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Negotiating in a Brave New World: Challenges and Opportunities for the Field of Negotiation Science

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INTRODUCTION

Contributors to this volume have collectively paved the way for a new revolution in the field of negotiation science. *The Psychology of Negotiations in the 21st Century Workplace* is a tour de force. The territory covered in the book is simply astounding, including such basic processes as fairness, trust, competition, and cooperation, to social structure and networks, to organizational learning and national culture—all of which capture part of the complex “elephant” that is negotiation. Each chapter draws on new and exciting theoretical and empirical developments from a wide variety of disciplines to inform key learning that can be distilled for managers, practitioners, and anyone who needs to manage interdependence with others in their daily lives. And, the authors have each grounded their theoretical, empirical, and practical discussions of negotiation in situ—in the particular features of the 21st century organizational landscape that invariably affect the process and outcomes of negotiations in this brave new negotiating world. Put simply, this volume exemplifies the science-practitioner model at its very best.

Unlike other volumes in the field, this collection is particularly unique in that it not only takes a look *back* on the seminal theories, the empirical discoveries, and the practical wisdom of decades of negotiation research but also provides a thoughtful window into the *future* of the science and

practice of negotiation and the contextual realities that negotiators will face. Negotiations in the 21st century, as many of the chapters illustrate, are much more complex; they are “wired,” they are global, they are networked, and they occur in increasingly flattened and fluid organizational structures (Goldman & Shapiro, Chapter 1, this volume). In this new 21st century workplace, negotiations are *connected*; they take place across a much broader array of actors—with peers, supervisors, customers, suppliers, alliance partners, and even computer agents—who are embedded in wider social networks, and they take place across many new forms of social media. By providing us with an analysis of the critical features of the 21st century organization in which negotiations are embedded, the chapters in this book provide an infinite number of research ideas for decades to come.

In this commentary, we take the opportunity to take a bird’s-eye view of the volume to make *explicit* some of the *implicit* scientific mandates that the authors address. We highlight the need for new conceptualizations of negotiation that are better matched to the organizational realities in the 21st century workplace; we discuss neglected scholarly territory and critical research gaps that desperately await investigation; above all, we champion a *negotiation science* that transcends disciplines and recommend new intellectual mergers that are required to address the complex organizational realities of negotiation that this volume identifies.

RECONCEPTUALIZING NEGOTIATION

While the book is diverse in its content, all the authors make clear that the way that we have fundamentally conceptualized negotiations in the past needs to be much broader, and the questions we ask need to change accordingly. Negotiation research, inherited from economics with a heavy game theoretic and prescriptive emphasis, has examined many cognitive, motivational, and emotional psychological processes that are inherent to the “game” negotiators are playing (Bazerman, Curhan, Moore, & Valley, 2000; Thompson, Wang, & Gunia, 2010), as well as the social and communication processes that occur as negotiators interact, exchange passes or volleys, to gain points (Weingart & Olekalns, 2004). Negotiations, using this game metaphor, were often seen as one-shot, delimited interactions

between actors—largely divorced from the social context—in the service of completing the game (Kramer & Messick, 1995).

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The chapters in this book challenge us to reconceptualize negotiations from largely one-shot, delimited interactions to a view of negotiations as involving many actors over networks, over time, and over space. They make clear that negotiations often extend within and across organizational boundaries, and that what happens at the table *does not end at the table*. Above all, they collectively highlight the sports metaphor that has dominated negotiation research (Gelfand & McCusker, 2002), which assumes that what happens on the field ends when the game is over and does not affect the next game. However, this metaphor does not fit these new organizational realities.

Accordingly, this volume invites new metaphors, new theoretical perspectives, and novel research questions to match the realities of the 21st century workplace. For example, the fact that negotiations often involve repeated transactions between parties in ongoing relationships embedded in networks that exist virtually invites a “network metaphor of negotiation” in contrast to a sports metaphor. The network metaphor suggests that dynamics that occur at the negotiation table can have downstream numerous “ripple effects” for negotiators’ relationships, their social networks, and organizations more broadly. In this view, negotiation failures (for example, feeling unfairly treated) can have important downstream costs for future willingness to negotiate and the ability to reap high economic outcomes over the long run (see Elfenbein & Curhan, Chapter 5, this volume). For example, as discussed in this volume, while injustices (Conlon & Ross, Chapter 2; Roloff, Brockner, & Wiesenfeld, Chapter 3); negative emotions (Cropanzano, Becker, & Feldman, Chapter 6); and unethical behavior (Lewicki & Hanke, Chapter 8) might be tolerated in a one-shot deal, they could present large future costs for negotiators in repeated, networked transactions. On the flip side, this conceptualization also suggests that *successes* that occur at the negotiation table (for example, feeling fairly treated) can have many positive ripple effects in repeated transactions in the future—engendering more trust, cooperative behavior, and more “idiosyncratic credits” for future behavior (Hollander, 1958). Importantly, positive or negative carryover effects at the negotiation table need not be confined to the parties’ relationships: They can extend to individuals’ trust or mistrust in the organization, their proclivity to engage in prosocial behavior or revenge and sabotage, and ultimately their organizational commitment or

