda for a second phase of the research which tackles how psychological contracts function in relation to written and relational contracts when strategic firm-level decisions regarding relationship management efforts are necessary due to conflict between supply chain associates.

The following three sections of the Conclusion will summarize the specific research objectives, methodological approaches, and contributions of these complementary efforts. The final section of the Conclusion is an important one. It outlines the additional research endeavors we believe are necessary to complete the picture surrounding the overarching research interests introduced in this dissertation.

**Research Methods**

*The Laboratory Experiment*

The first phase of this dissertation focused on a laboratory experiment wherein we observed a series of tactical-level ordering decisions made by individuals assuming the role of a buyer of floral goods. Through this controlled experiment, we were able to initiate conflictual situations of varying cause and degree, and examine how the decisions made in response to these violations deviate from what we know to be optimal. This was an important step of the research, in that we were able to assess the direction and absolute magnitude of deviations from optimal in both the immediate term (Hypotheses 1) and the long-term (Hypotheses 2). Furthermore, through participants’ responses on an exit survey
administered at the time of the experiment, we were also able to draw connections between various psychological constructs and the ordering behaviors exhibited.

The factors evaluated during the experiment were culled from a careful literature survey of previous work conducted in related areas. The ordering decisions were evaluated using a 2x2x2 independent factorial design, where the factors were time to violation, severity of violation, and attribution for the violation. Theoretical constructs examined through the exit survey included psychological contract violation, trust, and fairness. The operations model we employed for this research is based on a newsvendor problem with a buy-back incentive offered by the supplier. The software used during the experiment was designed specifically for this effort.

We followed strict laboratory protocol in the administration of our experiment. We recruited subjects from among those undergraduate students enrolled in the Introduction to Operations Management course at the Fisher College of Business during the spring academic quarter of 2010. A total of 304 students completed the laboratory experiment. Of those, 295 subjects’ responses were usable for our subsequent analyses.

Two types of primary data were collected during the administration of the experiment. First, we have detailed ordering data for our 295 subjects over 20 periods each. Additionally, each participant completed an exit survey, in which they responded to Likert-type questions regarding various psychological constructs related to the theoretical reasons their order quantities might deviate from optimal.

The order data was analyzed using ANCOVA, or analysis of covariance. We chose this technique because we could assess whether the order quantities submitted
across different treatment conditions were significantly different. Specifically, it allowed us to determine why order quantities might be lower – for example does the group experiencing early violations order differently from those experiencing a late violation? We also conduct hierarchical regression analysis on these data, so that we could make more precise statements regarding how the order quantities deviate. This technique also allowed us to parse out effects that we controlled for in the randomized experiment, specifically on the factors of gender and international student status. Finally, we also were able to control for subjects’ overarching ordering behavior, which may be thought of as their general tendency to under or over-order, a factor likely closely related to subjects’ level of risk aversion.

The exit survey data was analyzed using hierarchical regression analyses. Specifically, we used each of the treatment conditions, expressed as dummy variables, as our independent variables, and the various psychological assessments separately as our dependent variable. We were also able to include our control variables of gender and international student status in each of the analyses. Factor analysis was conducted on the four-item psychological contract construct so that a single-item measure could be employed in the above-mentioned analysis.

These analyses revealed some interesting findings from our study. Pertaining to the era of violation, there is a significant main effect of severity negatively influencing the buyer’s order quantities. Participants in those treatments experiencing minor violations decreased their order quantities significantly more than participants subjected to major severity violations. We explained this finding using the anchoring and
adjustment heuristic. Our buyers are proposed to have used average demand as an anchor, and adjusted their order quantities cognizant of that figure. We related these findings regarding ordering behaviors to the psychological phenomena reported in the exit surveys. Despite having greater deviations in order quantities, buyers in the minor severity violation treatment actually reported lower experience of psychological contract violation, and greater assessments of trust and fairness in their supplier. This suggests that in the context explored here, cognitive biases have a stronger influence on behaviors than emotional biases.

We separately evaluated ordering behaviors during the concluding era, so that we might better understand the long-term implications or recovery potential of various conflict types. An interaction effect of time and attribution exists on order deviations. Reneging attributions imparted the largest effect on deviations from optimal, particularly when the conflict occurs early in the relationship. Our findings in regards to reneging developed as expected, and moreover were supported by the exit survey data revealing significant feelings of psychological contract violation and decreased trust in the suppliers associated with reneging. Timing issues ran counter to expectations, but may be explained by increased monitoring efforts during early periods in a relationship and a sense of complacency evident in later periods. These relatively non-emotional explanations are further supported by a lack of significance of the timing factor where our psychological constructs are concerned.
We propose the use of an industry survey to expand our evaluation of psychological contracts to a more strategic decision-making context within the management of buyer-supplier relationships. The models building the foundation of the survey effort set out to test whether the psychological contract is a moderating or mediating force in determining the contractual governance mechanism employed to respond to situations of conflict within the relationship. Our framework is the first we know of to use these three different types of contracts in a single model. Beyond the basic framework, we also look to assess a variety of other variables thought to have implications regarding the management of supply chain relationships and about the processes associated with conflict management specifically. Constructs not previously addressed in Chapter 4 are discussed in the following section on Future Research.

