

FIRST WE TRY, THEN WE TRUST! REAL OPTIONS AND THE COOPERATION–COMPETITION TENSION IN STRATEGIC ALLIANCE SOCIAL DILEMMAS

Matthew W. McCarter

University of Illinois at Urbana–Champaign, College of Business

Joseph T. Mahoney

*University of Illinois at Urbana–Champaign, College
of Business*

Gregory B. Northcraft

*University of Illinois at Urbana–Champaign, College
of Business*

Abstract

The cooperation–competition tension in strategic alliances creates a social dilemma where member and alliance interests are in conflict. Because social dilemmas have significant negative implications for strategic alliance and member success, understanding the psychological mechanisms underpinning the cooperation–competition tension and ways to navigate this tension holds important theoretical implications for strategic alliance research. This paper proposes a real options approach to navigating strategic alliance social dilemmas. Acquiring a real option at the alliance level provides alliance members access to achieving a small win of mutual cooperation, and, when the small win is realized, members are more likely to cooperate in the larger strategic alliance. The increase of cooperation is because alliance member's perceived vulnerability is reduced. The level of exposure when acquiring the real option may influence the effect of a small win on perceived vulnerability through the development of trust.

Running head: Real Options and Strategic Alliance Social Dilemmas

FIRST WE TRY, THEN WE TRUST!

**REAL OPTIONS AND THE COOPERATION-COMPETITION TENSION IN
STRATEGIC ALLIANCE SOCIAL DILEMMAS**

Matthew W. McCarter*

Department of Business Administration
College of Business
University of Illinois at Urbana-Champaign
350 Wohlers Hall
1206 South Sixth Street
Champaign, Illinois 61820
Phone # (217) 531-8984
Fax # (217) 333-7410
mmccart6@illinois.edu

Joseph T. Mahoney

Department of Business Administration
College of Business
University of Illinois at Urbana-Champaign
140C Wohlers Hall
1206 South Sixth Street
Champaign, IL 61820
Phone #: 217-244-8257
josephm@illinois.edu

Gregory B. Northcraft

Department of Business Administration
College of Business
University of Illinois at Urbana-Champaign
350 Wohlers Hall
1206 South Sixth Street
Champaign, IL 61820
Phone #: 217-333-4519
northcra@illinois.edu

* Corresponding author.

Abstract

The cooperation-competition tension in strategic alliances creates a social dilemma where member and alliance interests are in conflict. Because social dilemmas have significant negative implications for strategic alliance and member success, understanding the psychological mechanisms underpinning the cooperation-competition tension and ways to navigate this tension holds important theoretical implications for strategic alliance research. This paper proposes a real options approach to navigating strategic alliance social dilemmas. Acquiring a real option at the alliance level provides alliance members access to achieving a small win of mutual cooperation, and, when the small win is realized, members are more likely to cooperate in the larger strategic alliance. The increase of cooperation is because alliance member's perceived vulnerability is reduced. The level of exposure when acquiring the real option may influence the effect of a small win on perceived vulnerability through the development of trust.

Keywords: Strategic Alliances, Cooperation-Competition, Social Dilemmas, Real Options, and Trust

1. Introduction

Strategic alliances — defined as “voluntary arrangements [among two or more organizations] involving the exchange, sharing, or co-development of products, technologies, or services” (Gulati, 1998: 293) — are common means for organizations to achieve goals that they could not achieve independently. Strategic alliances are formed to create value through the pooling of resources, and, as a consequence, provide alliance members with competitive advantages over competitors (Das & Teng, 2000; Hardy, Phillips & Lawrence, 2003). An example of a strategic alliance would be a consortium of firms (Braun, Electrolux, Hewlett-Packard, and Sony Europe) that pool resources (e.g., expertise, money, and human capital) to develop new processes for recycling electronic equipment (*Business and the Environment*, 2003).

However, strategic alliances often fail to create their anticipated benefits (Gottschlag & Zollo, 2007; Kale, Dyer & Singh, 2002). Returning to the previous example, although all alliance members want to benefit from the success of the alliance generating new ways to recycle equipment, each alliance member also has an incentive to behave opportunistically and withhold investing in alliance activities (Gerard & Wilson, 2009) – either to gain the benefits of the alliance at no cost, or to preserve those investments for their individual firm’s use. The struggle within strategic alliances resides in the tension experienced by members between doing what is *best for the alliance* (i.e., cooperating and investing resources into the alliance); and doing what is *best for themselves* (i.e., competing and attempting to enjoy the benefits of alliance activities without paying for them) (Arrow, 1974; Hamel, 1991; Khanna, Gulati & Nohria, 1998).

In recent years, management scholars have begun to explore a social dilemma perspective to better understand this cooperation-competition tension in strategic alliances and how to address this tension (Zeng & Chen, 2003). A *social dilemma* is any situation where there is a

conflict between individual and collective interests (Dawes, 1980; Liebrand, 1983). In strategic alliances, the resources generated through resource pooling are analogous to a *public good*: a resource that, once produced, can be enjoyed by all alliance members without diminishing its benefits (Olson, 1965). The reduced costs and other potential benefits (e.g., enhanced reputation to stakeholders) of new recycling processes are examples of public goods (Tirole, 1996).¹ The *non-excludability* and *non-rivalry* of public goods creates a social dilemma (Kollock, 1998), because alliance members are tempted to withhold contributing their resources toward the public good's creation; but, if all, or enough, members withhold resources, the alliance fails and its members suffer; e.g., poor air quality and climate instability that diminishes quality of life for everyone in a region (Messick & Brewer, 1983).

The social dilemma perspective (Zeng & Chen, 2003) focuses on the psychological processes experienced by strategic alliance members and posits that the cooperation-competition tension may be relieved either by altering how members perceive the alliance structure (a *structural approach*) or altering how members perceive each other (a *motivational approach*). However, as posited by Zeng and Chen's (2003) treatise on strategic alliance social dilemmas and corroborated empirically by Agarwal, Croson and Mahoney's (2009) examination of alliance governance mechanisms, neither the structural nor motivational approach, by itself, is sufficient to manage the cooperation-competition tension; both, in combination, are necessary for enabling alliance success. Thus, applying the social dilemma perspective to strategic alliances highlights an important theoretical gap and research question: *What alliance governance mechanism helps navigate the cooperation-competition tension by altering how members both perceive the alliance and each other?*

The current paper addresses this theoretical gap and research question by proposing a real options approach to managing strategic alliance social dilemmas. A *real option* is a right – without an obligation – to invest resources (e.g., labor, money, time) toward a course of action at a future point in time (Dixit & Pindyk, 1994). The core propositions here are: *When a strategic alliance acquires a real option, the alliance gains access to achieving a small win. The achievement of a small win in turn reduces the cooperation-competition tension by increasing trust and, as a consequence, decreasing perceived vulnerability among alliance members. The level of exposure (the amount of resources put at risk to acquire the real option) moderates this relationship between a small win and trust development.*

2. Theoretical Framework

This section provides a theoretical framework for the constructs and relationships presented in this paper's model. Section 2.1 reviews key definitions, forms of strategic alliance social dilemmas, and the structural and motivational approaches traditionally used for addressing the cooperation-competition tension. Section 2.2 considers the real options research literature and introduces the concept of collective real options and how a collective real option acts as a structural-motivational mechanism for governing the cooperation-competition tension in strategic alliance social dilemmas. Section 2.3 identifies trust and perceived vulnerability as two key psychological factors in influencing the cooperation-competition tension.

2.1. Strategic Alliance Social Dilemmas: Key Terms, Structures, and Approaches

In strategic alliance social dilemmas, *cooperation* occurs when an alliance member contributes private resources to further the alliance's interest; e.g., contributing resources to develop new processes for recycling machinery and used merchandise (Dawes, 1980). *Mutual cooperation* occurs when all members of the strategic alliance cooperate by contributing toward

the alliance (Messick & Brewer, 1983). *Defection* occurs when a member furthers individual interests by not contributing toward the strategic alliance; e.g., refusing to contribute (or under-contributing) resources toward alliance initiatives (Dawes, 1980).

