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Are the Powerful more Egocentric? The Effect of Culture and Power on Self-Interest in Social Dilemmas

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Running Head: Culture and Power in Social Dilemmas

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The Effect of Culture and Power on Self-Interest in Social Dilemmas

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ABSTRACT

This study examined whether an interaction between group culture and economic power influenced self-interest in a simulated social dilemma. Full-time managers enrolled in executive M.B.A. programs in Germany, Hong Kong, Israel, and the United States made shark harvesting decisions in an asymmetric commons dilemma task. Relative to managers from the U.S. and Germany, Israeli managers were more likely to follow an individually rational decision-making approach taking more resources in a high versus low economic power condition. In contrast, in the high economic power condition, managers from Hong Kong voluntarily took an economic hit, harvesting less of the common resource. Egocentrism mediated this interaction effect of culture and economic power for the Israeli managers who were more egocentric in a high power condition, but not for the Hong Kong Chinese managers who believed they deserved to harvest as much as the German and U.S. managers, yet did not. The theoretical and practical implications of the findings highlight the importance of studying the proximal effect of culture on dispositional and situational factors that influence cooperation in social dilemmas.

Key Words: Social Dilemma, Tragedy of the Commons, Take-Some Games, Commons Dilemma, Negotiation, Cooperation, Self-Interest, Culture, Power, and Egocentrism.

Scarcities of natural resources such as clean air, water, and biodiversity continue to be central issues facing contemporary society. These resources are prone to depletion because too many people have legal privileges to use them (common property) without bearing the costs of overuse and therefore, as a group, they are likely to overuse these resources to the point where they may be eliminated or destroyed. Commonly shared resources are destroyed in two ways: as a function of pollution [e.g., ozone depletion due to emission of chlorofluorocarbons (CFCs)] or over-consumption (e.g., extinction of fish due to harvest levels that exceed the replenishment rates). Structural solutions to this *tragedy of the commons* (Hardin, 1968), such as privatization or regulation, may be difficult to apply (Van Vugt, 1998) especially to commons that are global in scale (Young, 2001). In these cases, it is particularly relevant to better understand the psychological factors that lead decision makers to manage global resources responsibly.

To preserve scarce resources across the globe, decision makers from diverse cultural backgrounds must curb self-interested behavior, yet relatively little is known about the effect of culture on the emergence of cooperation (for a review, see Brett & Kopelman, 2004). The few studies that have directly tested the effect of culture on commons dilemmas in a theoretically guided paradigm have studied intra-cultural group settings (e.g., Buchan, Croson, & Dawes, 2002; Wade-Benzoni et al., 2002). This paper extends cross-cultural research on cooperation in commons dilemmas (also called take-some games, common-pool-resource games, or resource dilemmas) to inter-cultural group settings, and tests the effect of power and culture on self-interest.

CULTURALLY INFORMED DECISIONS IN COMMONS DILEMMAS

Negotiations between interdependent decision makers who risk destroying resources due

to over-use of existing scarce resources are conceptualized as commons dilemmas (Van Lange, Liebrand, Messick, & Wilke, 1992). Commons dilemmas are a subset of social dilemmas; they are situations that are *social* because individual behavior influences others' welfare and represent a *dilemma* because of the inherent conflict between individual and collective goals (Kahan, 1974). Social dilemmas are conceptualized as a form of tacit negotiations (Schelling, 1960; Thompson, 2001). They are considered tacit because direct communication and/or a binding contract is either difficult to achieve or illegal. Despite the plethora of research in social psychology and experimental economics on psychological factors influencing cooperation that would lead to sustainable resource management (Dawes, 1980; Komorita & Parks, 1994; Kopelman, Weber, & Messick, 2002; Messick & Brewer, 1983), the empirical inquiry of decision-making in social dilemmas has focused predominantly on rational choice models (Weber, Kopelman, & Messick, 2004) examining self-interest in a cultural vacuum (Brett & Kopelman, 2004).

Few theoretically grounded studies have tested the effect of culture on commons dilemmas. Cross-cultural research often relies on geography as a proxy for culture. But culture amounts to more than external attributes. For example, observed differences in bargaining behavior between decision makers from the United States, Japan, Israel, and Yugoslavia suggested these were not due to differences in languages, currencies, or experimenters, but may tentatively be attributed to group-level cultural differences (Roth, Prasnikar, Okuno-Fujiwara, & Zamir, 1991). In micro-level organizational behavior and social psychology research, culture is conceptualized as a subjective construct. Culture is reflected by an individual's mental representations and consists of interrelated patterns or dimensions, which come together to form a unique social identity shared by a minimum of two or more people (Deutsch, 1973). A shift to

studying values as a broad construct that explains cultural differences has enabled researchers to understand the complexity of culture in familiar psychological territory and adopt a theoretical lens that lends itself to empirical measurement (Bond, 1997; Gelfand & Dyer, 2000). According to cultural theory, nations and subgroups within nations, institutions, and organizations can be characterized by a distinct pattern of cultural values (Hofstede, 1980; Schwartz, 1992; Triandis, 1989).

A theoretical framework based on cultural values can help understand psychological factors that influence cooperation in social dilemmas. Comparisons of cooperative choice behavior in the U.S. versus the Netherlands found no national differences (e.g., Liebrand & Van Run, 1985); however, these two countries are not expected to differ with respect to cultural values (Hofstede, 1980; Schwartz, 1994) and thus, this non-finding is not surprising. In general, hypotheses theoretically grounded in differences in cultural values focus on individualism versus collectivism and predict that collectivists, who are more group focused, will be more cooperative. In line with these predictions, Parks and Vu (1994) compared groups of U.S. decision makers to groups of Vietnamese decision makers. In fact, the Vietnamese decision makers, who were assumed to be collectivists, were more cooperative than American decision makers, who were assumed to be individualist, but a sampling check of cultural values was not conducted and Vietnamese participants were recent immigrants to the U.S. This factor may have introduced a biased self-selected sub-sample of Vietnamese, as well as demand characteristics. More recently, a comparison of Japanese and U.S. managers (samples were confirmed to be more collectivist and individualist respectively) corroborated these findings; intra-cultural groups of Japanese managers were more cooperative than intra-cultural groups of U.S. managers (Wade-Benzoni et al., 2002). These results suggest that decision makers from collectivist cultures will

find it easier to forgo individual gains (for the greater good of the group) than members of individualist cultures who will be more self-interested.

On the other hand, studies on social dilemmas, trust, and cooperation in fact suggest a more complex relationship between culture and decision-making. In the absence of a sanctioning system, U.S. decision makers had higher levels of trust and cooperation than Japanese decision makers (Yamagishi, 1988). A comparison of decision makers from China, Korea, Japan, and the U.S. found no national differences, but individualist versus collectivist orientation and social identity (group members being neighbors vs. random participants) resulted in different relationships between trust and reciprocation in these four countries (Buchan, Croson, & Dawes, 2002). Thus, culture, may be a necessary, but not a sufficient determinant of decision-making.