We introduce the survey in this dissertation due to its fit and importance to the broader research program, and to provide a detailed agenda for its completion. The effort expended so far has focused on model development and instrument design, and the resulting survey instrument represents the key contribution of the survey to our body of work thus far. Follow-on steps in the near term include an academic and industrial review of this survey instrument for such things as qualitative feedback regarding the quality of the questions and quantitative estimates of the time required to take the survey. Recommendations acquired in this phase will be used to modify the survey instrument for full-scale administration.
Contributions

This study makes several important contributions. First, we extend our theoretical understanding of psychological contract violations as they pertain to supply chain relationships. Our contribution to the literature is in placing emphasis on the role of the individual in broader firm-level decision-making and also in highlighting how and why managers may execute decisions that do not necessarily agree with those decisions deemed economically optimal for the firm. The theory of psychological contracts, while having a rich history in the literature exploring employee-employer relationships, has with few exceptions largely been omitted from research into inter-firm relationships. Our work represents the first comprehensive research program set out to empirically explore the theory’s applicability to supply chain relationships. We achieve a deeper understanding of the implications of this and other closely related psychological constructs in the supply chain domain. The contribution of our broader research agenda promises to illuminate the interplay of this individual-level contract with the written and relational contracts that serve critical roles in the management of business exchanges. To the best of our knowledge, we are the first to incorporate the lens of all three contracts in an examination of inter-firm relationships.

Second, the results of our research endeavor provide an increased knowledge of inter-firm relationship behavior, and we anticipate this to be of benefit to business professionals responsible for managing inter-firm relationships. To best study the actual detailed behaviors of individuals, we employed an experimental approach in our research.
Using controlled laboratory experiments, we were able to clearly model the specific situation and observe decision-making behaviors and how they vary depending on our treatment conditions. This study helps us achieve an improved understanding of how individuals systematically react to violations of varying cause and degree, and what particular actions are more harmful to supply chain relationships of this nature. Our industry survey proposes to capture what strategic decisions are adopted in practice, and importantly assesses the quality of the outcomes of these decisions. The two studies complement one another, in that we are able to achieve a more comprehensive and intricate understanding of the effects of psychological contract violations in the decisions that are important in daily management efforts in addition to those decisions addressing the relationship on a more holistic level. The supply management community stands to benefit from this research into the social and behavioral dimensions of relationship management, as these variables are assumed to hold considerable influence over supply chain management decisions and drive supply chain behavior (Frankel, Bolumole, Eltantawy, Paulraj, and Gundlach, 2008).

Finally, this research serves as an important building block for an extended plan of research, which involves examining the influences of organizational and national cultures, how the existence or absence of environmental alternatives affects behavior, and the impact of reputations and reputation management on economic decision-making behaviors within inter-firm relationships. We have carefully constructed a comprehensive research program, delineated in the following section, which has been designed to: 1) demonstrate the theoretical nature of the problem; 2) measure the impact of the problem
in practice; and 3) identify techniques that managers can employ to mitigate the problem in their future supply chain interactions. The projects completed and proposed in this dissertation begin to resolve the first two objectives, with follow-on efforts adding to and complementing what we have presented here. It is our hope that this research program will be of great use to academics and practitioners alike.

More generally, however, we are also contributing to the burgeoning field of behavioral operations and supply chain management, defined as “an approach to the study of operations that explicitly incorporates social and cognitive psychological theory. [It is] the study of human behavior and cognition and their impacts on operating systems and processes” (Gino and Pisano, 2008: 679). Interest in human behavior in operations and supply chain management is evidenced by the newly founded college within the Production and Operations Management Society (http://www.poms.org/colleges/chbom/), and numerous calls for research of this type (reference Bendoly, 2006; Eckerd and Bendoly, 2011). The behavioral perspective seeks to break from the assumptions that people behave fully rationally and that individuals are unaffected by noise, irrelevant information, or emotion (Gino and Pisano, 2008). Our work addresses how the properties of individuals and the organizations and social systems to which they belong affect the management of important supply chain relationships.
Our current efforts have made significant headway towards demonstrating the applicability of a theory of psychological contracts to the realm of supply chain management, and to measuring the impact of psychological contract violations on strategic and tactical decision-making behaviors within this context. Important follow-on work designed into our research program looks towards an investigation of additional factors influencing these violation experiences in practice. To that end, we propose several models meant to address this research question and complete a comprehensive picture of psychological contract violations in inter-firm relationships.