lack thereof (see Pinkley, Chapter 4, this volume, and Elfenbein & Curhan, Chapter 5, this volume, for related discussions).

This new conceptualization further suggests that given that negotiators are invariably embedded in networks of interpersonal relationships (Brass & Labianca, Chapter 9, this volume), dynamics that occur at the negotiation can also have widespread ripple effects *across networks*. As Roloff et al. (Chapter 3, this volume) note, negotiations can be “overheard” by others, with the failures or successes at the negotiation table ultimately spreading throughout networks. Indeed, in the new 21st century workplace, negotiations do not end at the organizational door: Negotiated outcomes can become quickly known in the marketplace, where technology allows information about negotiation to be posted through various social media (Agarwal, Viswanathan, & Animesh, Chapter 14, this volume). Take, for example, the disgruntled employee or customer who “vents” through Twitter or Facebook about his or her negative negotiation experiences with an organization online.

In all, this view of negotiation implies that previous research findings that fit with a “one-shot deal” will need to be revisited and expanded to address the *dynamics of negotiation* and how they become dispersed across people, networks, social media, and time. It begs new questions such as, How do the basic psychological and social processes in one negotiation affect negotiation dynamics over a much longer timeframe? To what extent are negotiation processes contagious to others—how are observers of negotiations and their networks affected by the negotiations they witness? To what extent does a negotiator’s reputation spread across networks and with what implication for future negotiations? How do changes in negotiation networks, as is often the case given the increasingly mobile workplace, affect negotiations over time? For example, how do negotiators who “inherit” mistrust and mistreatment by others negotiate their relationships with this lingering psychological past? How is trust repaired in negotiations when it involves negotiators who were not part of the original process? Implicit in this discussion is that we need to move beyond standard criteria of economic capital achieved in a one-shot negotiation to include new criteria that matter in the networked view of negotiation. Criteria such as subjective value at the individual level (Elfenbein & Curhan, Chapter 5, this volume); relational capital at the dyadic level (Gelfand, Smith, Raver, Nishii, & O’Brien, 2006); and reputation and social capital at the network level (Brass & Labianca, Chapter 9, this volume) are currencies that loom

large in the 21st century workplace. Fundamentally, this networked view of negotiation implies that previous research findings and gold standard criteria that fit with a one-shot deal will need to be revisited.

In addition to inviting new ways to conceptualize negotiation and new criteria for evaluating negotiation success, the chapters in this book highlight important research gaps in the literature. They suggest that the brave new negotiation science needs to be multilevel in its focus, global in its reach, and interdisciplinary its structure, each of which are discussed in the following material.

THE OPEN SYSTEMS VIEW OF NEGOTIATION: IMPLICATIONS FOR CROSS-LEVEL MODELING IN NEGOTIATION

Chapters in this book hint at the fact that negotiations in the 21st century workplace function within the larger organizational contexts in which they are embedded. They foreshadow an *open systems view* of negotiation that includes inputs from various aspects of organizational systems that can constrain or afford dynamics at the table. To date, the negotiation literature has been primarily micro in its orientation and has largely been separated from its organizational roots. Rarely is negotiation discussed in connection to other central topics in organizational behavior, such as leadership, organizational culture, structure, human resource management, or organizational change. For example, chapters on organizational behavior in the *Annual Review of Psychology* have rarely discussed conflict management; likewise, reviews of the negotiation literature have rarely discussed conflict as it relates to organizational processes and performance (De Dreu & Gelfand, 2008). As we have previously argued (Gelfand, Leslie, & Keller, 2008), the time is ripe to connect negotiation to its organizational roots and to examine how features of organizations constrain or enable microlevel negotiation dynamics. This requires cross-level theories that link organizational culture, leadership, human resource (HR) systems, the structure of networks, among other features of the organizational landscape to psychological and social dynamics in negotiations. Next, we highlight some exciting opportunities that illustrate this intellectual spirit with some concrete examples.