CULTURE IN THE CONTEXT OF ECONOMIC POWER

A contextual approach to culture stresses the importance of examining the interactions between culture and individual difference measures or situational factors (Gelfand & Dyer, 2000). Rather than solely isolating the influence of culture, this study examines the interaction and impact of group culture and economic power on decision-making in commons dilemmas. This study integrates a subjective-psychological approach with a structural-sociological approach (Morris, Podolny, & Ariel, 2000) by examining the interaction between group culture and economic power asymmetry. A structural approach to culture, in contrast to a subjective approach to culture, focuses on the external relations that constrain behavior. In this paper, social structure, a situational factor reflected by power asymmetry, is hypothesized to play an important role in determining cross-cultural differences in behavior. Contingent on how managers psychologically interpret power asymmetry between social actors in a commons dilemma, they

may endorse different cultural norms for the purpose of allocating resources, taking relatively more or less for themselves.

How decision makers interpret power asymmetry is proposed to differ depending on the distinct pattern of values endorsed by their culture. Values are cross-situational principles that guide one's life (Schwartz, 1994). Two cultural values—hierarchy versus egalitarianism and individualism versus collectivism, which combined are conceptualized as horizontal- versus vertical-individualism or collectivism—have frequently been studied in the decision-making (Triandis & Gelfand, 1998) and negotiation (Brett & Okumura, 1998) literature. Hierarchy versus egalitarianism refers to the importance placed on ascribed hierarchical roles in structuring interactions and allocating resources. In hierarchical cultures, there is a preference for differentiated social status (whether merit-based or due to class structure) that has implications for who holds power in social situations (Hofstede, 1980; Schwartz, 1994). Social status exists in cultures that are egalitarian (low on hierarchy), but people are less receptive to power differences (Leung, 1997), suggesting that they are less likely to behaviorally respond to power differences. Self-direction—a discrete subset of the broader concept of individualism versus collectivism (Hofstede, 1980; Triandis, 1995)—focuses specifically on what drives individuals (Schwartz, 1992, 1994). People high on self-direction are driven to advance their own goals and value autonomy, freedom, independence, and self-reliance over the interests of their in-group.

Thus, cultural configurations of self-direction and hierarchy are likely to inform decision-making in commons dilemmas. Managers studied in the current research project were previously found to differ at the group level with respect to self-direction and hierarchy (Brett, 2001), representing the four possible combinations as follows: vertical-individualism (Israel), vertical-collectivism (Hong Kong), horizontal-individualism (U.S.), and horizontal-collectivism

(Germany). The basic argument put forth in the current empirical investigation is that managers from Israel and Hong Kong, who are relatively hierarchical, will be influenced by an economic power manipulation, but whether they focus on individual versus group goals will result in different patterns of self-interested behavior. Vertical-individualists will be more self-interested in contrast to vertical-collectivists who are more likely to consider the group. In contrast, managers from less hierarchical cultures—horizontal-individualist and horizontal-collectivists—will not be as sensitive to the context of economic power and thus serve as a benchmark.

In Hong Kong, hierarchy is embedded in a traditional status-oriented social structure, which is relatively stable. Chinese managers in Hong Kong are group-oriented, which may influence the meaning of hierarchy in organizations; collectivism, tradition, and conservatism generate a norm whereby low-status members are expected to concede to high-status members. Traditionally, senior officials have quiet disciplinary control over the conduct of all individual employees. At the same time, high-status members have a social responsibility to look out for the needs of lower-status members and for the group in general. The highest priorities, ones that often converge with self-interest, are: family and networks (called *guanxi* in Chinese society) of mutually beneficial actors. These are informal, often with one elder who has power, financial resources, and, especially, ties to powerful government officials, greater than others in the network. Though informal, they are very cohesive and dedicated to reciprocal favors. The collective goals of these units trump those of most other groups in the individual's allocation of personal resources and care. When the group or environmental fabric is threatened, an inverse equity norm would guide the behavior of powerful actors such that they will be willing to forgo a loss or show “voluntary restraint” (R. M. March, 1988, p. 49) to benefit the group. For high power individuals in the group, voluntary restraint would be routine. However, an inverse equity

would not be expected of low power players, who would continue to focus on the collective goals and contribute their share to the best of their ability. An inverse equity norm resonates with the idea of *noblesse oblige* (nobility obliges), which is generally used to confer that with wealth, power, and prestige come social responsibility. Thus, in vertical-collective groups like those found in Hong Kong, an inverse equity norm would only influence high-status decision makers in a position of economic power, who would show restraint in self-interest.

Although Israel was once a collectivist-egalitarian culture with a strong socialist-communal influence, in recent decades it has affirmed the virtues of individualism (e.g., Ezrahi, 1997) and adopted capitalistic values and norms. Managers, who are at the forefront of this change, scored high on self-direction and hierarchy (e.g., Brett, 2001; Gandal, Roccas, & Sagiv, 2005; Knafo & Sagiv, 2004; Sagiv & Schwartz, 2000). In Israel, individual position in the hierarchical structure relates to individual accomplishments, rather than birthrights or family status, and therefore Israeli managers who are high on self-direction and focus on individual goals are more likely to be guided by an equity norm. Therefore, I suggest that in a merit-based hierarchy, economic power implies that a decision maker has earned the right to exercise power and use common resources, whereas low economic power decision makers who are less invested will claim less of the resources.

Whereas managers from Hong Kong (vertical-collectivist cultural group) may interpret economic power differently than those from Israel (vertical-individualist cultural group), both will attend to situational economic power differences and adjust their behavior according to culturally-based norms. Chinese managers from Hong Kong will adopt an inverse equity norm in a position of high economic power, whereas Israeli managers will adopt an equity norm in both high and low economic power conditions. In contrast, for managers from the U.S. (horizontal-

individualist cultural group) and Germany (horizontal-collectivist cultural group), contextual cues of economic power will not be salient.

Thus, the first hypothesis of this paper is an interaction effect between cultural group and economic power on self-interested behavior in a commons dilemma, such that:

Hypothesis 1: Relative to managers from the U.S. (horizontal-individualist) and Germany (horizontal-collectivists), Chinese managers from Hong Kong (vertical-collectivists) will be less self-interested (more cooperative) in a high economic power condition, whereas Israeli managers (vertical-individualists) will be more self-interested (less cooperative) in a high economic power condition and less self-interested (more cooperative) in a low power condition.