One such model, depicted in Figure 12, involves examining the influences of organizational, industry, and national cultures, often referred to in the literature as a social contract. This type of contract, the fourth introduced to the investigation, provides an important context to the interpretation of events occurring in business relationships. The social contract serves to establish ethical guidelines and norms of behavior (Dunfee, 1991; Dunfee and Donaldson, 1995). Firms that share social contracts or work to build congruence in their social contracts tend to perceive their partner as behaving more ethically and being more committed to the relationship (Eckerd and Hill, 2011). However, when a partner acts in a way that goes against the grain of societal expectations, we propose this breach of the social contract will serve to exacerbate an experience of individual-level psychological contract violation. In other words, the social contract is expected to have a moderating effect on the relationships between
psychological contract violation and governance mechanisms. Included in our draft survey in Appendix G, we have several questions that ascertain opportunities for incongruence in social contracts. The first identifies the organizational culture of the respondent and partner firms based on whether the firms are for-profit, not-for-profit, or government agency. The second determines whether the firms in question are based in the same or different industries. Finally, we query the national affiliation of the firms and representatives. These questions thus assess the social contract on the three aforementioned levels: organizational, industry, and national culture.
Another model we propose investigates the impact of reputation on the relationships under investigation in this study. As shown in Figure 13, reputation is expected to moderate the influence of psychological contract violations on decisions to leverage particular governance mechanisms. We can investigate reputation on two different fronts: the reputation of the partner firm, and the manager’s concern for his or her own firm.
Considering the first reputation assessment, a supplier with a good reputation may dampen the effects of psychological contract violation. Previous research suggests that a supplier’s positive reputation is positively associated with the buyer’s willingness to make investments in the future of the relationship (Suh and Houston, 2010). Therefore, a supplier’s glowing reputation may inspire a manager to pursue relational governance mechanisms that may be perceived more likely to result in positive outcomes than if the supplier had a poor reputation. We employ items from Ganesan (1994) in our draft survey (Appendix G) to assess the reputation of the partner firm.

It is also likely that a manager has concern for the reputation of his or her own firm, and that this concern factors into decisions made on behalf of the firm (Fombrun and Shanley, 1990). For example, if a manager anticipates that the actions pursued with a supply chain partner will be scrutinized by others in the industry, this may influence governance mechanism leveraged, also. Interestingly, this may work one of two ways. The manager may not want to earn a reputation for being “soft” and therefore decide to pursue a more hard-lined approach in accordance with written contract mechanisms. Alternatively, in following suit with some of the opinions expressed by the managers that Macaulay (1963) interviewed, managers may want to protect their firm from a reputation for being litigious if they hope to continue to find partners to do business with in the future. Regardless the approach, the importance of industry social structures is likely to influence decisions in this regard. To assess respondents’ concern for reputation, the items for partner’s reputation are adapted to that effect.
In the final model proposed here, we incorporate a lens of transaction cost economics to the base model. Recognizing that the extant literature investigating the dynamics of written and relational contracts has often employed a transaction costs viewpoint, our sense is that adding information on psychological contracts will substantially enhance knowledge in this broad area. In fact, several similar constructs
important in the transaction costs literature appear in the psychological contracts literature as being critical to mitigating violations. For example, communication, or information exchange, is a critical component of transaction cost theory. In the psychological contract literature, it is recognized that a lack of quantity and quality in communication efforts is associated with decreased trust and hence a stronger propensity for violation (Robinson and Rousseau, 1994). Truthful and accurate communication is key to minimizing incongruence of psychological contracts (Morrison and Robinson, 1997). As such, we present in the draft survey (Appendix G) a set of questions designed to ascertain the quantity and quality of information shared between the supply chain partners. Items for the communication frequency and medium scales were adopted from Hartley, Zirger, and Kamath (1997) and Carr and Kaynak (2007), respectively. A third construct assesses the type of information shared. The items for this scale are culled from the communication construct recommended by Chen and Paulraj (2004); specifically we adopt those items relating to the content of information shared.

Additionally, the existence or absence of environmental alternatives is suspected to affect the behavioral changes brought forth by psychological contract violations. Managers may be less likely to act on sentiments associated with violations if they are locked in to a relationship with a particular supplier, as described in greater detail in Chapter 4. The status of environmental alternatives is one way to express the dependence construct of transaction cost theory. The items we use to describe the degree of buyer and supplier dependence are adapted from Heide (1994). The model we propose for investigation of these factors is presented in Figure 14.
Figure 14: A model of psychological, written, and relational contracts using the transactional cost framework (highlighted in box)
In addition to our planned research agenda, we have discovered several other opportunities through execution of the phases of research described in this dissertation. Of particular interest is a cross-cultural examination of the experience of psychological contract violations and the impact of these violations on behaviors. In conducting our U.S.-based experiment, we uncovered some interesting differences between national and international students that suggest it may be worthwhile to focus attention toward this area. Already, we have executed a replication of the experiment in Beijing, China, in conjunction with faculty members at the University of International Business and Economics. This extension represents a very important step to understanding the intricacies of cross-national relationship management, and stands to result in highly practical knowledge for the many managers attempting to coordinate relationships between firms in the U.S. and China.