Organizational Culture as an Affordance and Constraint of Negotiation Dynamics

An open systems view of negotiation suggests that *organizational culture*—basic assumptions, shared values, common understandings, and patterns of beliefs and expectations that are typically taken for granted (Schein, 1992)—can have important cross-level influences on negotiation dynamics in organizations. For example, although there are idiosyncratic ways of managing conflict at the individual level, organizations often provide strong situations—or develop distinct conflict cultures—that guide organizational members' attitudes and conflict behaviors at the microlevel (Gelfand et al., 2008; Gelfand, Leslie, Keller, & De Dreu, 2010). Organizations or units therein vary on the degree to which they cultivate what we have referred to as *dominating* conflict cultures (characterized by conflict management norms that encourage active confrontation to win conflicts publicly); *collaborative* conflict cultures (characterized by management norms for active, cooperative discussion of conflict); *avoidant* conflict cultures (characterized by conflict management norms of passive withdrawal in response to conflicts to maintain harmonious relationships); or *passive-aggressive* conflict cultures (characterized by norms for conflict management that are both disagreeable and passive and for which it is normative to handle it in the form of passive resistance). Recent research indeed has shown empirical support for the existence of conflict cultures at the organizational level and has shown that leaders conflict management styles are a strong predictor of organizational conflict cultures, with important consequences at the macrolevel, such as regarding creativity, turnover, and customer service (Gelfand, Leslie, et al., 2010).

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The cross-level impact of organizational conflict cultures on dynamics at the negotiation table remains wide open territory. For example, how people make meaning about their counterparts' negotiation behavior may be determined in part by macroconflict cultures. Collaborative conflict cultures may afford more positive sensemaking of others' fairness behavior (what Roloff et al. call "perceived fairness authenticity" in Chapter 3, this volume). Put differently, the same behaviors (asking others for voice, providing advance notice) might be interpreted much differently in a passive-aggressive or dominating conflict culture in which individuals would be more inclined to question others' motives. Conflict cultures might affect negotiator trust development and trust repair (Lewicki & Hanke,

Chapter 8, this volume); degree of revenge or forgiveness after mistreatment (Bies & Trip, Chapter 7, this volume); or more generally the ability to develop high subjective value (Elfenbein & Curhan, Chapter 5, this volume). Conflict cultures have implications for leveling the gender negotiation playing field. As Haselhuhn and Kray (Chapter 11, this volume) so aptly note: “The competitive atmosphere promoted by many 21st century organizations may set expectations for how negotiations should be conducted in the workplace. These expectations may feed into stereotypes of how negotiators should behave, which may in turn hinder efforts of female negotiators to overcome negative stereotypes” (page X). Stereotype threat at the individual level could likely be affected by organizational conflict cultures, being exacerbated in dominating conflict cultures and reduced in collaborative conflict cultures. Put differently, the macro organizational context plays a major role in the affordance or constraint of stereotype threat and women’s ability to negotiate on a level playing field. These brief examples aside, more generally, future research needs to look at how organizational culture affects microdynamics in negotiations.

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The Role of Leaders in Affording and Constraining Negotiation Dynamics

Relatedly, the impact that organizational leaders have on negotiations is an important area for future research. To date, research on negotiation has largely remained separate from studies of organizational leadership and vice versa. Leaders have long been argued to have a large impact on behavior in organizations, in part through their influence on organizational culture, as discussed, but also in their direct influence through their own moral values, ideals, and behavioral role modeling (Schein, 1992). Indeed, early studies showed a direct link between leadership and conflict dynamics. Lewin, Lippitt, and White (1939) found that boys in clubs with democratic leaders were friendlier, more spontaneous, and more cooperative as compared to boys in clubs with laissez-faire or autocratic leaders who were more competitive. Lewin et al. (1939) attributed these differences in conflict behavior to the pattern of interactions or “social climate” created by the different leadership styles. So it is in the domain of negotiations, in which leaders have the ability to profoundly influence negotiation dynamics in organizations.