Egocentrism

In commons dilemmas, egocentrism, or the belief that a decision maker deserves a larger proportion of the resources, leads to greater self-interest. For example, egocentrism not only explains over-harvesting behavior, but the reduction of egocentric interpretations of fairness is one reason why communication enhances cooperative behavior (Wade-Benzoni, Tenbrunsel, & Bazerman, 1996). The manifestation of the cognitive bias of egocentrism may vary across cultures. For example, a cultural view of judgment biases in negotiations confirmed that self-serving biases of fairness are more prevalent in individualistic cultures, such as the U.S., than in collectivistic cultures, such as Japan (Gelfand et al., 2002). Gelfand and colleagues suggested that the difference relates to different types of self-regard, in that positive self-regard (the need to “stand out”) characterizes North American culture, whereas critical self-regard (the need to “blend in”) characterizes Japanese culture (Heine, Lehman, Markus, & Kitayama, 1999). Prior research suggests that perceptions of fairness are culturally bounded, pointing to differences between the U.S. and Japan in bargaining contexts where the balance of power between parties is shifted (Buchan, Johnson, & Croson, 1999). Despite this, though contrary to their predicted hypotheses, in a commons dilemmas study that also compared the U.S. and Japan, decision

makers from both cultures were found to be equally egocentric (Wade-Benzoni et al., 2002); i.e., there was no main effect of culture on egocentrism. However, what that study did not take into account was the economic asymmetry of decision makers. If Japanese decision makers were less egocentric in high economic power positions than in low economic power positions, averaging across these two conditions would mask these differences and make it appear as if there was no effect of culture on egocentrism. Thus, I suggest an interaction between cultural group and economic power on egocentrism.

Egocentrism, in the context of a commons dilemma, refers to what a decision maker believes is his/her fair proportion of the total available resources. In line with the interaction hypothesis about self-interest, I suggest that Israeli managers will believe that it is fair to claim more resources when in a position of high economic power and less resources in a position of low economic power, whereas Chinese managers in Hong Kong will believe it is not fair to exercise their economic power in a high power condition, i.e., they will believe that noblesse oblige represents a fair distribution of resources. In essence, managers will perceive the allocation norms they adopt, equity versus inverse equity, as a fair share of the resources. Thus, the second hypothesis of the paper is:

Hypothesis 2: Relative to managers from the U.S. and Germany, Chinese managers from Hong Kong will be less egocentric in a high economic power condition, whereas Israeli managers will be more egocentric in a high economic power condition and less egocentric in a low power condition.

Finally, I predict that egocentrism will mediate the cultural effect by power interaction on self-interest. Therefore, the final hypothesis states:

Hypothesis 3: The interaction of cultural group and economic power (culture*power) on self-interest will be mediated by egocentrism, such that the effect of culture*power will be significantly diminished when egocentrism is taken into account.

METHODS

Task

The simulation used in this study, Shark Harvesters and Resource Conservation (SHARC), was adapted from a four-party asymmetric resource negotiation developed by Wade-Benzoni et al. (1996). The substantive details, as well as the payoff structure of the commons dilemma reflect real-world scenarios in the fishing industry. Participants played the role of representatives of one of four fishing associations that fished for sharks for income. Two fishing associations were comprised of commercial fishermen who fished for sharks for consumption purposes [Large Commercial (LC) and Small Commercial (SC)]. The other two associations operated boats on which customers fished for sharks for recreational purposes [Recreational Competition (RC) and Recreational Tours (RT)]. Similar to most social dilemma experiments, all participants had full information about the payoffs of all parties. The background materials explained that the population of large coastal sharks was in danger because the fishing industry was collectively over-harvesting and depleting the resource faster than it could be replenished. The common goal of all representatives was to resolve the exploitation problem. The individual goal of each representative was to protect the economic well-being of the members of his/her particular fishing association. The exercise materials informed participants that their profits would consist of two components: current harvest and expected profit from future harvests. Consequently, each association's net present value was a function of its harvest level, the value the association placed on shark harvesting in the future, and the total harvest of all four associations (see the Appendix).

Sample, Design, and Procedure

Study participants were full-time managers enrolled in executive M.B.A. programs that were affiliated with a U.S. institution, but located in four countries: Germany, Hong Kong, Israel, and the U.S. All programs were taught in English. Managers participated in a one-week joint negotiation workshop hosted by the U.S. program. It is important to note that executive managers do not necessarily represent the general population of these four countries as they self-select into business careers and attended an executive management program that may have its own organizational culture. Data were collected over four years. Altogether, 204 managers participated in the experiment ($N = 204$). The ages of the participants ranged from 27 to 52 years (mean = 37 years); 76% were male.

In a pre-simulation online survey (administered while still in one's country of origin), participants completed a brief cultural values questionnaire. At the workshop itself, a standard introduction to the exercise provided an outline of study activities and timing. Participants were then assigned to the role of representative of one of four fishing associations (LC, SC, RC, or RT). Role assignments were based on the goal of maximizing cultural variability within groups (each group had one representative from each fishing association). Within cultural group, participants were randomly assigned to groups and conditions. All data analyzed in this study were based on decisions that were made by participants as they individually planned to meet with the representatives of the three other associations. Participants did not know who was to play the role of the three other representatives in their group, but expected it would be culturally heterogeneous. Given the larger number of U.S. participants, SC was always represented by a U.S. participant and these decisions were excluded from the analysis. Included in the analysis were decisions of participants who played the role of representatives of LC, RC, or RT: 34 German participants, 66 Hong Kong participants, 32 Israeli participants, and 72 U.S.

participants. The unbalanced cell size was due to the available pool of participants in each program. For the purpose of hypothesis testing, RC and RT were collapsed into the low economic power condition; LC was analyzed as the high economic power condition. Following the economic role manipulation, participants made a series of decisions about what they thought was a fair amount for each association to harvest (used to calculate egocentrism), what they thought the other associations would in fact harvest, and their own harvesting decisions (used to calculate self-interest).

Measures

Cultural Group

In order to determine cultural group membership, participants were required to originate from the country where they received their executive management education and view that country's culture as their dominant culture. Participants were asked to report their nationality and citizenship, and to confirm whether it reflected their *dominant* culture. For example, an American expatriate studying in the program in Hong Kong would be automatically excluded, but a manager from Hong Kong in that program was included, even if the individual's citizenship was British, as long as the participant reported their dominant culture to be Chinese.

Beyond national cultural level, group culture may have been influenced by industry association (business executives), university affiliation, and/or the unique organizational culture of the executive management program in each country. The four cultural groups—executive MBA students from programs in Germany, Hong Kong, Israel, and the U.S.—were previously found to differ on cultural values of self-direction and hierarchy (Brett, 2001). Given that the hypotheses about these groups were theoretically grounded in differences in cultural values of

self-direction and hierarchy, these differences were measured to provide a sampling check.

Cultural values were measured using thirty-eight items from Schwartz's survey (1994), adapted to negotiation contexts (Brett & Okumura, 1998). Participants in the current study rated the degree to which they considered each value a guiding principle in their life on a nine-point Likert like scale that ranged between negative one (opposed to my values) and positive seven (of supreme importance). Responses were standardized with respect to all items in the survey to adjust for individual differences in how participants valued the scale itself (Schwartz & Sagiv, 1995). Based on prior research on these four cultural groups (Brett, 2001), cultural values of the participants in this study were expected to differ with respect to individual level cultural values of self-direction and hierarchy; the U.S. managers were expected to be horizontal-individualists (low on hierarchy and high on self-direction), the German managers horizontal-collectivists (low on hierarchy and low on self-direction), the Israeli managers vertical-individualists (high on hierarchy and high on self-direction), and the Hong Kong managers vertical-collectivists (high on hierarchy and low on self-direction).