Another opportunity arising from execution of our experiment involves a more focused effort towards understanding when emotional biases factor into decision making and when they do not. Our results demonstrate two interesting phenomena. First, it appears there may be a potential interplay of cognitive and emotional biases, where in our experiment the cognitive bias of anchoring and adjustment proved a more powerful force in affecting decisions than the emotional biases reported by subjects. Second, our experiment results suggest that the availability of clear and concise processes may also serve to overcome emotional biases. Additional research exploring these possibilities would prove fruitful to a wide variety of situations in which humans interact and where there is the potential for emotions to impede good decision-making.
In all, through this dissertation we have introduced an ambitious research program in its entirety. We have adopted an individual-level, psychological contract theory currently underutilized in the operations and supply chain literature and incorporated it into a broader-based contracts view of inter-firm relationship governance as well as aspects dealing with detailed, tactical decision-making. Our hope is that academics and practitioners alike find value in the incremental contributions brought forth by each phase of the research in addition to the holistic implications of psychological contract as it applies to buyer-supplier relationships.
References


Brockner, J., Tyler, T.R., and R. Cooper-Schneider. 1992. The influence of prior commitment to an institution on reactions to perceived unfairness: the higher they are, the harder they fall. Administrative Science Quarterly, 37 (2), 241-261.


Hello. I am Stephanie Eckerd, and this experiment is one phase of my dissertation research in which I investigate buyer-supplier contracts.

If you have not already done so, please make sure you sign up on the sign-in sheets at the front of the room prior to leaving. These sheets will be used to assign your extra credit in Bus Mgt 630. Also, please note that your signature on this form represents a pledge on your honor that you will not discuss the experiment with others until after you have received an email debriefing statement from me. This helps me to protect the integrity of the research, and validity of the data I am collecting. I greatly appreciate your understanding and compliance with this policy.

Please do NOT progress past the current screen until after the introduction is completed and I have given you the ok to begin. A copy of the PP has been provided for you at your workstation. You also have scrap paper to jot down any notes or questions. Please leave both the PP and scrap paper when you are done. As we go through the introduction, please hold all questions for the end. I will privately address any questions, informing the session as a whole of information
only as I deem it necessary. This experiment is an individual effort, so please do not talk with others during the experiment.

<advance slide>

In this session, you have been assigned to make decisions as the buyer of floral goods for an upscale grocer. Your decision each period involves determining how many dozen roses to order. You will order in units, where one unit equals one dozen roses (this is typically how they are sold). Flowers are saleable only in the period they are ordered for; they are a perishable good, and therefore any units left over at the end of the period are obsolete (in other words, they must be scrapped). In this situation, it is in your best interest to try to lessen costs associated with inventory overage (left over units), with the costs of missing out on unmet demand (this is the NEWSVENDOR concept you learned about in 630).

Your objective during this experiment is to maximize your profitability. As incentive, we are drawing one subject from each experiment session to win an iTunes gift card valued at $20. Your odds of winning the gift card are proportional to your earnings. For example, if I earn $1000 during the session, and our proctor wins $10,000, then he is 10 times more likely to win than I am. This means that every dollar you earn counts, and so effort expended each and every period is rewarded.
In this experiment, you are randomly partnered with a student in another lab who is assigned the role of the supplier. The students you are partnered with are undergraduates at another leading business program. They are currently receiving instructions on their specific role in the experiment, and the decisions they must make.

It has come to everyone’s attention that the supplier has access to a secondary market for “dead” roses (you can imagine this to be a potpourri or dried floral arrangements market). You and the supplier have the opportunity, therefore, to enter into a buy-back arrangement, whereby the supplier will pay you for unsold roses at the end of each period. The terms of this arrangement are un-negotiated. All buy-back activity is conducted on an AD HOC basis (meaning period by period your decision about the order quantity and the supplier’s decision about buy-back price are determined anew).

Analogies are useful when thinking about supply chain coordination techniques like buy-backs. In this case, we can think of the profit across the entire supply chain as a pie. If you and your supplier were to act independently (in other
words, NOT participate in a buy-back arrangement, then the size of the pie is small.