For example, leaders can play a central role in creating a workplace environment that promotes transparency ultimately to build trust—a

foundation of negotiations—by modeling their own trustworthiness so that individuals can trust the organization and thus trust each other more (see Bies & Tripp, Chapter 7, this volume). Leaders can also play a major role in modeling compassion, temperance, and justice, which are key drivers of forgiveness—another foundational aspect of conflict and negotiations in which trust has been violated (Fehr & Gelfand, 2011). Leaders can help to structure social networks to enhance trust and reduce unethical behavior (see Bies & Tripp, Chapter 7, this volume, and Lewicki & Hanke, Chapter 8, this volume) and can leverage social networks in helping to identify which representatives are in the best position to manage intergroup conflict in organizations (Brass & Labianca, Chapter 9, this volume). At a more macrolevel, leaders have the ability to facilitate organizational learning over negotiations with customers, suppliers, and alliances and other constituencies by encouraging, rewarding, and supporting people to share tacit knowledge about negotiations and by developing linking mechanisms for them to do so (for example, by creating negotiation centers of excellence and role rotation; see Chapter 12, this volume, by Hughes, Enlow, Siegel, & Weiss) and by ensuring that there is continued coordination between the contracting process and the contracting phase (see Malhotra, Chapter 13, this volume). Leaders can also have an impact on negotiation dynamics by directly creating HR management systems that emphasize the importance of negotiation skills throughout the organization, for example, through extensive training and seminars and by including evaluations of such competencies in performance appraisals. More generally, the impact of leaders on negotiation dynamics should be an intellectual priority in future research.

National Culture as an Affordance and Constraint of Negotiation Dynamics

Chapters in this book have all touched on the global context of negotiation in the 21st century. They highlight the fact that negotiators in many walks of life need to manage their interdependence with people who are from very different cultures than their own. A negotiation science in the 21st century sorely needs to take on this global challenge and incorporate it into the questions we ask, the samples we gather, and the conclusions we make about *human* behavior in negotiation. Psychological research has been shown to rely heavily on researchers and participants from Western

societies (Arnett, 2008), a group of people who have been described as “the WEIRDest people in the world” (Henrich, Heine, & Norenzayan, 2010) to indicate the fact that they are largely “Western, Educated, Industrialized, Rich, and Democratic” (p. 61). Indeed, in an analysis of six major psychological journals published between 2003 and 2007, Arnett (2008) found that 73% of the authors were from U.S. institutions. Combining the United States with European and English-speaking countries, 98% of the authors were based in Western societies. Moreover, 68% of the samples in these studies were drawn from the United States, and 27% were in European and English-speaking countries. In other words, 95% of all the samples in the six major psychological journals were from Western societies.

Negotiation research is no exception. We recently conducted a similar analysis of research on negotiation to examine whether this field also exhibits the tendency toward cultural centrism (Gelfand, Severance, Fulmer, & Al Dabbagh, in press). We analyzed two recent comprehensive reviews of the literature (an *Annual Review of Psychology* chapter by Thompson et al., 2010, and an APA handbook chapter on negotiation by Gelfand, Fulmer, & Severance, 2010) and did a content analysis on the geographic distribution of the author affiliations and sample locations on all of the studies cited. Consistent with prior studies (Arnett, 2008; see also Adair, Coelho, & Luna, 2002; Bauserman, 1997), we found that the United States, together with European and English-speaking countries, represented 95% of all of the authors on papers cited in these reviews (with 77% of them from the United States and the rest from Western Europe, the United Kingdom, Canada, Australia, and New Zealand), with the remaining authors coming from Asia (3%) or Israel (2%). A full 90% of the samples on which these studies were based were from the United States and European and English-speaking countries (with 74% of these from the United States), and over 85% of the studies used student samples. The rest of the samples were mainly from Asia (6%) or Israel (2%). Participants in other nations in the Middle East, Latin America, or Africa made up roughly a total of 2% of all samples. By way of comparison, the proportions of the authors and samples in the United States and Western countries in the field of negotiation are somewhat higher than those in the field of psychology as a whole reported by Arnett (2008). There is no doubt that research on negotiation has been heavily dominated by Western authors and Western samples.