Strategic alliance social dilemmas have two fundamental forms: an n-prisoner's dilemma and an assurance dilemma (McCarter & Northcraft, 2007). An "n-prisoner's dilemma" occurs when an alliance member has the greatest incentive to compete (defect) against the other members irrespective of those other members' actions (Rapoport & Chammah, 1965).² Figure 1a provides an example of a five-member strategic alliance social dilemma with an n-prisoner's dilemma structure. Defection is the most lucrative (and dominant) strategy for Member A in this form of social dilemma. An example of an alliance following an n-prisoner's dilemma structure is a consortium where the quality of air and stability of the climate within a region is a linear function of the total amount of resources invested in alliance initiatives by the alliance members.

The second form of strategic alliance social dilemma is an assurance or "stag-hunt" dilemma and is shown in Figure 1b (Camerer & Knez, 1997; Skyrms, 2004). Free riding is impossible for Member A in this social dilemma structure because mutual cooperation is required for the public good to be produced and mutual cooperation among alliance members always yields the highest payoff for all members (Cortazar, 1997). However, cooperation in an assurance social dilemma only is attractive to an alliance member if that member is "assured" that all the other members will cooperate (Liebrand, 1983). Although economically mutual cooperation may be in the best interest for every alliance member, unilateral defection is often perceived as being in an alliance member's best interest if assurance that others will cooperate is lacking (Franzen, 1995). An example of an alliance assurance dilemma would be a consortium where each member must supply unique resources (e.g., expertise, land, equipment) toward the

production of a new recycling process (Taylor & Ward, 1982). If even one alliance member chooses not to supply their resources then the technology is not produced and all members of the alliance (and public) suffer (and those who did supply their unique resources incur further losses such as lost hours of their personnel).

While free riding is impossible in assurance dilemmas, the fragility of mutual cooperation remains. In fact, the fragility of cooperation increases in assurance dilemmas because it only requires one defector for the alliance to fail: each member's non-redundancy makes it difficult (if not impossible) for the cooperating alliance members to make up for any dearth of resources necessary for producing the public good. While these two types of strategic alliance social dilemmas differ in structure, the underlying tension remains the same: members face a choice between doing what is best for themselves (their own firm) or doing what is best for the alliance, and furthering self-interests undermines the alliance's interest. Because of the focus on resolving this cooperation-competition tension, the propositions presented in this paper are not restricted to any one particular form of strategic alliance social dilemma.

Insert Figure 1 about here

The social dilemma perspective offers two approaches to alliance governance. The first is a structural (or *economic governance*) approach and focuses on altering how members perceive the nature of the social dilemma (Hennart, 1988; Kogut, 1991; Zeng & Chen, 2003). The structural approach entails managing the structure of the payoffs (the economic costs and benefits) associated with cooperation and defection to make cooperation more attractive and/or defection less attractive to alliance members. If cooperation is more attractive and/or defection less attractive, alliance members also will be less suspicious that other alliance members will

defect. Examples of a structural approach include *altering the payoffs* in the alliance *ex ante* by requiring each alliance member to commit a valuable, non-returnable resource to the alliance, thereby removing an alliance member's option to defect, and consequently eliminating free riding (Celly, Spekman & Kamauff, 1999; Gulati, Khanna & Nohria, 1994); or *issuing sanctions* such as contractually stipulated punishments for defection that would be applied *ex post* if an alliance member did not cooperate (Hardin, 1968; McCarter & Northcraft, 2007).

The structural approach, by itself, has some limitations (Zeng & Chen, 2003). For example, mutual cooperation in alliances with more than two members resembling an assurance game may be inherently unstable since it only takes one defector for the public good to be lost (Agarwal *et al.*, 2009; Franzen, 1995). Furthermore, introducing sanctions may exacerbate the cooperation-competition tension in strategic alliances. Such sanctions transform the dilemma from a moral decision (is it right to defect?) to a business decision (what are the costs and benefits of defecting?), and thus transform the focus from whether to defect to how to defect without getting found out (Tenbrunsel & Messick, 1999). Such sanctions also may motivate the punished to seek retribution on the punishers (Denant-Boemont, Masclet & Noussair, 2007).

The motivational (or *relational governance*) approach seeks to change how alliance members perceive each other while not altering the structure of the social dilemma (Zaheer & Venkatraman, 1995; Zeng & Chen, 2003). This approach entails governance mechanisms such as enhanced communication (Monge *et al.*, 1998) and group identification (Peteraf & Shanley, 1997) that facilitate trust among the alliance members (Dyer & Singh, 1998).

The motivational approach also, by itself, has limitations. For example, social psychology and political science research shows that creating a superordinate identity to enable mutual cooperation can backfire; members who have strong identities with multiple organizations and

groups (Polzer, Stewart & Simmons, 1999) may perceive superordinate identification initiatives as a threat to their own subgroup identities (Fiol, Pratt & O'Connor, 2009). In terms of communication, many alliances are composed of members who are geographically dispersed and rely on various electronic media (e.g., telephone, e-mail) to communicate. Aside from the increased possibility of members misinterpreting each others' communications (Jarvenpaa & Leidner, 1999), media lacking in face-to-face richness can make it easier to deceive partners (Chen & Komorita, 1994; Farrell & Rabin, 1996) and even foster unfounded suspicions of untrustworthiness, further crippling mutual cooperation (Rockmann & Northcraft, 2008). In sum, neither governance approach, independently, may be sufficient to alleviate the cooperation-competition tension in strategic alliance social dilemmas, suggesting the need to identify a governance mechanism that incorporates both approaches. Applying a real options approach to strategic alliance social dilemmas begins to address this theoretical gap in the alliance literature.

2.2. Real Options

As noted earlier, a real option is an action taken in the present that creates an ability or opportunity to choose to invest more in the future or exit the investment (McGrath, Ferrier & Mendelow, 2004; Merton, 1998). Acquiring real options is an economically attractive strategy for firms when making investment decisions because real options reduce uncertainty about the investment. In doing so, real options create “psychological hedges” in the minds of the investor (Bazerman & Gillespie, 1999; Malhotra, 2005), whereby investors perceive themselves as less vulnerable to the negative effects of investment failure (Meyerson, Weick & Kramer, 1996).

While real options have a variety of forms (Trigeorgis, 1999), the current paper focuses on “time-to-build” real options. In using time-to-build options (also called growth or compound options) an individual firm's investments in the strategic alliance come in (at least) two stages

(Sing, 2002; Smit & Trigeorgis, 2004). The first stage is when the firm, facing high uncertainty from the environment, acquires the real option by investing a small amount of resources. This small initial investment in the first stage provides an opportunity to uncover additional information about the environment, so as to make a more informed decision in the second stage. The second stage is when the firm, having learned more about the environment, exercises the option of either investing additional resources or abandoning the venture. This ability to not invest all at once provides the firm with “strategic flexibility” to wait until additional information about the environment unfolds and make the second (larger) investment only if the returns on the initial investment are favorable (Li *et al.*, 2007). A pilot project is an example of acquiring a time-to-build real option (Ziedonis, 2007). The firm makes an initial investment in a small version of the venture (the pilot project) to see whether further investments might hold promise; the firm then can exercise the real option created by the pilot project by making a second, additional investment in the venture if the results from the pilot project are favorable (Fawcett, Magnan & McCarter, 2008; Kim & Sanders, 2002). Therefore, in making the first investment, the time-to-build real option is acquired. In making the second investment, the time-to-build real option is exercised (Li *et al.*, 2007).

2.2.1. Collective Real Options

Research on real options tends to view their acquisition as an individual-level decision and action (Kogut, 1991; Trigeorgis, 1999; Ziedonis, 2007). However, as Li *et al.* (2007) and Dixit and Pindyck (1994) suggest, real options may be acquired and exercised by collectives, e.g., strategic alliances. The current paper builds on this existing body of work of real options by introducing the idea of collective real options, and (for brevity) shall henceforth use the term collective real option in place of collective time-to-build real option.