Based on a confirmatory factor analysis with a Varimax rotation, self-direction and hierarchy accounted for 43.65% of the variance. Self-direction included six items: creativity (uniqueness, imagination), independent (self-reliant, self-sufficient), ambitious (hard-working, aspiring), choosing own goals (selecting *my* own purposes), intelligent (logical, thinking), authority (the right to lead or command), and curious (interested in everything, exploring). A high score indicated self-direction ($\alpha = .70$). Hierarchy included four items: social power (control over others, dominance), wealth (material possessions, money), social recognition (respect, approval by others), and preserving *my* public image (protecting *my* "face"). A high score indicated the presence of hierarchy ($\alpha = .74$).

The sampling check confirmed the expected pattern of vertical versus horizontal individualism and collectivism. A multivariate analysis of variance (MANOVA) with *a priori* contrasts tested the expected group differences on cultural values of self-direction and hierarchy. The model was significant for both: self-direction ($F_{3, 203} = 6.03, p = .002$), and hierarchy ($F_{3, 203} = 5.30, p = .002$). As expected, Israeli and U.S. managers scored significantly higher on self-direction than Hong Kong and German managers. Furthermore, the Hong Kong and Israeli managers were significantly more hierarchical than German and U.S. managers (Table 1).

Economic Power

Economic power was manipulated. High versus low economic power was reflected both by the harvest level and by the value of preserving the resource (the coefficient preceding Future) in each association's profit function (see the Appendix). For example, LC had the most economic power (current Harvest Level of 2000 metric tons and 10% dependence on Future), whereas RT had the least (500 metric tons and 85%, respectively).

Egocentrism

The egocentrism measure reflected the market share participants felt their association deserved. Participants were asked what they believed was a fair harvest for their own association, as well as for the other three associations. Based on these decisions, a previously established controlled measure of egocentrism was calculated (for details, see Wade-Benzoni et al., 1996, p. 118). A score of zero indicated no egocentrism, whereas a positive value indicated egocentrism and a negative value indicated the opposite of egocentrism (could be interpreted as low-self esteem or unworthiness). Values ranged from -19 to 47 ($M = 2.5; SD = 10.9$).

Self-Interest

The harvest level of each association reflected the self-interest of that decision maker. Based on real-world industry constraints, decision makers were restricted from increasing their harvest level above the current level and from reducing it beyond 80% (Appendix). To compare self-interest across roles, harvest level was standardized by role.

Controls

To rule out the influence of variables external to the theorized model, three demographic variables were considered: gender, age, and years in workforce (work experience). Because age and work experience were highly correlated ($r = 0.56, p < .01$), of the two, only work experience was included in the model. Gender, which may account for differences in strategic economic behavior (Croson & Buchan, 1999), was also included as a control variable in the model.

To rule out potential group-level differences in familiarity with the underlying concepts of social dilemmas (e.g., due to differences in prior course work in economics), answers from an exam that was administered three days following this exercise were compared. Exams were graded anonymously, and scores were standardized by class. Although significant differences were found (the German managers scored significantly higher than the Hong Kong managers), this pattern would not obfuscate the hypothesized relationships. It is also important to note that random assignment to roles (LC, SC, RC, or RT), controlled for individual-level differences in variables such as prior knowledge.

Analysis

An analysis of variance (ANOVA) was used to test the effect of cultural group (categorical variable: Germany, Hong Kong, Israel, or the U.S.) and economic power (categorical variable: high vs. low) on self-interest (continuous variable), as well as egocentrism (continuous variable). A Baron and Kenny (1986) version of the Sobel test (1982) was used to test whether egocentrism mediated the interaction of cultural group and economic power on self-interest.

RESULTS

Hypothesis 1 predicted that there would be an interaction between cultural group and economic power (culture*power) on self-interest and was supported. Based on an ANOVA (overall model $F_{9, 203} = 1.6, p = .12$), as expected, there was no main effect of cultural group or economic power, but the predicted interaction term culture*power on self-interest was significant ($F_{3, 203} = 3.21, p = .024$).

In the high economic power condition, managers from all cultural groups followed an economically rational pattern of decision-making of defecting (continuing to maximize profits by harvesting closer to the initial 2,000 metric tons in comparison to the recommended cut by 50% to 1,000 metric tons that would ensure the sustainability of the resource). However, Hong Kong managers were significantly less self-interested ($M = 1407, SD = 352$) than German managers ($M = 1605, SD = 315$) and U.S. managers ($M = 1625, SD = 367$), whereas Israeli managers were significantly more self-interested ($M = 1777, SD = 351$). Contrast tests confirmed these differences ($t = 3.03, p = .006$). In the low economic power condition, all managers were economically rational and reduced their original harvest level to maximize their individual profits (note that in the low economic power condition, sustainability goals were aligned with

profitability, as long as at least one other association cooperated and reduced its harvest level), but *a priori* contrasts ($t = -1.70, p = .099$) revealed the Israeli managers were marginally more self-interested and reduced their harvest level more ($M = 297, SD = 259$) than Hong Kong ($M = 414, SD = 226$), German ($M = 415, SD = 303$), and U.S. ($M = 406, SD = 231$) managers (Table 2 and Figure 1).

Hypothesis 2 predicted a culture*power interaction on egocentrism, such that in a high economic power condition Israeli managers would be more egocentric than German and U.S. managers, whereas Hong Kong managers will be less egocentric. In contrast, in a position of low economic power, Israeli managers will be less egocentric than managers from the three other groups. Based on an ANOVA (overall model $F_{9, 203} = 2.96, p = .003$), there was no main effect of cultural group, but the predicted interaction term culture*power on egocentrism was significant ($F_{3, 201} = 3.10, p = .028$). In a high economic power condition, based on *a priori* contrast tests ($t = -2.49, p = .029$), Israeli managers, as predicted, were significantly more egocentric ($M = 11.59, SD = 16.79$), but contrary to predictions Hong Kong managers ($M = 4.56, SD = 14.38$) were as egocentric as the German ($M = 4.26, SD = 13.7$) and U.S. ($M = 8.01, SD = 11.15$) managers. In the low economic power condition, Israeli managers were significantly less egocentric ($M = -3.97, SD = 6.82$) than Hong Kong ($M = 1.85, SD = 8.15$), German ($M = 2.31, SD = 10.29$), and U.S. ($M = 0.38, SD = 7.66$) managers ($t = 2.54, p = .021$). Thus, although the culture*power interaction was significant, Hypothesis 2 was only partially confirmed. The predictions about Israeli managers were confirmed the predictions about Hong Kong managers were not (Table 2 and Figure 2).