<advance slide>

However, by coordinating with your supply chain partner, you increase the size of the pie; that is, you increase profits across the entire supply chain. Coordinating for your supplier means sharing the risk of left-over inventory by offering to buy-back unsold goods. Because the supplier is willing to buy-back unsold goods coordinating for you means ordering more.

<advance slide>

How the pie is split is determined by the specific buy-back price per unit your supplier offers. A higher buy-back price indicates he or she is sharing more of the risk, and therefore more of the profits.

<advance slide>

Relevant data for your session are as follows:

- You have a purchase price of $35 per unit ordered from the supplier
- The retail price you charge to your customers is $55 per unit
Demand averages 400 units per period, with a standard deviation of demand during the period of 200 units.

Using this data, we can assess potential optimal order quantities given different buy-back prices. This graph charts the order quantity you make to the period profitably you earn ON AVERAGE. For example, your expected profits with a $25 buy-back price are highest when ordering approximately 450 units. However, when acting independently (in other words, a buy-back price of $0), then your best order quantity drops to approximately 300 units. This graph will be displayed throughout the experiment for your reference.

We will now take a quick look at the screens the program will take you through. First, it is up to you to make an order decision. Enter the number of units you wish to order into the green box, and click SUBMIT ORDER. Demand for that period will process, and the screen will advance automatically when ready.
The DEMAND screen shows what demand was realized during the period. Likely, one of two scenarios has occurred: either you ordered too little, in which case you will be informed of the number of units of LOST SALES; or you will have ordered too much, in which case you will be informed as to how many units are remaining to send back to your supplier.

Once you have read the information, click CONTINUE to alert the supplier about your demand. The supplier will review demand, any units returned, and make a buy-back pricing decision if necessary. The program will progress to the next screen once the supplier has submitted their required information.

<advance slide>

The SUPPLIER BUY-BACK AND PERIOD PROFITABILITY screen provides you a summary of the activity for that period. This includes the period number, your order quantity, the period demand, units sold, left-over units, lost sales (in units and dollars), the supplier’s buy-back price, and both the supplier’s and your profits for the period. Information specific to the current period is highlighted on the left-hand side of the screen.

<advance slide>
After completing 20 rounds of activity, you will be provided a summary of your winnings and directed to complete an exit survey prior to exiting the lab. You will also need to enter your name and OSU email address when prompted, in the event you are drawn as the winner of the gift certificate.

Upon reaching the Congratulations page, PLEASE DO NOT CLOSE OUT OF THE SCREEN. Simply alert me or the proctor that you are done, and wait to be dismissed from the lab.

I thank you greatly for participating today. In approximately early June, I will email all participants a debriefing document summarizing the experiment findings.

This completes our introduction. I will alert the supplier group as to our completion of the introduction, and if they are ready we will begin. Please do NOT start until I give you the ok.

<PLAY WITH IPOD>

The supplier group is ready. You may now proceed to your first order decision page. Please raise your hand if you have questions, and the proctor or I will assist you.
Appendix B: Experiment introduction slides and handout

Experiment Introduction

Argyle Grocer & Florist

PLEASE DO NOT PROCEED
PAST THIS SCREEN
Welcome!

• Stephanie Eckerd, Investigator
• Computer-based experiment investigating buyer-supplier contracts
• Please remember to sign-in
• Please obey the rules of the computer laboratory!
• Your participation is at all times voluntary

This Session

• In this session, you will make decisions as the buyer of floral goods for an upscale grocer
• Your decision involves determining each period how many roses to purchase (1 unit = 1 dozen roses)
• Your objective is to maximize your profitability
  – 12 $20 iTunes gift certificates
This Session

• You are partnered with a supplier (for example, Bob or Betty), located in another lab
  – Partnered with business students from another leading business program
• You and your supplier have agreed to try out a buy-back arrangement under un-negotiated terms
• The supplier’s decision is **how much to pay** for your leftover (unsold) inventory

| Your decision is **how many units to order** for sale in your shop. |

Supply Chain Profitability

• You can think of supply chain profits as a pie...
  – When working **independently** of your supplier, the size of the pie is **smaller**
Supply Chain Profitability

• When coordinating with your supplier, the size of the pie is larger...
  – For you, coordinating means ordering more

Supply Chain Profitability

• However, the size of your piece of that pie is determined by how much of your demand risk the supplier is willing to share
  – In other words, how large a buy-back price they offer
**Known Variables**

- Purchase price: $35 / unit
- Retail price: $55 / unit
- Demand: 400 units / period
- Standard deviation of demand: 200 units

**Potential Coordinating Scenarios**

![Graph showing expected profit per period with different buy-back scenarios.](image)
Order Decision

Period: 1

Units Requested [ ]

Submit Order

Demand

Demand for Period 1 was
You experienced lost sales of units this period.