Collective real options are distinct from the traditional conceptualization of real options in at least two ways. The first distinction is the level at which the real option is acquired. Traditional research on real options has examined how individual firms acquire real options to reduce uncertainty when making investment decisions (e.g., Bowman & Moskowitz, 2001). Collective real options are created by the collective (e.g., alliance) as a whole and later are available for exercise by each individual member of the collective (Pape & Schmidt-Tank, 2004). An example of an acquisition of a collective real option would be when a strategic alliance collectively chooses to preface a large-scale alliance initiative with a pilot project (Fawcett *et al.*, 2008): the alliance members may first choose to develop a new process to recycle one particular kind of equipment and pilot its effects on a select region prior to agreeing to develop a large equipment recycling plant.

The concept of a collective real option is not new to the strategic alliance literature. Arend and Seale's (2005) modeling of two-party alliances as an iterated two-person prisoner's dilemma drew from the real options domain to explain when and why alliance members choose the "option to exit" the relationship when mutual cooperation becomes threatened. Bazerman and Gillespie's (1999) work on contingency contracts runs parallel to the concept of collective real options. Contingency contracts are agreements where parties agree (as a collective) to invest small amounts of resources upfront with the opportunity to invest more in the future if conditions are favorable (Roberto, 2004). As suggested by these two works, acquiring collective real options enable members to uncover information about both the social and economic environment.

The second feature that distinguishes collective real options from a traditional real option is when the benefits of the real option are realized. Past research on time-to-build real options makes the assumption that their benefits are not realized until after all investments have been

made (e.g., Majd & Pindyk, 1987). However, as suggested by Dixit and Pindyck (1994) and Li et al. (2007), real options provide social – as well as economic – market information. Recent empirical work on technology outsourcing draws from the real options research literature to maintain that alliance members may make small initial investments as a strategy to uncover more information about each other before large amounts of resources are committed to the alliance (van de Vrande, Vanhaverbeke & Duysters, 2009). Here we maintain that collective real options enable an alliance to reduce uncertainty about its members and, in doing so, provide social benefits prior to the collective real option being exercised. The creation of social benefits from acquiring a collective real option can be better understood by utilizing a small wins framework.

2.2.2. Small Wins and Collective Real Options

Small wins are “concrete, complete, implemented outcome[s] of moderate importance” (Weick, 1984: 43). Small wins are concrete in that the individuals involved in the collective task know what was achieved; complete in that they are able to distinguish the results of the task from others in the future or past; and implemented such that the individuals can enjoy the benefits of a successful outcome.

The small wins framework was derived from the observation that most organizing efforts – e.g., strategic alliance initiatives – are high in complexity and uncertainty about the intents of others and outcomes of mutual cooperation (Weick, 1984). For example, the complexity of partner coordination and uncertainty about cooperative financing are ever-present barriers to collective action in developing new technologies such as renewable energy and resource recycling initiatives (*Business Wire*, 2005; Wilson & Douglass, 2007). The high complexity and uncertainty about the task and necessity of large-scale resource investment can lead to the parties involved being fearful about the likelihood of successful collective action, and this fear often

leads to individuals being likely to keep the status quo and take no collective action at all (Hobfoll, 1989, 1998). The small wins framework posits that breaking a large-scale collective effort up into two or more smaller collective efforts reduces the task's complexity and uncertainty. As a consequence of reducing task complexity and uncertainty, parties are more likely to invest resources toward the smaller collective effort, giving them an opportunity to achieve a small win. The achievement of a small win propels the parties forward to achieve larger-scale collective efforts (Reay, Golden-Biddle & Germann, 2006).

Acquiring collective real options provides alliances an avenue to achieving the small win of mutual cooperation in strategic alliance social dilemmas (Kaufman & Kerr, 1993). By acquiring a collective real option – e.g., an alliance implementing a pilot project – the members reduce the complexity of the alliance's main initiative and uncover more information about each other's intentions (e.g., whether or not all members intend to cooperate). If mutual cooperation occurs while acquiring the collective real option – e.g., mutual investment of resources in a pilot project – then this mutual cooperation acts as a small win among the alliance members. The experience of a small win relieves the cooperation-competition tension inherent in strategic alliance social dilemmas through the development of trust and reduction of perceived vulnerability.

2.3. The Psychology of Collective Real Options in Strategic Alliances

This subsection identifies the psychological constructs of trust and perceived vulnerability as keys to understanding how the small wins when acquiring a collective real option relieves the cooperation-competition tension in strategic alliance social dilemmas.

2.3.1. Trust

Trust is an “expectation that alleviates the fear that one's exchange partner will act opportunistically” (Bardach & Eccles, 1989: 104). In strategic alliances, this positive

expectation equates to an alliance member anticipating that the other alliance members will contribute resources toward the producing the alliance's public good; e.g., an alliance member anticipates that other alliance members will contribute resources toward the production of new recycling technology and initiatives (McCarter & Northcraft, 2007). Trust is consistently identified as a critical governance mechanism for fostering cooperation in strategic alliances (Gulati, 1995; Lado, Dant & Tekleab 2008; Young-Ybarra & Wiersema, 1999), with recent research focusing on how trust develops in strategic alliances (Gulati & Sytch, 2008).

Trust may be developed in a variety of ways (Kramer, 1999). Researchers from political science, psychology, and organizational theory maintain that anticipation of future interaction (“the shadow of the future”) develops trust among alliance parties, and, as a result, increases cooperation (Axelrod, 1984; Heide & Miner, 1992; Pruitt & Kimmel, 1977; Ring & Van de Ven, 1994). Strategy, organizational behavior, and social psychology scholars posit that trust develops through the aggregate effects of past encounters (“the shadow of the past”) (Gautschi, 2000; Gulati, 1995; Lewicki & Bunker, 1996; Sniezek, May, & Sawyer, 1990). A synthesis has been suggested by Boulding: “The human race is not merely pushed by past events or present circumstances, but it is also pulled by its own images of the future, into the future” (1978: 132). In merging these two approaches to trust building, recent research has empirically shown that it is the combination of the shadow of the past and the shadow of the future that fosters the highest amount of trust in collective efforts (Poppo, Zhou & Sungmin, 2008). As reasoned by this logic, past exchanges create trust, but this history is only relevant to the parties because they anticipate future interaction.

Research on strategic alliances – utilizing the shadow of the past and the shadow of the future – traditionally takes a behavioral approach to trust development (Deutsch, 1958), where it

is assumed that an individual rationally evaluates the past and the potential (future) behavioral patterns of a member to then determine whether to reciprocate in-kind (Gulati, 1995; Heide & Miner, 1992; Poppo *et al.*, 2008). Recently, trust development scholars in organizational behavior have posited an alternative approach to trust development by focusing on the psychological processes involved in trust formation and suggesting that individuals not only examine whether their members cooperate or defect but also why their members chose to do so (Lewicki, Tomlinson & Gillespie, 2006). A fundamental insight from this psychological approach to trust development is that individuals interact with each other across a “breadth” or spectrum of activities and, as a consequence, may trust one another to do one thing but distrust one another to do another (Lewicki, McAllister & Bies, 1998). In other words, using a psychological approach to trust development, the question an alliance member asks is not only “Do I trust my members?” but “Do trust my members to do a certain thing” (Hardin, 1993). The answer to this question resides in understanding the nature of perceived vulnerability.

2.3.2. Perceived Vulnerability

Vulnerability (or risk) has been defined in a variety of ways (Alwang, Siegel & Jorgensen, 2001; March & Shapira, 1987; Mitchell, 1999). Consumer behaviorists conceptualize vulnerability as “an individual’s biased assessment of a risky situation” (Cho & Lee, 2006) where vulnerability is composed of the degree of variability in the outcome of the purchase (or investment) (Cox, 1967a) and the amount of resources that can be lost (Cunningham, 1967). Scholars studying managerial risk-taking define vulnerability as an individual’s assessed probability of an investment’s success and their confidence in that assessment (Sitkin & Pablo, 1992; Sitkin & Weingart, 1995). Trust researchers see vulnerability as a function of the social

environment or the extent to which an individual believes their resources are in danger of being exploited by others (Meyerson, Weick & Kramer, 1996).