Hypothesis 3 predicted that egocentrism would mediate the culture*power effect on self-interest and was confirmed. When egocentrism was added to the ANOVA of cultural group and

economic power on self-interest, the culture*power effect was no longer significant ($F_{3, 203} = 1.73, p = .16$). Furthermore, the unstandardized regression coefficient and standard error for the culture*power effect on egocentrism ($b = 1.05, s.e. = 0.328$) and of egocentrism on self-interest ($b = 0.023, s.e. = 0.005$) were used to assess mediation according to the Baron and Kenny (1986) version of the Sobol test (1982) and confirmed that egocentrism mediated the effect of culture*power on self-interest ($Z\text{-value} = 2.63, p = .008$).

DISCUSSION

This study examined the effect of culture in the context of economic power on cooperation in a commons dilemma posed to executive managers. The pattern of results suggests that decision makers from hierarchical versus egalitarian cultures react to situational cues of economic power and enact these cues in different ways depending on whether their culture is also high on self-direction and driven to advance individual goals, or low on self-direction and driven to advance group goals. Managers from Israel (vertical-individualist cultural group) were more self-interested in a high power condition and less self-interested in a low power condition than the German (horizontal-collectivist) and U.S. (horizontal-individualist) managers. In contrast, Hong Kong Chinese managers (vertical-collectivist) in a high economic power condition were less self-interested and willing to exercise voluntary restraint taking less of a common resource, a decision that would result in a financial loss. Thus, managers from group cultures that valued hierarchy differentially responded to the power manipulation, and while vertical-individualist managers from Israel aligned their decisions with individual goals of profit maximization, vertical-collectivist managers from Hong Kong sacrificed individual profits for the good of society. These findings extend and build on prior research on culture and social

dilemmas (Buchan, Croson, & Dawes, 2002; Buchan, Croson, & Johnson, 1999; Liebrand & Van Run, 1985; Wade-Benzoni et al., 2002; Wade-Benzoni, Tenbrunsel, & Bazerman, 1996; Yamagishi, 1988) and support the theoretical argument that a contextual model (Gelfand & Dyer, 2000) is better suited for understanding the effects of culture on decision-making.

Not only does this study highlight the importance of looking at culture in the context of proximal variables like economic power, but it also suggests that psychological mechanisms that explain the effect of culture on decision-making may vary by culture. The findings of this study may reflect the difference in meaning and normative expectations associated with power and status in collectivist versus individualist cultures. As predicted, the Israeli managers with high economic power believed it was fair for them to harvest relatively more resources and maintain their high profits and these egocentric perceptions mediated the effect of culture and power on self-interested decisions. However, it is puzzling that while the decisions of Hong Kong managers were more socially responsible, taking fewer resources when in positions of power, they did not view this as a fair allocation of resources. Perhaps this reflects the so-called *burden* of social responsibility. It may also represent changing times; these decision makers may still comply with tradition, even though they do not embrace its underlying ideology.

This study contributes to the literature on social dilemmas by confirming a culture effect by power interaction on self-interest, but it is not without limitations. One question that remains unanswered is how to evaluate what constitutes high versus low economic power. Are these relative terms, or are there concrete reference points that indicate to a decision maker from a vertical-collectivist culture when to adopt an inverse equity norm and assume social responsibility? Furthermore, although these findings offer implications for cross-cultural behavior in commons dilemmas, generalizing these beyond this self-selected sample may be

problematic. The groups did not necessarily reflect managers from the respective countries. Each group reflected a unique group culture; an amalgamate of national and professional-organizational culture, and some may be more representative of their country than others. Furthermore, although it may be considered a limitation of this study, the analyses were run based on group affiliation, not on individual measures of cultural values as the independent variables. There has been a growing skepticism in the field of psychology that values can fully explain cultural differences in behavior (Gelfand, Nishii, & Raver, 2006). Even when the values constructs are broadened to include other person variables, such as attitudes and beliefs, they are still mixed in their ability to explain cross-cultural differences in behavior (see Bond, 1997, for a review). Thus, a reductionism approach that relies on individual measures may not be capable of explaining group-level variance. Gelfand and colleagues (2006) recently suggested that a multilevel theory of tightness-looseness of cultural groups may broaden our view of cultural differences and provide stronger explanatory power of decision-making, such as the psychology of cooperation in social dilemmas. Despite these potential limitations, the results do reflect group-level differences found in prior studies, where Asian cultures were found to be more cooperative (e.g., Parks & Vu, 1994; Wade-Benzoni et al., 2002), and this study extends these findings and suggests that this effect may be driven by those in high power positions.

To summarize, this study suggests that cultural groups that differ in values (what is important) may enact different allocation norms (what is appropriate), depending on the structural role they occupy. Decision makers from vertical-collectivist cultures (such as the sample of Hong Kong managers examined in this study) seem to apply an inverse equity rule when they have a relatively high power role, whereas the decision of managers from vertical-individualist cultures (such as the Israeli managers in this study) could be explained by an equity

norm. Because norms are distinct to specific situations, a contextual model of culture surpasses an examination of main effects. Adopting March's (1994) model of decision-making, my co-authors and I have argued that the question "What does a person like me (identity) do (rules) in a situation like this (recognition)" offers a more comprehensive understanding of the decision-making in social dilemmas than rational choice or expected utility models (Weber, Kopelman, & Messick, 2004). Thus a person's salient identity, the individual's recognition of the situation, and identification of relevant rules drive behavior. Since culture can influence more stable identity factors (e.g., social motives), situational factors (e.g., economic power), as well as allocation rules (e.g., equity vs. inverse-equity), one question this study raises, then, is where culture comes into play in the theoretical conceptualization of social dilemmas. Is culture built into the different components of the *Logic of Appropriateness* model (i.e., the group, and its culture, are part of the person, the situation, and the rules), or does it have a unique impact, and thus merit revising the question to: "What does a *person* like me (identity) *do* (rules) in a *situation* like this (recognition) given this *culture* (group)?"

In terms of application to management, the findings suggest that interventions that reduce egocentrism (e.g., face-to-face communication (Wade-Benzoni, Tenbrunsel, & Bazerman, 1996) may only be effective in some cultures. Based on this paper, it may not be effective in Hong Kong and it remains for future research to better understand what motivated the decisions of the Hong Kong managers to curb self-interest in high power positions. Another managerial application might be to make economic power salient to decision makers, and in that context cue a group, versus self-focus that will engender a decision-making pattern of social responsibility (collective rationality) as adopted in this study by the Hong Kong managers. With a strong enough situational cue of high economic power along with a group focus, managers from any

culture may be more cooperative in social dilemmas.