Please click the button below to alert the supplier of this period's demand.
After clicking, please wait for the supplier to evaluate the information presented, and make a buy-back pricing decision.
The page will then advance automatically.

Continue
End of Experiment

• After iterating through the final period, you will be asked to complete an exit survey.
• Please report your name and email address when prompted.
• When you reach the “Congratulations” screen, please notify your proctor and do NOT close out of that screen.
Appendix C: Experiment exit survey

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Neutral</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Strongly Agree</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel a great deal of anger toward my supplier.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>I feel betrayed by my supplier.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>I feel that my supplier has violated the contract between us.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>I feel extremely frustrated by how I have been treated by my supplier.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Not at all</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Neutral</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Completely</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much do you trust your supplier?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>How much do you like your supplier?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>How much do you want to work with this person in the future?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>How fair do you believe your supplier is?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
Gender?  o Male  o Female

Age?  ________ years  _______ months

Work experience?  ________ years  _______ months

Are you an international student?  o Yes  o No

If yes, please identify your country of origin: ___________________
Appendix D: Participant information sheet

Experiment Participation Information for 2010 Spring Quarter Business Management 630 Students

As a PhD student at the Fisher College of Business, I am currently in the dissertation phase of my program. One aspect of my dissertation involves conducting a computer-based laboratory experiment, and I am inviting you to participate in this research project. Your participation is completely voluntary. The research conducted in this experiment is expected to be of benefit to business professionals responsible for managing inter-firm relationships.

The experiments will be held at various times during the month of May; a subject may only attend one session. The location of the experiments is 345 Mason Hall. The expected duration of an experiment session is approximately one hour. Experiment subjects will receive an introduction to the experiment, and then complete a computer-based supply chain simulation that requires the subject to make ordering or buy-back decisions on behalf of his/her firm over a set number of periods. Completion of an exit survey is requested prior to dismissal from the experiment. This experiment involves minimal risk. In the event identifiable information is collected, all identifiable information will be deleted following allocation of compensation.
As compensation for your time and effort, those participating in the experiment will be awarded up to 3 percentage points applied to your final course grade for Business Management 630. The extra credit cannot be applied to any other course. A subject may discontinue participation at any time without penalty or loss of benefits to which the subject is otherwise entitled. Subjects who start but do not finish the experiment will receive a pro-rated amount of the extra credit incentive based on the length of time they spent in relation to the estimated one hour for the experiment. There is an alternative extra credit assignment available for those not wishing to participate in the experiment. Details of this alternate assignment, discussed in the class presentation, are available upon request. My contact information is provided at the bottom of this page.

In addition to the extra course credit offered, subjects may also elect to provide their name and an email address at the end of the experiment so that they may be included in a lottery. The lottery procedure will draw one name per session from each session’s top performers (in terms of profitability achieved during the experiment). Winners of the lottery will each receive a gift certificate.

To participate in the experiment, you must first **SIGN UP**. The sign-up will be conducted on-line through a link available on your Carmen home page for this course. Sign-ups will be conducted on a first-come, first-served basis, until either all sessions are filled or the date of the experiment. If you need to discuss scheduling, please contact me using the information below.

In order to receive the extra credit, the following rules must be adhered to:

1. You must show up to your scheduled session **ON TIME**.
2. You must follow the rules of the computer laboratory (i.e., no food, no drink, etc.)
3. You may not discuss the experiment with others until **AFTER** you have received a debriefing document, available approximately 6 weeks following completion of the last session.

Failure to adhere to these rules will result in forfeiture of course extra credit.

I wish to remind you that your participation in this experiment is completely voluntary. I have made every effort to respect your time and make it easy for you to volunteer if you so choose. You may, however, choose to submit the alternate extra credit assignment for equal points, or choose not to participate in any of the extra credit assignments. In no way will your participation or lack thereof **negatively** affect your standing in Business Management 630.

Please do not hesitate to contact me with any questions you may have. For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251. In the event of research-related injury subjects are encouraged to call any of the investigators.

Thank you for your time.

Stephanie Eckerd, Co-Investigator
PhD Candidate, Fisher College of Business
251C Fisher Hall
Eckerd_2@fisher.osu.edu
614-247-6265

Kenneth K. Boyer, Principal Investigator
Professor, Fisher College of Business
644Fisher Hall
Boyer_9@fisher.osu.edu
614-292-4605
Appendix E: Participant Alternate Extra Credit Assignment Details

Alternate Extra Credit Assignment for 2010 Spring Quarter Business Management 630 Students

Students participating in the extra credit experiment will be awarded up to 3 percentage points applied to the final course grade for Business Management 630. The extra credit cannot be applied to any other course. There is an alternative extra credit assignment available for those not wishing to participate in the experiment or who drop out during the session. Details of this alternate assignment are as follows:

- You are required to pull an article (or several, if necessary) from the Wall Street Journal or other comparably reputable business press source. This article will address issues relevant to operations management in a current and real-world context.
- In 2 and ½ pages, summarize the current operational issue discussed in the article. Relate the issues specifically to content learned in the Business Management 630 course.
- The report will be double-spaced, in Times New Roman 12-point font, with one-inch margins on all sides.
- Either the article(s) or a complete reference to the article(s) must be provided.
- This is a graded assignment. A student may earn up to 3% extra credit towards the final course grade in Business Management 630.
The extra credit assignment is due by 5:00PM on May 22, 2010. It may be emailed to Stephanie Eckerd, contact information found below. No exceptions to the assignment, due date, or otherwise will be made.