The re-occurring feature in these conceptualizations is that vulnerability is an individual's perception subject to situational, social and personal influences. In synthesizing these research literatures, the current paper defines *perceived vulnerability* as an individual's assessment of vulnerability associated with taking a course of action, and this vulnerability is composed of uncertainty about the future behavior of others and/or the environment, and the amount of resources that are at stake. From this definition, perceived vulnerability contains two distinct, but related, elements: uncertainty and exposure.

In strategic alliances, uncertainty comes from two sources. Marketing and strategy literatures highlight the external, market environment as a source of uncertainty – e.g., uncertainty about the overall profitability of a market after entry (Folta, 1998; Li *et al.*, 2007; Mitchell, 1999). Social dilemma and decision-theoretic frameworks term this type of uncertainty as *environmental uncertainty* (or performance risk) since it is concerned with elements of the “task environment” that are outside the control of the alliance members (Caplin & Leahy, 2001; Das & Teng, 1998; Wit *et al.*, 2004). An example would be strategic alliance members being uncertain concerning the benefits of the new recycling process (Zwaniacki, 2008). Real options research traditionally focuses on this type of uncertainty and how it may be reduced through acquiring real options (e.g., McGrath & Nerkar, 2004; Oriani & Sobrero, 2008). Organizational and social psychologists identify human behavior as an additional source of uncertainty (Sniezek *et al.*, 1990; Zand, 1972). Social dilemma and organizational scholars refer to the lack of information about the behavior of others as *social uncertainty* (or relational risk) (Das & Teng,

1996; Komorita & Parks, 1995; Messick, Allison & Samuelson, 1988). These two types of uncertainty – separate or combined – create the uncertainty element of perceived vulnerability.

The second element of perceived vulnerability is *exposure*, or the amount an individual alliance member must risk losing in proportion to their total wealth for achieving the benefits from investment (Cho & Lee, 2006; Cunningham, 1967). If an alliance member, for example, is asked to contribute 90 (10) percent of their total wealth toward the public good, then this alliance member is considered to experience relatively high (low) exposure (Lubell, 2004). Taken together, both exposure and uncertainty compose an individual alliance member's perceived vulnerability about an investment situation in collective action.

In summary, strategic alliances face a social dilemma where alliance members experience tension between doing what is best for themselves versus what is best for the alliance. Collective real options enable strategic alliance members to find out more information about the social and task environments. When mutual cooperation occurs in the acquisition of the collective real option, the strategic alliance members experience a small win. The achievement of a small win reduces uncertainty inherent in how a member perceives their vulnerability in the alliance.

3. The Model

First we try, then we trust!

– Sean Connery from the film *Entrapment* (1999)

As suggested by the above quotation, collective real options enable strategic alliance members to “first try” to see if they can trust one other prior to making full investments in the alliance. If there is mutual cooperation when the alliance acquires the real option, then this mutual cooperation acts as a small win thereby increasing trust among the alliance members. The increase of trust among the alliance members reduces the social uncertainty element of perceived vulnerability, and, as a consequence, members are more willing to cooperate by

contributing resources toward the strategic alliance.³ The relationship between small wins of acquiring the real option and the formation of trust is moderated by the members' exposure when acquiring the real option. Figure 2 provides a conceptual roadmap outlining these relationships.

 Insert Figure 2 about here

3.1. Small Wins of Mutual Cooperation and Trust

The small wins from mutual cooperation in acquiring the collective real option create high trust among alliance members.⁴ Theory building on trust in strategic alliances references the real options research literature as holding promise in understanding how “incremental resource commitments” among alliance members could increase trust among alliance members (Das & Teng, 1998: 504). Bazerman and Gillespie's reflection on the use of contingency contracts among alliance members maintains that such contracts can increase trust among contracting parties because it provides them with a “safety net” to exit the relationship if an “agreement goes unexpectedly awry” while an opportunity to enhance the relationship if the agreement goes well (1999: 159). When a strategic alliance acquires a collective real option through mutual cooperation, the small win of mutual cooperation creates an exchange history among the parties (Gulati, 1995) who also intend to work together in the future (Heide & Miner, 1992). As a result, “predictability” about others' future behavior increases (Weick, 1984) and trust, as a consequence, is enhanced (Snizek *et al.*, 1990; Vangen & Huxham, 2003). This logic leads to the first proposition.

Proposition 1: *Members in strategic alliances who experience the small wins of mutual cooperation when acquiring the collective real option will experience higher trust compared to members in strategic alliances who do not experience small wins of mutual cooperation in acquiring the collective real option.*

3.2. Trust and Perceived Vulnerability

Trust will be a critical psychological factor in determining the level of perceived vulnerability that a member experiences in a strategic alliance. When trust is high, social uncertainty about the intentions of past and future behavior of others is minimized (Kollock, 1994). A decrease in social uncertainty makes an individual less fearful that their investment will be lost because of free riding and defensive defection (Schnake, 1991; Sniezek *et al.*, 1990). Vulnerability is therefore reduced among alliance members. Trust will mediate the relationship between small wins of mutual cooperation in acquiring the collective real option and perceived vulnerability.

***Proposition 2:** As trust among members increases in a strategic alliance, perceived vulnerability experienced by those members decreases.*

3.3. Exposure when Acquiring the Collective Real Option and Trust Development

Recent research on trust development in strategic alliances suggests that it is not the amount of history among members that develop trust, but rather the quality of that history (Gulati & Sych, 2008). The psychological approach to trust development helps explain this position (Lewicki *et al.*, 2006). At high levels of exposure when acquiring the collective real option, a strategic alliance member is more likely to experience higher perceived vulnerability from social uncertainty (Cho & Lee, 2006; Hobfoll, 1998). As a result of experiencing heightened perceived vulnerability, the member will be inclined to under-invest in the acquisition of the collective real option. As a consequence of this under-investment, the opportunity for achieving the small win of mutual cooperation is less likely. The unsuccessful achievement of a small win when acquiring the collective real option will keep trust low among alliance members. Trust will be low because the unsuccessful achievement of mutual cooperation creates a trust breach,

decreasing a member's trust in the other members' intentions to contribute toward the strategic alliance (Lount, Zhong & Murnighan, 2007; Stout, 2008).

Considering the potential negative outcome of high exposure, an initial strategy to elicit high contribution toward alliance public goods may be to ask for very small amounts (have minimal exposure) when acquiring the collective real option to develop high trust among alliance members. However, several bodies of work suggest that low exposure when acquiring the collective real option may also undermine the development of trust, even when the small wins of mutual cooperation are realized in acquiring the collective real option. Some trust scholars, for example, propose that without “enough vulnerability” among parties, trust cannot successfully form (Das & Teng, 1998; Mayer, Davis & Schoorman, 1995; Ribstein, 2000). Social psychology research on foot-in-the-door technique shows that while getting an individual to make a small initial investment increases the likelihood of them complying to invest more in the future (Dillard, Hunter & Burgoon, 1984; Freedman & Fraser, 1966), future compliance to larger requests is most likely when the initial request is moderate compared to low (Segilman, Bush & Kirsch, 1976).