The differences in choice behavior, generated by studying culture in the context of economic power, foreshadow an elaborate story about the potential pitfalls of commons dilemmas. This account takes different forms in different cultures. A colorful and complex empirical story is always interesting; however, understanding behavior in a commons dilemma is not only an academic endeavor, but a real-world problem that interests both managers and policymakers. Whereas legal scholars contribute to institutional solutions to the tragedy of the commons, such as privatization (e.g., creative forms of property rights such as Tradable Environmental Allowances (TEA) (Rose, 2002; Titenberg, 2002), scholars of management can offer psychological and behavioral insights that may promote cooperation. Behavioral cooperation can help effectively manage common resources within organizations (e.g., funds and materials to which employees have open and unmonitored access), as well as promoting inter-organizational cooperation to better manage resources.

This study reinforces case studies in anthropology that point the attention of researchers to the richness of culturally-distinct solutions that have developed over centuries of common resource management (Ostrom, 1990; Ostrom, Walker, & Gardner, 1992). Future experimental research should adopt a contextual framework that accounts for situational variables such as the distribution of economic power to help understand the impact of culture on resource management negotiations.

REFERENCES

- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of Personality & Social Psychology, *51*(6), 1173-1182.
- Brett, J. M. (2001). Negotiating globally. San Francisco: Jossey-Bass.
- Brett, J. M., & Kopelman, S. (2004). Culture and Social Dilemmas. In G. Michelle & B. J. M. (Eds.), Negotiation and culture: research perspectives. Palo Alto: Stanford University Press.
- Brett, J. M., & Okumura, T. (1998). Inter- and intracultural negotiation: U.S. and Japanese negotiators. Academy of Management Journal, *41*(5), 495-510.
- Bond, M. H. (1997). Adding value to the cross-cultural study of organizational behavior. In P.C. Early & M. Erez (Eds.), New perspectives in international industrial/organizational psychology (pp. 256-275). San Francisco, CA: New Lexington Press.
- Buchan, N. R., Croson, R. T. A., & Dawes, R. M. (2002). Swift neighbors and persistent strangers: A cross-cultural investigation of trust and reciprocity in social exchange. The American Journal of Sociology, *108*(1), 168-206.
- Buchan, N. R., Croson, R. T. A., & Johnson, E. J. (1999). Getting to Know You: An International Experiment of the Influence of Culture, Communication, and Social Distance on Trust and Reciprocation. Unpublished working paper
- Buchan, N. R., Johnson, E., & Croson, R. (1999). Understanding what's fair: Contrasting perceptions of fairness in ultimatum bargaining in Japan and the United States. Unpublished manuscript.
- Croson, R., & Buchan, N. (1999). Gender and Culture: International Experimental Evidence from Trust Games. American Economic Review, Papers and Proceedings, *89*(2), 386-391.
- Dawes, R. M. (1980). Social dilemmas. Annual Review of Psychology, *31*, 169-193.
- Deutsch, M. (1973). The resolution of conflict. New Haven, CT: Yale University Press.
- Ezrahi, Y. (1997). Rubber bullets. Berkeley: University of California Press.
- Gandal, N., Roccas, S., & Sagiv, L. (2005). Personal value priorities of economists. Human Relations, *58*(10), 1227-1252.
- Gelfand, M.J., Nishii, L. H., & Raver, J.L. (2006). On the nature and importance of cultural tightness-looseness. Journal of Applied Psychology, *91*(6), 1225-1244.
- Gelfand, M. J., & Dyer, N. (2000). A cultural perspective on negotiation: Progress, pitfalls, and prospects. Applied Psychology, *49*(1), 62-99.
- Gelfand, M. J., Higgins, M., Nishii, L. H., Raver, J. L., Dominguez, A., Murakami, F., et al. (2002). Culture and egocentric perceptions of fairness in conflict and negotiation. Journal of Applied Psychology, *87*(5), 833-845.
- Hardin, G. (1968). The tragedy of the commons. Science, *162*, 1243-1248.

- Heine, S. H., Lehman, D. R., Markus, H. R., & Kitayama, S. (1999). Is there a universal need for positive self-regard? Psychological Review, 106(4), 766-794.
- Hofstede, G. (1980). Culture's consequences: International differences in work-related values. Newbury Park, CA: Sage.
- Kahan, J. P. (1974). Rationality, the prisoner's dilemma, and population. Journal of Social Issues, 30(4), 189-210.
- Knafo, A., & Sagiv, L. (2004). Values and work environment: Mapping 32 occupations. European Journal of Psychology of Education, 19(3), 255-273.
- Komorita, S., & Parks, C. D. (1994). Social dilemmas. Madison, WI: Brown & Benchmark.
- Kopelman, S., Weber, J. M., & Messick, D. M. (2002). Factors influencing cooperation in commons dilemmas: A review of experimental psychological research. In E. Ostrom, T. Dietz, N. Dolsak, P. C. Stern, S. Sonich & E. U. Weber (Eds.), The drama of the commons. Washington, DC: National Academy Press.
- Leung, K. (1997). Negotiation and reward allocations across cultures. In P. C. Earley & M. Erez (Eds.), New perspectives on international industrial/organizational psychology (pp. 640-675). San Francisco, CA: New Lexington Press.
- Liebrand, W. B., & Van Run, G. J. (1985). The effects of social motives on behavior in social dilemmas in two cultures. Journal of Experimental Social Psychology, 21(1), 86-102.
- March, J. (1994). A primer on decision making: How decisions happen. New York: Free Press.
- March, R. M. (1988). The Japanese negotiator: Subtlety and strategy beyond western logic. Tokyo, Japan: Kodansha International.
- Messick, D. M., & Brewer, M. (1983). Solving social dilemmas: A review. In L. Wheeler & P. Shaver (Eds.), Review of personality and social psychology (Vol. 4, pp. 11-44). Beverly Hills, CA: Sage.
- Morris, M. W., Podolny, J. M., & Ariel, S. (2000). Missing Relations: Incorporating relational constructs into models of culture. In P.C. Earley & H. Singh (Eds.), Innovations in International and Cross-cultural Management (pp. 52-90). Thousand Oaks, CA: Sage Publications.
- Ostrom, E. (1990). Governing the commons: The evolution of institutions for collective action. New York, NY: Cambridge University Press.
- Ostrom, E., Walker, J., & Gardner, R. (1992). Covenants with and without a Sword: Self-Governance Is Possible. American Political Science Review, 86(2), 404-417.
- Parks, C. D., & Vu, A. D. (1994). Social dilemma behavior of individuals from highly individualist and collectivist cultures. Journal of Conflict Resolution, 38(4), 708-718.
- Rose, C. M. (2002). Common property, regulatory property, and environmental protection: Comparing community based-management to tradable environmental allowances. In E. Ostrom, T. Dietz, N. Dolsak, P. C. Stern, S. Sonich & E. U. Weber (Eds.), The drama of the commons (pp. 233-257). Washington, DC: National Academy Press.
- Roth, A. E., Prasnikar, V., Okuno-Fujiwara, M., & Zamir, S. (1991). Bargaining and market