Stephanie Eckerd, Co-Investigator  Kenneth K. Boyer, Principal Investigator
PhD Candidate, Fisher College of Business  Professor, Fisher College of Business
251C Fisher Hall  644 Fisher Hall
Eckerd_2@fisher.osu.edu  Boyer_9@fisher.osu.edu
614-247-6265  614-292-4605
Experiment Participant Debriefing - Response to conflict in the supply chain: How psychological contract violations influence changes in economic decision-making behavior

You have recently participated in the above-titled experiment and requested the following debriefing information.

Our research investigates how individuals alter their economic decision-making behavior within a supply chain management context when their supply chain partner fails to meet reciprocal obligations. These reciprocal obligations constitute the foundation of a psychological contract, a generally implicit contract that is formed between individuals over time and is idiosyncratic to their specific relationship.

To achieve this, we conducted a laboratory experiment in which subjects were asked to make hypothetical order quantity decisions. Subjects were informed that they were interacting with a human supply chain partner located in a different laboratory, when in fact the role of the supplier was programmed. At a predetermined point in the
experiment, the programmed supplier behaved in a manner inconsistent with the historically honored buy-back terms. Specifically, the programmed supplier unexpectedly offered a lower buy-back price for items than the supplier had awarded in previous periods. This defection lasted for three periods, and resulted in a higher expected supplier profit at the buyer’s expense for those periods. Subsequent to these three periods of defection, the programmed supplier behaved in accordance with initially established buy-back terms.

Those variables varied during the experiment included: 1) information regarding the cause of the conflictual event (reneging / non-purposeful); 2) the degree of severity of the conflict (minor / major); and 3) the time to conflict during the course of the experiment (long-term / short-term). In the purposeful reneging condition, a message provided by the programmed supplier indicated an abundance of returns and limited funding forced the supplier to allocate buy-back funds between buyers, and that other buyers were given preference over the subject buyer. In the non-purposeful event condition, the supplier cited a temporary change in external conditions (bad weather causing an increase in transportation costs) that forced the alternate pricing behavior. The buy-back price was decreased by either 20% in the minor conflict treatment, or 80% in the major conflict scenario. The time to conflict was varied between period 4 (short-term) and period 11 (long-term) of the experiment. Finally, the information provided in the introduction varied slightly, with some treatment groups left to determine an optimal order policy on their own in an ad hoc fashion (although it was strongly implied which
was most profitable), and other treatment groups were more explicitly encouraged to operate under optimal conditions and specifically what those conditions were.

Before participants left the laboratory, they were asked to respond to an exit questionnaire. The survey was designed to assess the participant’s perception as to whether the supply chain partner breached a psychological contract and any associated violation experienced as a result to the conflict. We also collected some general demographic data about the participants.

The results of this research study will increase our knowledge of inter-firm relationship behavior, and we anticipate it to ultimately be of benefit to business professionals responsible for managing inter-firm relationships. This study will help us achieve an improved understanding of how individuals react to failures of varying cause and degree in supply chain relationships, and what actions are more likely to cause irreparable damage in an inter-firm relationship. This study also provides the critical foundation to a broader research program, which is intended to help managers understand when and why different types of governance mechanisms are implemented in resolving inter-firm relationship failures, and also how social context plays a role in determining manager’s behaviors.

Those who tended to perform “best” in an economical sense were those subjects who adhered strictly to the optimal ordering policies discussed in the introduction. These policies were based on the data provided, including expectations about the demand distribution. Many students attempted to correct for variations in demand; however, this typically results in greater over- and under-estimations of demand in the long-run.
We thank you for your participation in our research project. If you have additional questions involving the experimental procedures we encourage you to contact us.

Stephanie Eckerd
251C Fisher Hall
eckerd_2@fisher.osu.edu
614-247-6265
DRAFT SURVEY

Sales/Purchasing Manager: Consider a conflict your firm experienced with a supply chain partner (hereafter called the “partner” or “partner firm”) within the last year. Please answer the following questions in reference to that particular conflict.