Relatedly, attribution theory suggests that individuals attribute other's behavior to either internal or external causes and predicts that causal attributions of an individual's performance on tasks is a function of the task's perceived difficulty (Heider, 1958). If an individual performs well on a task, internal sources (e.g., personal ability and attitude) are less likely to be “discounted” and performance is more likely to be attributed to external sources (e.g., the ease of the task) when tasks are perceived as easy compared to when they are perceived as difficult (Kelley, 1973). This difference suggests that when alliance members contribute small amounts of resources toward the acquisition of a collective real option that such cooperation behavior is more likely to be attributed to the easiness of the low exposure rather than to the good intentions

(or trustworthiness) of the alliance members (Malhotra & Murnighan, 2002). Empirical results from experimental social psychology support this position in regards to trust development. Using the “Trust Game” in a laboratory setting, Pillutla, Malhotra, and Murnighan (2003) found that small offers from the sender were attributed by receivers as signals of low trust, while receivers attributed larger offers as signals of high trust from the sender. In other words, the extent to which an individual invests in another individual affects how their investment is perceived. Therefore, the current paper proposes the following propositions:

***Proposition 3:** As exposure in acquiring the collective real option decreases, the likelihood of investment by alliance members to realize a small win of mutual cooperation increases.*

***Proposition 4:** Exposure in acquiring the collective real option will moderate the relationship between small wins and trust such that small wins of mutual cooperation will have less of an effect on trust among alliance members when exposure is low than when exposure is high.*

***Proposition 5:** There will be a curvilinear relationship between exposure in the acquisition of the collective real option and trust among alliance members such that trust will be high at moderate levels of exposure and low at both low and high levels of exposure.*

3.4. Perceived Vulnerability and Cooperation in Strategic Alliances

Perceived vulnerability negatively affects a member’s willingness to contribute resources toward the strategic alliance. In social dilemmas, an individual experiences high perceived vulnerability from uncertainty (about others or the value of cooperation) and the fact they must sacrifice resources that cannot be returned. Resource conservation theories maintain that, when an individual perceives that their resources are threatened with a potential, irreversible loss, they experience stress or perceived vulnerability, and, therefore seek to avoid the threat by selecting a course of action that minimizes the likelihood that their resources will be lost (Hobfoll, 1989, 1998). Consumer purchasing theories make a similar prediction about individuals facing risky

investments: high perceived risk (or vulnerability) in an investment motivates individuals to engage in “risk reduction strategies” – one of which is avoiding the investment (Cases, 2002; Cox, 1967b). In social dilemma terms, this strategy is equivalent to not contributing (or under-contributing) toward the alliance public good. This logic leads to the following:

Proposition 6: *An alliance member will be less likely to contribute toward the alliance’s interests when perceived vulnerability is high compared to when perceived vulnerability is low.*

To review, a collective real option creates the opportunity for strategic alliances to achieve the small wins of mutual cooperation. These small wins build trust, and high trust increases an alliance member’s willingness to contribute towards the alliance by lowering perceived vulnerability. Exposure in the acquiring of the collective real option directly affects the likelihood of mutual cooperation and also moderates the relationship between mutual cooperation and the development of trust among alliance members. Combining these exposure effects suggests a curvilinear relationship between exposure and the formation of trust in strategic alliances.

4. Discussion

Taking a real options approach to navigating strategic alliance social dilemmas provide several insights to strategic management. First, a real options approach to governing the cooperation-competition tension provides an understanding about how an alliance may be re-structured to not only psychologically alter how members think about the alliance but also how members think about each other (Kollock, 1998; Zeng & Chen, 2003). Recent empirical research finds that neither structural nor motivational governance mechanisms suffice in managing the cooperation-competition tension (Agarwal *et al.*, 2009; Prahinski & Benton, 2004). Uncertainty in the *social* environment is just as crucial to management in strategic alliances as uncertainty in the *market* environment. Real options enable strategic alliance members to not only hedge risk

from the market environment, but also to hedge risk from the social environment by allowing members to “first try, then trust” each other on larger alliance initiatives.

A second contribution to the strategic alliance research literature is in regards to trust formation. Strategic alliance research has assumed trust develops in a linear fashion, only recently finding that a period of “ambivalence” exists among members in the early stages of the alliance (Gulati & Sytch, 2008). The current paper maintains that one of the reasons for this period of ambivalence may be that alliance members are increasing the “breadth” of their relational experiences (Lewicki *et al.*, 1998) to not trust too early and misattribute each others’ cooperative actions to the ease of the task (low exposure) rather than a product of the amount of trust in the alliance (Malhotra & Murnighan, 2002). Strategic alliances that use collective real options as a means to develop trust, therefore, must search out the “happy medium” whereby alliance members perceive that the amount of exposure experiences is enough to elicit the development of trust, but not so much to discourage investment in the real option.

This paper also provides several contributions to the study of real options. First, the real option literature has primarily examined how firms individually use real options in investments (Li *et al.*, 2007). However, the current paper emphasizes that real options may be used strategically in *collective* efforts (Busby & Pitts, 1997). Indeed, collective real options can increase trust and, as a result, foster cooperation by decreasing perceived vulnerability among alliance members.

A second contribution to the real options literature is the challenge of the assumption that time-to-build real option benefits cannot be realized until after all stages of investment have been made (Majd & Pindyck, 1987). This assumption may hold if we assume those benefits are only monetary (Trigeorgis, 1999). However, the model in the current paper considers the social (e.g.,

information about other members' intent) and economic benefits (e.g., monetary returns from the pilot project and future monetary returns from the full-scale investment in new recycling technology) are available before full investment. Considering that with whom we invest can be just as important as in what we invest (Adabor, 2006), knowing the social benefits of real options provides individuals with valuable information that affects both their social and investment behavior.

Lastly, this paper advances our conceptualization of small wins. While Weick's (1984) framework has provided explanation concerning how large scale strategic alliance initiatives are achieved (Reay *et al.*, 2006), the framework gives little consideration about how the size of the small win makes a difference for motivating cooperation. The propositions in the current paper maintains that *the size of the small win matters* because if the small win is "too small" then alliance members may not be convinced that future cooperation shall result in large-scale benefits.

5. Conclusion

It has been said by some that, "What we accomplish together will benefit many" (Stewart, 2001: 1). Unfortunately, these benefits of working together can be elusive because strategic alliances create social dilemmas in which individuals may withhold contribution because they perceive themselves as potentially vulnerable to others' opportunistic behavior (Williamson, 1991). Drawing from strategy, social psychology and organization science, the current paper presents a structural-motivational approach to governing the competition-cooperation tension in strategic alliances. Collective real options provide alliance members the chance to first try and then trust each other before undertaking large-scale public goods production. Using a real options approach enables us to explain how an appropriately-sized small win is the first step toward completing the long journey toward strategic alliance members successfully working together.

Footnotes

¹ Public goods come in two forms (Cornes & Sandler, 1996). *Pure public goods* are resources that are available to anyone in a society or similar large-scale collective; e.g., a nation, community, or city. Examples of pure public goods include public radio, national defense, and lighthouses. *Private public goods* (or *club goods*) are resources that are available to anyone within a smaller-scale collective such as a strategic alliance or work team. Examples of private public goods include new technologies and processes developed in strategic alliances and generic advertising campaigns (e.g., “Got milk?” and “Beef, it’s what for dinner!”) in a particular industry. In this second instance, the private public good is *public* to a smaller specified collective (e.g., members of an alliance) while being *privatized* from a larger specified collective (e.g., the entire populace of a city). While this paper’s model is not limited to either form of public good, it refers to examples of private public goods and uses the abbreviated term public good to remain consistent with the types of public goods discussed in the literature on strategic alliance social dilemmas (e.g., Agarwal *et al.*, 2009; McCarter & Northcraft, 2007; Zeng & Chen, 2003).

² Most past research utilizing the prisoners’ dilemma to understand inter-organizational relations limit the paradigm to a two-partner prisoners’ dilemma; e.g., joint ventures, buyer-supplier relations (e.g., Heide & Miner, 1992). This paper, however, is particularly interested in strategic alliances where the number of partners exceeds two because such a situation is common in strategic alliances (Rokkan & Buvik, 2003) and the presence of three or more partners provides the opportunity for partners to free ride (Komorita & Parks, 1995).

³ It is important to remember, however, that aside from social uncertainty there is also environmental uncertainty or uncertainty about the benefits of mutual cooperation (Das & Teng, 1996). Recent research on social and environmental uncertainty in social dilemmas suggests that alliance members may still defect in the presence of unfavorable market environments, irrespective of the level of social uncertainty among alliance partners (McCarter, Northcraft & Rockmann, 2008). The propositions made in the current paper assumes that the market environment revealed from acquiring the real option provides strategic alliance members with a favorable future and therefore focuses on the wins of mutual cooperation to as to reduce uncertainty in the social environment.