- behavior in Jerusalem, Ljubljana, Pittsburgh, and Tokyo: An experimental study. American Economic Review, 81(5), 1068-1095.
- Sagiv, L., & Schwartz, S. H. (2000). Value priorities and subjective well-being: Direct relations and congruity effects. European Journal of Social Psychology, 30(2), 177-198.
- Schelling, T. C. (1960). The strategy of conflict. Cambridge, MA: Harvard University.
- Schwartz, S. H. (1992). Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries. In M. P. Zanna (Ed.), Advances in experimental social psychology (pp. 1-59). New York, NY: Academic Press.
- Schwartz, S. H. (1994). Beyond individualism/collectivism: New cultural dimensions of values. In U. Kim & T. H. C. (Eds.), Individualism and collectivism: Theory, method, and applications. Cross-cultural research and methodology series (Vol. 18, pp. 85-119). Thousand Oaks, CA: Sage.
- Schwartz, S. H., & Sagiv, L. (1995). Identifying culture-specifics in the content and structure of values. Journal of Cross-Cultural Psychology, 26(1), 92-116.
- Sobel, M. E. (1982). Asymptotic intervals for indirect effects in structural equations models. In S. Leinhardt (Ed.), Sociological methodology (pp. 290-312). San Francisco, CA: Jossey-Bass.
- Thompson, L. (2001). The Mind and heart of the negotiator (2nd ed.). Upper Saddle River, NJ: Prentice Hall.
- Titenberg, T. (2002). The tradable permits approach to protecting the commons: What have we learned? In E. Ostrom, T. Dietz, N. Dolsak, P. C. Stern, S. Sonich & E. U. Weber (Eds.), The drama of the commons (pp. 197-232). Washington, DC: National Academy Press.
- Triandis, H. C. (1989). Cross-cultural studies of individualism and collectivism. In J. Berman (Ed.), Nebraska symposium on motivation (pp. 41-133). Lincoln, NB: University of Nebraska Press.
- Triandis, H. C. (1995). Individualism and collectivism. Boulder, CO: Westview Press.
- Triandis, H. C., & Gelfand, M. J. (1998). Converging measurement of horizontal and vertical individualism and collectivism. Journal of Personality & Social Psychology, 74(1), 118-128.
- Van Lange, P., Liebrand, W., Messick, D. M., & Wilke, H. A. (1992). Social dilemmas: The state of the art introduction and literature review. In W. B. G. Liebrand, D. M. Messick & H. A. Wilke (Eds.), Social dilemmas: Theoretical issues and research findings (1st ed., pp. vii, 334). New York, NY: Pergamon Press.
- Van Vugt, M. (1998). The conflicts in modern society. Psychologist, 11(6), 289-292.
- Wade-Benzoni, K. A., Okumura, T., Brett, J. M., Moore, D. A., Tenbrunsel, A. E., & Bazerman, M. H. (2002). Cognitions and behavior in asymmetric social dilemmas: A comparison of two cultures. Journal of Applied Psychology, 87(1), 87-95.
- Wade-Benzoni, K. A., Tenbrunsel, A. E., & Bazerman, M. H. (1996). Egocentric interpretations of fairness in asymmetric, environmental social dilemmas: Explaining harvesting behavior and the role of communication. Organizational Behavior & Human Decision

Processes, 67(2), 111-126.

Weber, J. M., Kopelman, S., & Messick, D. M. (2004). A conceptual review of decision making in social dilemmas: Applying a logic of appropriateness. Personality and Social Psychology Review, 8(3), 281-307.

Yamagishi, T. (1988). The provision of a sanctioning system in the United States and Japan. Social Psychology Quarterly, 51(3), 265-271.

Young, O. R. (2001). Institutional interplay: The environmental consequences of cross-scale interactions. In E. Ostrom, T. Dietz, N. Dolsak, P. C. Stern, S. Sonich & E. U. Weber (Eds.), The drama of the commons. Washington, DC: National Academy Press.

Table 1. Sampling Check of Group Differences in Cultural Values

Cultural Group of Managers	n	Cultural Values	
		Self Direction	Hierarchy
Hong Kong Chinese			
<u>M</u>	66	0.51 _b	-0.03 _c
<u>SD</u>		0.50	0.57
German			
<u>M</u>	34	0.38 _b	-0.38 _d
<u>SD</u>		0.46	0.55
Israeli			
<u>M</u>	32	0.76 _a	-0.02 _c
<u>SD</u>		0.38	0.55
U.S.			
<u>M</u>	72	0.67 _a	-0.30 _d
<u>SD</u>		0.39	0.58
N	204		
F		6.03	5.30
<u>p</u>		0.001	0.002

Note. Means with different subscripts differ significantly at a $p < .05$ by *a priori* contrast effects.

Table 2. Descriptive Statistics for Self-Interest (Harvesting) and Egocentrism (Controlled)

Cultural Group	Power	Self-Interest					Egocentrism				
		Low Economic Power			High Economic Power			Low		High	
		<i>n</i>	Metric Tons	Z-score	<i>n</i>	Metric Tons	Z-score	<i>n</i>	Controlled	<i>n</i>	Controlled
Hong Kong Chinese Managers (Vertical-Collectivist)											
	<u>M</u>	43	414 _i	0.03	23	1407 _a	-0.49	42	1.85 _a	23	4.56 _a
	<u>SD</u>		226	0.96		352	0.92		8.15		14.38
German Managers (Horizontal-Collectivist)											
	<u>M</u>	23	415 _i	-0.08	11	1605 _b	0.02	23	2.31 _a	10	4.26 _a
	<u>SD</u>		303	1.10		315	0.82		10.29		13.70
Israeli Managers (Vertical-Individualist)											
	<u>M</u>	19	297 _{ii}	-0.40	13	1777 _c	0.47	19	-3.97 _b	13	11.59 _b
	<u>SD</u>		259	1.06		351	0.91		6.82		16.79
U.S. Managers (Horizontal-Individualist)											
	<u>M</u>	50	406 _i	0.08	22	1625 _b	0.08	50	0.38 _a	22	8.01 _a
	<u>SD</u>		231	0.95		367	0.96		7.66		11.15
Total											
	<u>M</u>	135	395	-0.03	69	1578	-0.05	134	0.56	68	6.98
	<u>SD</u>		247	1.00		369	0.96		8.36		13.79
Culture*Power Interaction											
	<u>F</u>						3.21				3.10
	<u>df</u>						3				3
	<u>N</u>						203				201
	<u>p</u>						0.024				0.028

Note. In each column, means with different subscripts differ significantly (Roman numerals at $p < .10$; Alphabetical letters at $p < .05$).