The limited focus in negotiation research on Western nations, particularly on American samples, is concerning in this new 21st century

workplace. Arnett (2008) pointed out that Americans make up merely 5% of the total world population, a percentage that is expected to diminish continually over coming years. Henrich et al. (2010) further proposed that the WEIRD samples (i.e., Western, educated, industrialized, rich, and democratic) are in fact outliers among the general human population. Given the very different environments to which they are accustomed, Henrich and colleagues suggested that WEIRD people are unlikely to be representative of the rest of the world's population and may even be the *worst* samples from which to generalize scientific research. Indeed, even basic perceptual phenomena—such as visual illusions (Segall, Campbell, & Herskovits, 1966), color perception (Roberson, 2011), and neural structure and function (Chiao, 2009) are subject to cultural variation.

Negotiation science needs to step up to this global challenge and continually question whether the assumptions, theories, questions, methods, and conclusions are universal or are in fact applicable to only WEIRD samples. Cross-cultural research can also identify new explanations for age-old findings in the West. For example, we have recently argued that cultural differences in negotiation can be understood as default strategies (Yamagishi, 2010) that are ecologically rational (Gelfand et al., in press). That is, many of the negotiators' biases, motivations, and strategies that have been documented as universal "facts" may reflect Western individuals' adaptations to a particular (and unique) ecological niche. In particular, American samples tend to operate in everyday structural contexts in which there are uniplex and weak social ties (Morris, Poldony, & Ariel, 2000); high relational, job, and residential mobility in that people change relationship partners, jobs, and residences with great frequency (Oishi, 2010; Schug, Yuki, Horikawa, & Yakemura, 2009; Schug, Yuki, & Maddux, 2010); and weak everyday situations (Gelfand et al., 2011), all of which reinforce and sustain high descriptive norms for individualism, competition, looseness, and egalitarianism. Gelfand et al. (in press) noted that the ecological niche of American samples affords and constrains a default strategy in negotiations that could be referred to as the *individuals' asserting and maximizing self-interest strategy* (IAMS; Hashimoto & Yamagishi, 2009). The IAMS strategy in negotiation assumes that individuals believe that they are supposed to "be all they can be"—to stand out, be unique, express oneself, and promote self-interest, often through competition. It assumes that people are able to enter and exit social relationships with relative ease and to have swift trust. And, it assumes economic capital takes precedence

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over relational capital in contexts in which relationship partners change frequently. Importantly, these assumptions are perfectly “rational” in the context of the ecological niche in which these samples navigate.

By contrast, Gelfand et al. (in press) argued that East Asian samples tend to operate in everyday structural contexts in which they are embedded in strong, multiplex networks (Morris et al., 2000); have low relational, job, and residential mobility (wherein people *do not* change relationship partners, job, and residences with great frequency; Oishi, 2010; Schug et al., 2009, 2010); and navigate contexts in which there is high situational constraint (Gelfand et al., 2011). The highly constrained ecological niche of East Asian samples affords a default strategy that could be referred to as the *not to offend others strategy* (NOOS; Hashimoto & Yamagishi, 2009). The NOOS departs in numerous ways from the IAMS strategy in its assumptions about what is “socially wise.” It assumes as its basis that individuals’ behavior should be calibrated with the duties and expectations of the group; that one should be modest and avoid behaviors that threaten one’s reputation (particularly in low-mobility contexts in which one cannot enter and exit relationships easily), which could result in ostracism, the ultimate “psychological death”; that developing trust, particularly with strangers, is “dangerous” and takes much more time given strong ingroup-out-group distinctions. Within this strategy, relational capital looms larger than economic capital for securing the loyalty and commitment of negotiation partners in contexts for which there is low mobility, closed networks, and high constraint. This perspective also suggests that cultural effects can be dynamic—that is, when ecological environments change, strategies change in *all* cultures (Chiu, Gelfand, Yamagishi, Shteynberg, & Wan, 2010; Yamagishi, 2010), which helps us to avoid assuming within-culture strategies are used in between-culture negotiations, as cautioned by Tinsley, Turan, Weingart, & Dillon (Chapter 10, this volume). More generally, it suggests that strategies that are perceived as the most ecologically rational will guide negotiation behavior (cf. Gigerenzer, 2005; Kruglanski & Gigerenzer, 2011), thus producing different (but equally valid) “cultural rationalities” in negotiation (Gelfand et al., in press).