⁴ Of course, it is possible that members of an alliance could cooperate and achieve mutual cooperation with the intent of opportunistically defecting later. Such a strategy is analogous to the “investor confidence game” (Stout, 2008) where an individual gradually builds confidence with others only to opportunistically defect later for a larger purse.

(a) *Five-Member Prisoner's Dilemma*

Number of other alliance members that cooperate

		0	1	2	3	4
Member A's decision	Cooperate	0	15	30	45	60
	Defect	20	35	50	65	80

(b) *Five-Member Assurance Dilemma*

Number of other alliance members that cooperate

		0	1	2	3	4
Member A's decision	Cooperate	0	0	0	0	100
	Defect	50	50	50	50	50

Adapted from Franzen (1995: 190).

Figure 1: Two strategic alliance social dilemma structures

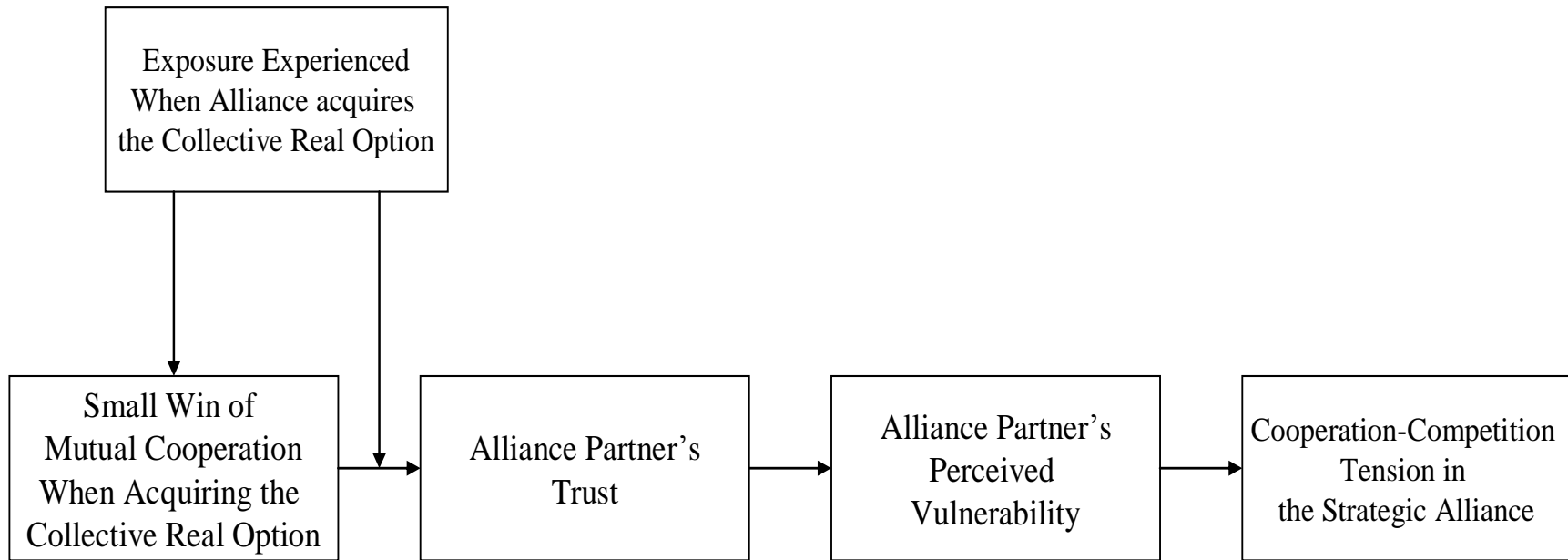


Figure 2: A conceptual model of a real options approach to strategic alliance social dilemmas

References

- Adabor H. 2006. The role of personal relationships in inter-firm alliances. Benefits, dysfunctions, and some suggestions. *Business Horizons* **49**: 473-486.
- Agarwal R., Croson R., Mahoney J. T. 2009. Decision making in strategic alliances: An experimental investigation. *Strategic Management Journal*, forthcoming.
- Alwang J., Siegel P., Jorgensen S. 2001. Vulnerability: A view from different disciplines, *Social protection discussion paper*. The World Bank: Washington D.C.
- Arend R. J., Seale D. A. 2005. Modeling alliance activity: An iterated prisoners' dilemma with exit option. *Strategic Management Journal* **26**: 1057-1074.
- Arrow K. 1974. *The limits of organization*. Norton: New York, NY.
- Axelrod R. 1984. *The evolution of cooperation*. Basic Books: New York, NY.
- Bazerman M. H., Gillespie J. J. 1999. Betting on the future: The virtues of contingent contracts. *Harvard Business Review* **77**(5): 155-160.
- Boulding K. J. 1978. *Ecodynamics: A new theory of societal evolution*. Sage: Thousand Oaks, CA.
- Bowman E. H., Moskowitz G. T. 2001. Real options analysis and strategic decision making. *Organization Science* **12**: 772-777.
- Bradach J. L., Eccles R. G. 1989. Markets versus hierarchies: from ideal types to plural forms. *Annual Review of Sociology* **15**: 97-118.
- Busby J. S., Pitts C. 1997. Real options in practice. *Management Accounting Research* **8**: 169-186.
- Business and the Environment*. 2003. Four big companies form take-back partnership in Europe. **14**(1): 12-13.
- Business Wire*. 2005. GE Announces strategic alliance with Harrison Western, October 20, http://goliath.ecnext.com/coms2/gi_0199-4819951/GE-Announces-Strategic-Alliance-with.html, (accessed January 9, 2009).
- Camerer C., Knez M. 1997. Coordination in organizations: A game-theoretic perspective. In Shapira Z. (Ed.), *Organizational decision making*: 158-191. Cambridge University Press: New York, NY.
- Caplin A., Leahy J. 2001. Psychological expected utility theory and anticipatory feelings. *Quarterly Journal of Economics* **116**: 55-79.
- Cases A. S. 2002. Perceived risk and risk reduction strategies in Internet shopping. *International Review of Retail, Distribution, and Consumer Research* **12**: 375-394.

- Celly K. S., Spekman R. E., Kamauff J. W. 1999. Technological uncertainty, buyer preferences and supplier assurances: an examination of Pacific Rim purchasing arrangements. *Journal of International Business Studies* **30**: 297-316.
- Chen X-P. Komorita S. 1994. The effects of communication and commitment in public goods social dilemmas. *Organizational Behavior and Human Decision Processes* **60**: 367-386.
- Cho J., Lee J. 2006. An integrated model of risk and risk-reducing strategies. *Journal of Business Research* **59**: 112-120.
- Cornes R., Sandler T. 1996. *The theory of externalities, public goods, and club goods*. (2nd ed.). Cambridge University Press: Cambridge, UK.
- Cortazar R. 1997. Non-redundant groups, assurance games, and the origins of collective action. *Public Choice* **92**: 41-53.
- Cox D. F. 1967a. Risk handling in consumer behavior: An intensive study of two cases. In DF Cox (Ed.), *Risk taking and information handling in consumer behavior*: 34-81. Harvard University Press: Cambridge, MA.
- Cox D. F. 1967b. *Risk taking and information handling in consumer behavior*. Harvard University Press: Cambridge, MA.
- Cunningham S. 1967. The major dimensions of perceived risk. In D. F. Cox (Ed.), *Risk taking and information handling in consumer behavior*: 82-108. Harvard University Press: Cambridge, MA.
- Das T. K., Teng B-S. 1996. Risk types and the inter-firm alliance structures. *Journal of Management Studies* **33**: 827-843.
- Das T. K., Teng B-S. 1998. Between trust and control: Developing confidence in partner cooperation in alliances. *Academy of Management Review* **23**: 491-512.
- Das T. K., Teng B-S. 2000. A resource-based theory of strategic alliances. *Journal of Management* **26**: 31-62.
- Dawes R. 1980. Social dilemmas. *Annual Review of Psychology* **31**: 169-193.
- Denant-Boemont L., Masclet D., Noussair C. N. 2007. Punishment, counterpunishment and sanction enforcement in a social dilemma experiment. *Economic Theory* **33**: 145-167.
- Deutsch M. 1958. Trust and suspicion. *Journal of Conflict Resolution* **2**: 265-279.
- Dillard J., Hunter J. E., Burgoon M. 1984. Sequential-request persuasive strategies: Meta-analysis of foot-in-the-door and door-in-the-face. *Human Communication Research* **10**: 461-488.
- Dixit A., Pindyck R. 1994. *Investment under uncertainty*. Princeton University Press: Princeton.
- Dyer J. H., Singh, H. 1998. The relational view: Cooperative strategies and sources of inter-organizational competitive advantage. *Academy of Management Review* **23**: 660-679.