Figure 1. Interaction Effect between Culture and Economic Power on Self-Interest

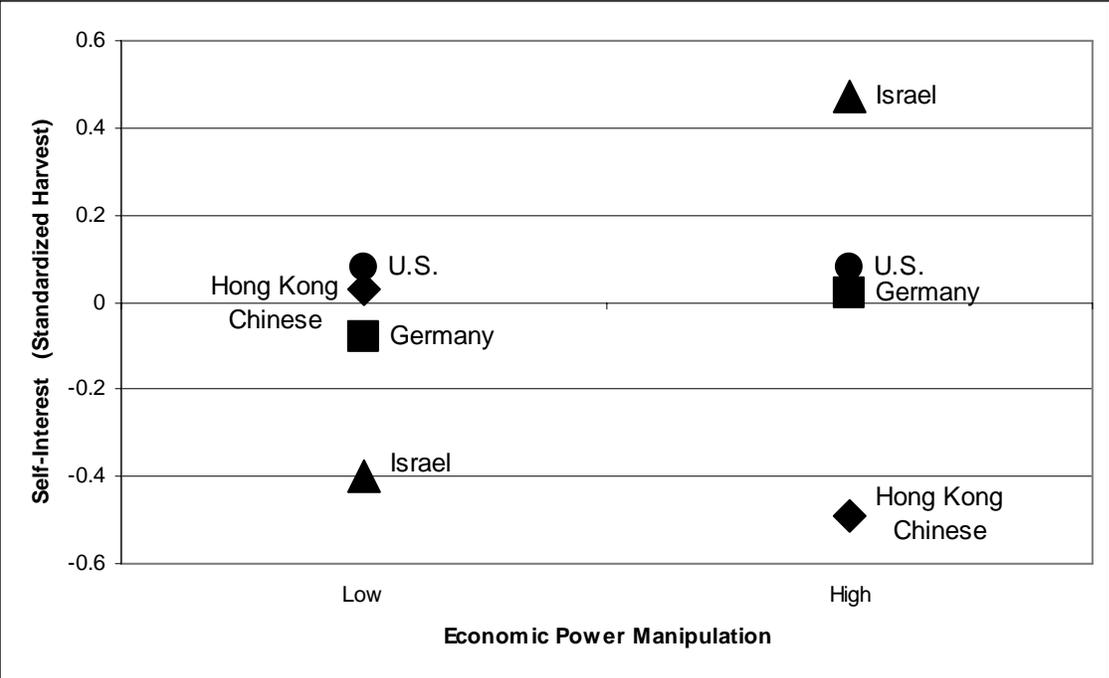
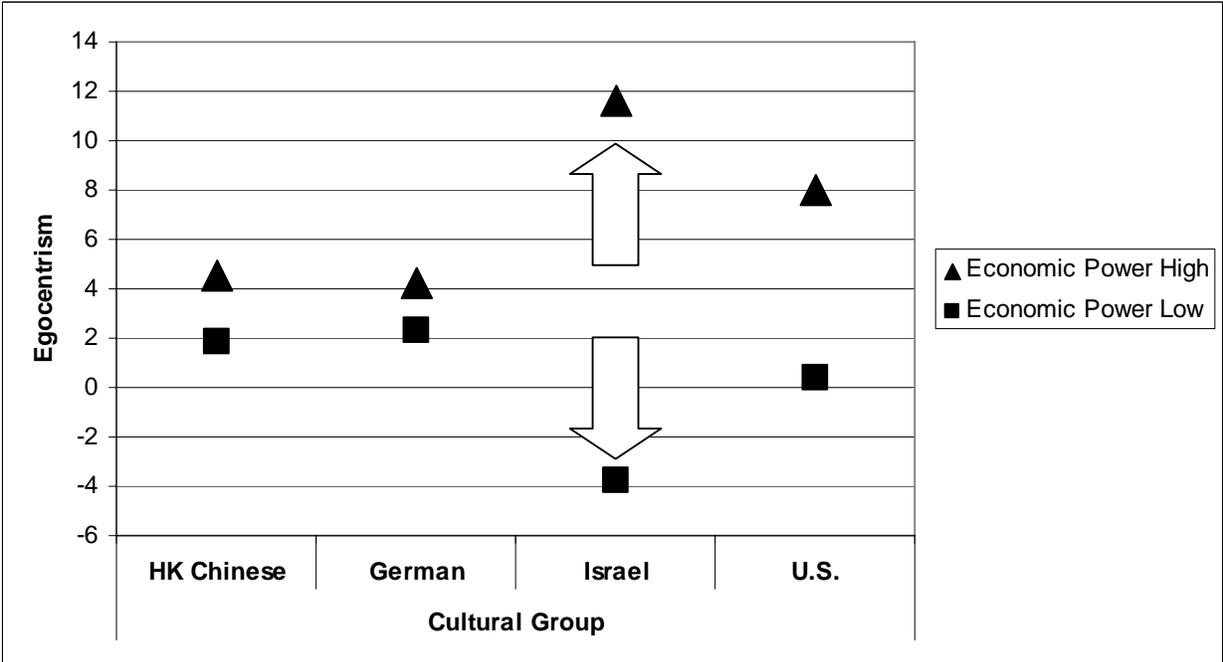


Figure 2. Interaction Effect between Culture and Economic Power on Egocentrism



APPENDIX

Profit Formulas

The payoff structure was described by the following net present value (NPV) profit functions:

Large Commercial (LC):	$\$10,000 \times (\text{LC Harvest Level} + .10[\text{Future}])$
Small Commercial (SC):	$\$10,000 \times (\text{SC Harvest Level} + .25[\text{Future}])$
Recreational Competition (RC):	$\$10,000 \times (\text{RC Harvest Level} + .70[\text{Future}])$
Recreational Tours (RT):	$\$10,000 \times (\text{RT Harvest Level} + .85[\text{Future}])$

Payoffs were multiplied by a factor of 10,000 to bring the dollar values to the appropriate industry scale. The variables and constraints also reflect real-world restrictions of this industry, and are defined below.

Associations' Harvest Level: How many metric tons (m.t.) of sharks are representative of what each association decides to take from the resource.

Constraints:

- (1) Harvest level could not be increased from the current level, which reflected the maximum capacity of each association.
- (2) Harvest level could not be reduced by more than 80% of the current level (i.e., all parties had to remain in business).
- (3) No transfer payments (i.e., neither profits nor sharks could not be exchanged).

Ranges in metric tons:

LC: 400 – 2,000; SC: 300 – 1,500; RC: 200 – 1,000; RT: 100 – 500.

Future: Level of the resource that would remain available for reproduction and sustain future harvesting. It was calculated as:

$$= 5000 - \text{Total Harvest Level (Total)}$$

$$\text{Total} = \text{LC Harvest Level} + \text{SC Harvest Level} + \text{RC Harvest Level} + \text{RT Harvest Level}.$$

Constraint: Future could not exceed 2,500 (i.e., there was no added value to conserving resource beyond environmentally recommended level of 2,500).

Range:

$$0 \leq \text{Future} \leq 2,500 \text{ m.t.}$$