As with organizational culture, the cross-level impact of national cultures on dynamics at the negotiation table remains wide open territory. There are many exciting empirical possibilities on culture and negotiation that await future investigation, and there are scores of ideas that can be

gleaned from the chapters in this book. Pinkley (Chapter 4, this volume) aptly asks how applicable conventionally prescribed negotiation strategies apply in negotiations when one's negotiation counterparts are diversified across cultures. Roloff et al. (Chapter 3, this volume) identify challenges in managing fairness concerns across the negotiation table with great psychological distance between diverse parties. Results from Western samples that are discussed throughout the book need to be revisited in future research. For example, are the markers of deceptive messages culturally universal (Lewicki & Hanke, Chapter 8, this volume)? How does culture affect the dynamics of trust development and decline? Are the dimensions of subjective value universal or culture specific (Elfenbein & Curhan, Chapter 5, this volume)? Are there differences in standards used to evaluate fairness in negotiation (Conlon & Ross, Chapter 2, this volume)? What are universal and culture-specific triggers of revenge (Bies & Tripp, Chapter 7, this volume)? How does culture influence the nature of contracting (Malhotra, Chapter 13, this volume)? How does the structure of social networks in different cultures affect negotiation behavior (Brass & Labianca, Chapter 9, this volume; Gelfand, *in press*; Morris et al., 2000)? In all, the global context of negotiation mandates that the science of negotiation becomes global in its scope.

THE INTERDISCIPLINARY MANDATE: TOWARD A NEGOTIATION SCIENCE

Finally, this book makes clear that to understand negotiations in the 21st century workplace, we will need to go outside our familiar psychological territory to partner with disciplines that have different conceptualizations, methods, and scientific worldviews. A perusal of the chapters in this book and the research cited reveals that psychological research on negotiation, with some exceptions, generally exists in its own “scientific silo.” While each chapter offers important insights into the complex elephant of negotiation, there needs to be much more bridging within and across disciplines to connect these theoretical and empirical dots. As Karl Popper (1963) noted, “We are not students of some subject matter, but students of problems. And problems may cut right across the borders of any subject matter or discipline” (p. 88). The value—if not the necessity—of

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interdisciplinary perspectives is indisputable. Many of the greatest scientific breakthroughs have been made possible through interdisciplinary research. From the mapping of the genome to understanding the global map of terrorism, it is clear that science benefits from multiple perspectives that require expertise from different disciplines. The study of negotiation is perfectly suited to interdisciplinary perspectives. It invariably involves insights from economics, psychology, political science, sociology, organizational behavior, and computer science, among many other disciplines. Together, they all contribute to what could be called a *negotiation science* for the 21st century.

There are many exciting “disciplinary mergers” between psychology and other disciplines to exploit fully. Collaborations between psychologists and computer scientists are positioned to bear much scientific fruit. For example, individuals in the 21st century are increasingly negotiating with computer agents, requiring teams of artificial intelligence researchers and psychologists to understand how they adapt to each other. The literature on psychological and social processes has been driven by human-human interactions; thus, there is a critical need to compare human-agent dynamics with human-human dynamics. Does the literature on negotiation biases, justice, trust, emotions, among other topics, apply to how humans respond when they know they are interacting with a computer agent? Pioneering studies conducted by Nass and colleagues have highlighted the conditions under which humans respond to computers the same as they do toward other humans (Nass, Fogg, & Moon, 1996; Reeves & Nass, 2003). According to the “media equation” principle, social dynamics surrounding human-computer interactions mirror those that solely comprise groups of humans. However, studies about the effects of computers on human behavior in negotiation settings have not produced conclusive results. For example, research has shown that people accept lower offers from computer proposers than from human proposers in simple take-it-or-leave-it ultimatum games (Blount, 1995). Yet people also exhibit reciprocal behavior toward agents in a manner that is similar to their interaction with other humans (van Wissen, van Diggelen & Dignum, 2009), and research has also shown that when people negotiate to form groups, they behave similarly to the predictions of cooperative game theory (Bachrach, Kohli, & Graepel, 2011). The similarities and differences between human-agent and human-human negotiations warrant much more empirical attention.

Likewise, artificial intelligence scientists have a keen interest in developing agents that effectively negotiate, requiring a deep knowledge of human psychology. Recent models of agent design have used opponent modeling approaches and use learning to adapt to people's negotiation strategies. Representative works include Byde, Yearworth, Chen, Bartolini, and Vulkan (2003), who constructed agents that bargain with people in a market setting by modeling the likelihood of acceptance of a deal, and Oshrat, Lin, and Kraus (2009), who used density estimation techniques to estimate people's acceptance of offers in a repeated multiattribute negotiation scenario and showed that agents outperformed people.