- Farrell J., Rabin, M. 1996. Cheap talk. *Journal of Economic Perspectives* **19**: 103-118.
- Fawcett S. E., Magnan G., McCarter M. W. 2008. Supply chain alliances and social dilemmas: Bridging the barriers that impede collaboration. *International Journal of Procurement Management* **1**: 318-342.
- Fiol C. M., Pratt M. G., O'Connor E. J. 2009. Managing intractable identity conflicts. *Academy of Management Review* **34**: 32-55.
- Folta T. 1998. Governance and uncertainty: The trade-off between administrative control and commitment. *Strategic Management Journal* **19**: 1007-1028.
- Franzen A. 1995. Group size and one-shot collective action. *Rationality and Society* **7**: 183-200.
- Freedman J., Fraser S. 1966. Compliance without pressure: The foot-in-the-door technique. *Journal of Personality and Social Psychology* **4**: 195-202.
- Gautschi T. 2000. History effects in social dilemma situations. *Rationality and Society* **12**: 131-162.
- Gerard, D., Wilson E. J. 2009. Environmental bonds and the challenge of long-term carbon sequestration. *Journal of Environmental Management* **90**: 1097-1105.
- Gottschlag O., Zollo M. 2007. Interest alignment and competitive advantage. *Academy of Management Review* **38**: 418-437.
- Gulati R. 1995. Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances. *Academy of Management Journal* **38**: 85-112.
- Gulati R. 1998. Alliances and networks. *Strategic Management Journal* **19**: 293-317.
- Gulati R., Khanna T., Nohria N. 1994. Unilateral commitments and the importance of process in alliances. *Sloan Management Review* **35**(3): 61-70.
- Gulati R., Sytch M. 2008. Does familiarity breed trust? Revisiting the antecedents of trust. *Managerial and Decision Economics* **29**: 165-190.
- Hamel G. 1991. Competition for competence and inter-partner learning within international strategic alliances. *Strategic Management Journal* **12**: 83-103.
- Hardin G. 1968. The tragedy of the commons. *Science* **162**: 1243-1248.
- Hardin R. 1993. The street-level epistemology of trust. *Politics and Society* **21**: 505-529.
- Hardy C., Phillips N., Lawrence T. B. 2003. Resources, knowledge and influence: The organizational effects of interorganizational collaboration. *Journal of Management Studies* **40**: 321-347.
- Heide J., Miner A. 1992. The shadow of the future: Effects of anticipated interaction and frequency of contact on buyer-seller cooperation. *Academy of Management Journal* **35**: 265-291.

- Heider F. 1958. *The psychology of interpersonal relations*. Wiley: New York, NY.
- Hennart J-F. 1988. A transaction costs theory of equity joint ventures. *Strategic Management Journal* **9**: 361-374.
- Hobfoll S. 1989. Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist* **44**: 513-524.
- Hobfoll S. 1998. *Stress, culture, and community*. Plenum Press: London, UK.
- Jarvenpaa S. L., Leidner D. E. 1999. Communication and trust in global virtual teams. *Organization Science* **10**: 791-815.
- Kale P., Dyer J. H., Singh H. 2002. Alliance capability, stock market response, and long-term alliance success: The role of the alliance function. *Strategic Management Journal* **23**: 747-767.
- Kaufman C., Kerr N. 1993. Small wins: Perceptual focus, efficacy, and cooperation in social dilemmas. *Journal of Applied Social Psychology* **23**: 3-20.
- Kelley H. 1973. The process of causal attribution. *American Psychologist* **28**: 107-128.
- Khanna T., Gulati R., Nohria N. 1998. The dynamics of learning alliances: Competition, cooperation, and relative scope. *Strategic Management Journal* **19**: 193-210.
- Kim Y. J., Sanders G. L. 2002. Strategic actions in information technology investment based on real option theory. *Decision Support Systems* **33**: 1-11.
- Kogut B. 1991. Joint ventures and the option to expand and acquire. *Management Science* **37**: 19-33.
- Kollock P. 1994. The emergence of exchange structures: An experimental study of uncertainty, commitment, and trust. *American Journal of Sociology* **100**: 313-345.
- Kollock P. 1998. Social dilemmas: The anatomy of cooperation. *Annual Review of Sociology* **24**: 183-214.
- Komorita S., Parks C. 1995. Interpersonal relations: Mixed-motive interaction. *Annual Review of Psychology* **46**: 183-207.
- Kramer R. M. 1999. Trust and distrust in organizations: Emerging perspectives, enduring questions. *Annual Review of Psychology* **50**: 569-598.
- Lado A. A., Dant R. R., Tekleab A. G. 2008. Trust-opportunism paradox, relationalism, and performance in interfirm relationships: evidence from the retail industry. *Strategic Management Journal* **29**: 401-423.
- Lewicki R. J., Bunker B. 1996. Trust in relationships: A model of trust development and decline. In R. Kramer, T. Tyler (Eds.), *Trust in organizations*: 114-139. Sage: Newbury Park.

- Lewicki R. J., McAllister D. J., Bies R. J. 1998. Trust and distrust: New relationships and realities. *Academy of Management Review* **23**: 438-458.
- Lewicki R. J., Tomlinson E. C., Gillespie N. 2006. Models of interpersonal trust development: Theoretical approaches, empirical evidence, and future directions. *Journal of Management* **32**: 991-1022.
- Li Y., James B., Madhavan R., Mahoney J. 2007. Real options: Taking stock and looking ahead. *Advances in Strategic Management* **24**: 31-66.
- Liebrand W. 1983. A classification of social dilemma games. *Simulation and Games* **14**: 123-138.
- Lount R. B., Zhong C-B., Murnighan J. K. 2007. Getting off on the wrong foot: The timing of a breach and the restoration of trust. *Personality and Social Psychology Bulletin* In press.
- Lubell M. 2004. Collaborative watershed management: A view from the grassroots. *Policy Studies Journal* **32**: 341-363.
- Majd S., Pindyck R. 1987. Time to build, option value, and investment decisions. *Journal of Financial Economics* **18**: 7-27.
- Malhotra D. 2005. The effect of real options on trust and trustworthiness: The relevance of irrelevant alternatives, *IACM 18th Annual Conference*: 1-23: Seville, Spain.
- Malhotra D., Murnighan J. K. 2002. The effects of contracts on interpersonal trust. *Administrative Science Quarterly* **47**: 534-559.
- March J. G., Shapira Z. 1987. Managerial perspectives on risk and risk taking. *Management Science* **33**: 1404-1418.
- Mayer R. C., Davis J. H., Schoorman F. D. 1995. An integrative model of organizational trust. *Academy of Management Review* **20**: 709-734.
- McCarter M. W., Northcraft G. B. 2007. Happy together?: Insights and implications of viewing managed supply chains as a social dilemma. *Journal of Operations Management* **25**: 498-511.
- McCarter, M. W., Northcraft, G. B., Rockmann, K. 2008. *The effect of outcome variance in public goods dilemmas*. Working paper, University of Illinois at Urbana-Champaign, 1-34.
- McGrath R. G., Nerkar A. 2004. Real options reasoning and a new look at the R&D investment strategies of pharmaceutical firms. *Strategic Management Journal* **25**: 1-21.
- McGrath R. G., Ferrier W. J, Mendelow A. L. 2004. Real options as engines of choice and heterogeneity. *Academy of Management Review* **29**: 86-101.
- Merton R. C. 1998. Applications of option-pricing theory: Twenty-five years later. *American Economic Review* **88**: 323-349.