1. What is your role in the relationship with this partner?
   - ○ Buyer
   - ○ Supplier

2. How is your firm best characterized?
   - ○ Government
   - ○ For-profit firm
   - ○ Not-for profit organization

3. How is the partner firm best characterized?
   - ○ Government
   - ○ For-profit firm
   - ○ Not-for-profit organization
4. Do you consider you and your partner to be within the same industry?
   ○ Yes
   ○ No

5. In what country is your office located?
   <Drop-down box with country list>

6. In what country is your partner’s office located?
   <Drop-down box with country list>

7. What is the length of the relationship between your firm and the partner firm?
   ____________ years

8. How long have you personally been responsible for managing this relationship?
   ____________ years
9. How frequently do you personally communicate with this partner?
   - At least weekly
   - More than weekly but less than monthly
   - Monthly or less frequently

10. What is the primary medium for communication with this partner?
    - Face-to-face
    - Email
    - Telephone
    - Fax
    - Written
    - Other

11. Please describe the types of information shared within the context of this particular relationship.

<table>
<thead>
<tr>
<th>Item</th>
<th>Strongly disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>We share sensitive information (financial, production, design, research, and/or competition).</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>The partner firm is provided with any information that might help it.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>We keep each other informed about events or changes that may affect the partner.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
12. Please assess the reputation of the partner firm.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>This partner has a reputation for being honest.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>This partner has a reputation for being concerned about their supply chain partners.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>This partner has a bad reputation in the market.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Most firms think that this partner has a reputation for being fair.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

13. Please assess the importance of reputation preservation in regards to your firm and the decisions you make on behalf of it.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>We have a reputation for being honest.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>We have a reputation for being concerned about our supply chain partners.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>We have a bad reputation in the market.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Most firms think that we have a reputation for being fair.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
14. Please characterize the competitive environment in which you operate.

<table>
<thead>
<tr>
<th><strong>Buyer dependence:</strong></th>
<th>Strongly disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>If we decided to stop purchasing from this supplier, we could easily replace their volume with purchases from other suppliers.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>There are many competitive suppliers for these components.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Our production system can easily be adapted to using components from a new supplier.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Dealing with a new supplier would only require a limited redesign and development effort on our part.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Supplier dependence:</strong></th>
<th>Strongly disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>If we stopped buying from this supplier, they could easily replace our volume with sales to some other buyer.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>It would be relatively easy for this supplier to find another buyer for these components.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Finding new buyers for these components would not have a negative impact on the price this supplier can charge.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>If the relationship with our company was terminated, it would not hurt this suppliers operations.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
15. Please categorize the conflict between you and the partner firm.
   - **Operational** (examples include issues based on quality of the product, price, delivery, returns, etc.)
   - **Ethical** (examples include use of obscure contract terms, exaggerated or misleading statements, preferential treatment, etc.)
   - **Other**
     
     Please specify: __________________________________________

16. Please estimate the dollar amount that was at risk in the conflict you have identified.

$ __________________________

17. Please characterize the conflict on the following attributes:

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intentional</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Frequency of conflict</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
18. Please answer the following questions in consideration of what your firm contributed to the relationship and what was received from the partner firm in return.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost all the promises made by the partner have been kept so far.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>So far the partner has done an excellent job of fulfilling its promises to me.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>I have not received everything promised to me in exchange for my contribution.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>The partner firm has broken many of its promises to me even though I have upheld my side of the deal.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

19. Please answer the following questions in consideration of what your firm contributed to the relationship and what was received from the partner firm in return.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel a great deal of anger toward the partner firm.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>I feel betrayed by the partner firm.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>I feel that the partner firm has violated the contract between us.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>I feel extremely frustrated by how I have been treated by the partner firm.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
20. Please select the mechanisms by which the conflict was managed on each of the following:

| We relied on specific contract terms to resolve the conflict (for example, leveraged a financial penalty as specified in the formal contract). | Did Not Use | Used |
| We resorted to litigation to resolve the conflict. | o | o |
| We sought market alternatives for future sales/purchases. | o | o |
| We sought third-party assistance (arbitration) in resolving the conflict. | o | o |
| We worked out a new deal, rather than hold each other to the original contract terms. | o | o |
| We made adjustments to the ongoing relationship to cope with the conflict. | o | o |
| We treated the conflict as a joint responsibility. | o | o |
| We acted together in seeking a unified solution. | o | o |
| We were willing to work through this conflict for the sake of the long-term relationship. | o | o |

21. Ultimately, was this relationship was terminated as a result of the conflict?

- [ ] Terminated
- [ ] Not Terminated

22. Please rate your satisfaction with the following:

<table>
<thead>
<tr>
<th>The manner in which the conflict was managed.</th>
<th>Very Dissatisfied</th>
<th>Very Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The outcome of the conflict.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>The overall relationship.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>