Learning techniques have also been applied to model the belief hierarchies that people use when they make decisions in one-shot interaction scenarios (Ficci & Pfeffer, 2008; Gal & Pfeffer, 2007). Zuckerman, Kraus, and Rosenschein (2007) used machine learning to allow agents to predict which strategy would be chosen by people in settings that demand coordination among several possible strategies. Research in artificial intelligence is also increasingly integrating *emotional* cues into agents' decision-making strategies, illustrating that exhibiting emotions can improve agents' performance as compared to agents that negotiate strategically only using decision theory (Antos & Pfeffer, 2011).

And, negotiation research on agents has also been increasingly applied to gender and culture. Katz, Amichai-Hamburger, Manisterski, and Kraus (2008) showed that agents that take gender differences into account outperform those that do not, and Gal, Kraus, Gelfand, Khashan, and Salmon (2011) showed that an adaptive agent can negotiate with people across different cultures in strategic settings in which agreements are not binding. More generally, there is a growing consensus among researchers on the applicability and relevance of psychological theories regarding agent design for human-computer interaction. This work highlights the interdisciplinary nature of human-computer negotiation, which requires the combination of different theories and methods to develop effective agents for human-computer negotiation applications.

Computational models of negotiation are also critical for examining complex negotiation dynamics. Over the past several years, scholars have been studying conflict through the lens of dynamical systems theory (e.g., Coleman, Vallacher, Nowak, & Bui-Wrzosinska, 2007; Nowak et al., 2010; Nowak, Vallacher, Bui-Wrzosinska, & Coleman, 2006), an increasingly influential paradigm in many areas of science (Johnson, 2001; Schuster,

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1984; Strogatz, 2003; Vallacher, Read, & Nowak, 2002; Weisbuch, 1992). A *dynamical system* is a set of interconnected elements (e.g., beliefs, feelings, and behaviors) that change and evolve over time. The system as a whole evolves and changes as a result of interactions among the individual elements in the system. Applying dynamical modeling to conflict situations can provide a number of insights. For example, dynamical modeling suggests that successfully changing any element of a relationship in a conflict (e.g., level of trust) is a function of the status of the other elements (e.g., each party's motives, attitudes, actions) of this relationship. Dynamical research can also identify basic parameters that account for sudden and dramatic changes in the nature of a conflict relationship (Nowak, 2004). The dynamical systems approach has been suggested as a way to conceptualize and investigate such conflict-related phenomena as emotion (Thagard & Nerb, 2002), attitude change (Nowak, Szamrej, & Latane, 1990), cooperation and competition (Liebovitch et al., 2008), and conflict intractability (e.g., Coleman et al., 2007), among others.

Dynamical systems theory offers a rich array of new metaphors, constructs, and principles that might be fruitfully applied to the negotiation literature. Dynamic system constructs such as attractors, emergence, and self-organization can serve as useful metaphors to help the researcher understand the dynamic nature of negotiations (e.g., Vallacher & Nowak, 1994). Second, the dynamical systems approach provides social scientists with tools that facilitate the mathematical description of the hypothesized mechanisms underlying specific negotiation dynamics. Thus, although social science theory is typically expressed verbally, the dynamical systems tools translate these theories into computer simulations. Dynamical models allow researchers to identify the assumptions inherent in our theories that are difficult to identify when theories are maintained in their verbal form. Finally, the dynamical systems approach has implications for the types of empirical methodologies developed and employed in research. Typically, traditional social sciences focus on the central tendency of variables and ignore important dynamics reflected in variables' variances. Further, dynamical systems models and methods push the social sciences to focus on events as they unfold over time (Bui-Wrzosinska, 2005).

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Partnerships between negotiation scholars and neuroscientists are another natural scientific merger. For example, the emerging areas of social neuroscience (Heatherton, Macrae, & Kelley, 2004) and neuroeconomics (Zak, 2004), which focus on the use of neuroscience methods to