- Messick D., Allison S., Samuelson C. 1988. Framing and communication effects on group members' responses to environmental and social uncertainty. In S. Maital (Ed.), *Applied behavioral economics*, Vol. 2: 677-700. New York University Press: New York, NY.
- Messick D., Brewer M. 1983. Solving social dilemmas. In Wheeler L., Shaver P. (Ed.), *Review of personality and social psychology*, Vol. 4: 11-44. Sage Publications: Beverly Hills.
- Meyerson D., Weick K., Kramer R. 1996. Swift trust and temporary groups. In R. Kramer, T. Tyler (Eds.), *Trust in organizations*, 166-195. Sage: London, UK.
- Mitchell V-W. 1999. Consumer perceived risk: Conceptualizations and models. *European Journal of Marketing* **33**: 6-195.
- Monge P. R., Fulk J., Kalman M. E., Flanagin A. J., Parnassa C., Rumsey S. 1998. Production of collective action in alliance-based interorganizational communication and information systems. *Organization Science* **9**: 411-433.
- Olson M. 1965. *The logic of collective action*. Harvard University Press: Cambridge, MA.
- Oriani R., Sobrero M. 2008. Uncertainty and the market valuation of R&D within a real options logic. *Strategic Management Journal* **29**: 343-361.
- Pape U., Schmidt-Tank S. 2004. Valuing joint ventures using real options, *ESCP-EAP working paper #7*: 1-38. European School of Management: Paris, France.
- Peteraf M., Shanley M. 1997. Getting to know you: A theory of strategic group identity. *Strategic Management Journal* **18**: 165-186.
- Pillutla M., Malhotra D., Murnighan J. K. 2003. Attributions of trust and the calculus of reciprocity. *Journal of Experimental Social Psychology* **39**: 448-455.
- Polzer J., Stewart K., Simmons J. 1999. A social categorization explanation for framing effects in nested social dilemmas. *Organizational Behavior and Human Decision Processes* **79**: 154-178.
- Poppo L., Zhou K. Z., Sungmin R. 2008. Alternative origins to inter-organizational trust: An interdependence perspective on the shadow of the past and the shadow of the future. *Organization Science* **19**: 39-55.
- Prahinski C., Benton W. C. 2004. Supplier evaluations: communication strategies to improve supplier performance. *Journal of Operations Management* **22**: 39-62.
- Pruitt D. G., Kimmel M. J. 1977. Twenty years of experimental gaming. *Annual Review of Psychology* **28**: 363-393.
- Rapoport A., Chammah A. M. 1965. *Prisoner's dilemma*. University of Michigan Press: Ann Arbor, MI.

Reay T., Golden-Biddle K., Germann K. 2006. Legitimizing a new role: Small wins and micro-processes of change. *Academy of Management Journal* **49**: 977-998.

Ribstein L. 2000. Law v. trust. *George Mason University Law and Economics working paper series No. 00-38*: 1-34.

Ring P. S., Van de Ven A. H. 1994. Developmental processes of cooperative inter-organizational relationships. *Academy of Management Review* **19**: 90-118.

Roberto M. A. 2004. Strategic decision-making processes. *Group and Organization Management* **29**: 625-659.

Rockmann K. W, Northcraft G. B. 2008. To be or not to be trusted: The influence of media richness on defection and deception. *Organizational Behavior and Human Decision Processes* **107**: 106-122.

Rokkan, A. I., Buvik, A. 2003. Inter-firm cooperation and the problem of free riding behavior: An empirical study of voluntary retail chains. *Journal of Purchasing and Supply Management* **9**: 247-256.

Schnake M. E. 1991. Equity in effort: The ‘sucker effect’ in co-acting groups. *Journal of Management* **17**: 41-54.

Segilman C., Bush M., Kirsch K. 1976. Relationship between compliance in the foot-in-the-door paradigm and the size of the first request. *Journal of Personality and Social Psychology* **3**: 517-520.

Sing T. F. 2002. Time to build options in construction processes. *Construction Management and Economics* **20**: 119-130.

Sitkin S. B., Pablo A. L. 1992. Re-conceptualizing the determinants of risk behavior. *Academy of Management Review* **17**: 9-38

Sitkin S. B, Weingart L. R. 1995. Determinants of risky decision-making behavior: A test of the mediating role of risk perceptions and propensity. *Academy of Management Journal* **6**: 1573-1592.

Skyrms B. 2004. *The stag hunt and evolution of social structure*. Cambridge University Press: Cambridge, UK.

Smit H. T. J., Trigeorgis L. 2004. *Strategic investment: Real options and games*. Princeton University Press: Oxford, UK.

Sniezek J. A., May D. R., Sawyer J. E. 1990. Social uncertainty and interdependence: A study of resource allocation decisions in groups. *Organizational Behavior and Human Decision Processes* **46**: 155-180.

Stewart L. 2001. Food pantry workers gives thanks. *Daily Herald*, November 19, A1.

Stout L. A. 2008. The investor confidence game. *UCLA School of Law Research Paper # 02-18*: 1-45. School of Law: Los Angeles, CA.

- Taylor M., Ward H. 1982. Chickens, whales, and lumpy goods: Alternative models of public-goods provision. *Political Studies* **30**: 350-370.
- Tenbrunsel A. E., Messick D. M. 1999. Sanctioning systems, decision frames, and cooperation. *Administrative Science Quarterly* **44**: 684-707.
- Tirole J. 1996. A theory of collective reputation (with applications to the persistence of corruption and to firm quality). *Review of Economic Studies* **63**(1): 1-22
- Trigeorgis L. 1999. Real options: A primer. In Alleman J., Naoam E. (Eds.), *Real options: The new investment theory and its implications for telecommunications economics*, 3-34. Kluwer Academic Publishers: Boston, MA.
- van de Vrande V., Vanhaverbeke W., Duysters G. 2009. External technology sourcing: The effect of uncertainty on governance mode choice. *Journal of Business Venturing* In press.
- Vangen S., Huxham C. 2003. Nurturing collaborative relations. *Journal of Applied Behavioral Science* **39**: 5-32.
- Weick K. E. 1984. Small wins: Redefining the scale of social problems. *American Psychologist* **39**: 40-49.
- Williamson O. E. 1991. Comparative economic organization. *Administrative Science Quarterly* **36**: 269-296.
- Wilson J., Douglas E. 2007. Renewable energy gains still far off. *Los Angeles Times*, January 20, C1.
- Wit A., van Dijk E., Wilke H., Groenenboom A. 2004. The interplay between environmental and social uncertainty in social dilemmas. In R. Suleiman, D. V. Budescu (Eds.), *Contemporary psychological research on social dilemmas*, 376-398. Cambridge University Press: Cambridge, MA.
- Young-Ybarra C., Wiersema M. 1999. Strategic flexibility in information technology alliances: The influence of transaction cost economics and social exchange theory. *Organization Science* **10**: 439-459.
- Zaheer A., Venkatraman N. 1995. Relational governance as an interorganizational strategy: An empirical test of the role of trust in economic exchange. *Strategic Management Journal* **16**: 373-392.
- Zand D. 1972. Trust and managerial problem solving. *Administrative Science Quarterly* **17**: 229-239.
- Zeng M., Chen X-P. 2003. Achieving cooperation in multiparty alliances: A social dilemma approach to partnership management. *Academy of Management Review*, **28**: 587-605.
- Ziedonis A. A. 2007. Real options in technology licensing. *Management Science* **53**: 1618-1633.
- Zwaniecki A. 2008. San Francisco seeks partners in push for green future. *News Blaze*, November 8, <http://newsblaze.com/story/20081108101425tsop.nb/topstory.html> (accessed November 25, 2008).