understand human behavior, are ripe for integration with negotiation theory and research. Biological factors have been shown to play an important role in a wide range of organizational phenomena, such as entrepreneurship (White, Thornhill, & Thompson, 2006), occupational choice (Dabbs, De la Rue, & Williams, 1990), and job satisfaction (Arvey, 1989). Indeed, the growing momentum on this topic can be seen in a recent special issue of *Organizational Behavior and Human Decision Processes* devoted to biological processes in organizations (Shane, 2009). Existing models of negotiation rarely examine the role of biological factors, but recent research showed the promise of neuroscience for the study of decision making (Rilling & Sanfey, 2011; Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003); punishment (de Quervain et al., 2004); ingroup trust and cooperation (De Dreu et al., 2010); procedural and distributive justice (Dulebohn, Conlon, Sarinopoulos, Davison, & McNamara, 2009); social influence (Mason, Dyer, & Norton, 2009); and gender differences (Severance & Gelfand, 2011), among other topics. The emerging field of cultural neuroscience (Chiao, 2009) also has the potential to shed new light on cultural variation in basic processes in negotiation such as trust, reciprocity, cooperation and competition, fairness, revenge, and forgiveness. For example, Zak and colleagues (Zak & Fakhar, 2006; Zak, Kurzban, & Matzner, 2005) found that cultural differences in interpersonal trust and cooperation can be explained in part by differences in consumption of estrogen-like molecules that are linked to oxytocin. Using functional magnetic resonance imaging (fMRI) techniques, Zhu, Zhang, Fan, and Han (2007) measured brain activity of Western and Chinese participants and provided neuroimaging evidence that culture shapes the way the self is represented in the human brain. More generally, integrating theories and models of biological sciences into negotiation research will extend current research by helping to identify the precise mechanisms that account for negotiation dynamics and has the potential to help us understand the evolutionary bases of this universal process.

Related to the integration of biological sciences and negotiation science is the need to link negotiation research focused on humans to that of other species. There is an abundance of research on conflict processes among chimpanzees (de Waal, 2000); spotted hyenas (Wahaj, Guse, & Holekamp, 2001); dolphins (Weaver, 2003); crayfish (Huber, Panksepp, Yue, Delago, & Moore, 2001); bees, ants, and other insect communities (Trivers & Hare, 1976), as well as many other species. This research provides examples of

important concepts, metaphors, and questions that are relevant for human negotiation behavior. For example, Flack, de Waal, and Krakauer, (2005) demonstrated that *third-party policing*, the physical intervention by a third party into a conflict between two primates, is common among the pig-tailed macaques, and that eliminating the high-power interveners caused the social system to destabilize, leading to more conflict, less sociopositive interaction, and less reconciliation among other pigtail macaques (see the discussion of ripple effects in this commentary). As another example, research has shown that *crowding* among capuchin monkeys decreased aggression, play, and social grooming (van Wolkenten, Davis, Gong, & de Waal, 2006), suggesting that primates may avoid social encounters and adopt a conflict avoidance strategy in contexts of high density (cf. our discussion of the NOOS strategy as practiced by humans in highly constrained environments). More generally, by reaching out and partnering with primatologists, we will be better able to address the fundamental question of how human negotiation behavior varies from other species.

These examples aside, there are many other possible disciplinary mergers that await negotiation science in the 21st century. Psychological perspectives on negotiation can be fruitfully integrated with theories and research on social structure found in sociology and legal anthropology, with frames detected with methods found in computational linguistics, with research on cultural consensus and associated methods found in cognitive anthropology, among others. To be sure, while there is limitless potential for interdisciplinary partnerships, much needs to be done to capitalize fully on the differences that invariably bring the most creative research products. As noted in an editorial in *Science*, “In the years to come, innovators will need to jettison the security of familiar tools, ideas and specialties as they forge new partnerships” (Kafatos & Eisner, 2004, p. 1257). Scientific disciplines have their own cultures, and interdisciplinary teams will invariably find that they are managing cultural conflict even as they pursue common intellectual questions. Differences in worldviews, scientific language, and priorities that are entrenched in different disciplinary paradigms will make the research process both more rewarding and more difficult (and more time consuming). New structures and scientific outlets will need to be created to counter the discipline-focused tradition that characterizes academe. The benefits, in our view, far outweigh the costs. Interdisciplinary research can inspire creative breakthroughs; provide outside perspectives on models, applications, and methods; and

identify crucial deficiencies and oversights in projects or previous research (Nissani, 1997).

CONCLUSION

In this commentary, we have discussed the need for new conceptualizations of negotiation, the need for connecting microdynamics to its multilevel context, and the need for a negotiation science that has many scientific players across disciplines and cultures working together at the same table to study similar questions. In highlighting the complex realities of negotiating in the 21st century, this book has moved the field into new and exciting scientific territory.

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