

Hostile Communications in a Crisis Simulation Game

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Abstract

We conducted an experiment testing the impact of the content of communications on the propensity for aggression in a simulated crisis game. In addition, we investigated the relationship between previous military spending and the outbreak of hostility. Finally, we examined whether the structure of the incentives might alter a player's strategy. Specifically, this experiment had two conditions, one which provided a territorial advantage, a pre-emptive incentive to attack. The second presented a situation of territorial disadvantage which encouraged a more conservative approach to conflict. Our sample included 90 male and female subjects who participated in an experimental crisis simulation game in one of three types of dyads: male-male, female-female, or male-female. Participants were randomly assigned to stimulus material which manipulated the environmental and territorial structure in which they would play. In six rounds of play, subjects made procurement decisions, took an action in response to the conflict, and wrote messages to their adversary. The study found significant effects for condition, lagged declared military spending, and lagged communication.

Key words: experiment, decision making, communications, military spending, crisis, war

Hostile Communications in a Crisis Simulation Game

Recent events in international relations, and even domestic politics, call attention to the importance of communications between leaders and adversaries, particularly in the context of a crisis situation. The heated words between the leaders of India, Atal Bihari Vajpayee, and Pakistan, General Pervez Musharaf, over the course of the last couple of summers over the disputed territory of Kashmir, raised concerns by many about the possibility of nuclear war between the two powers. Recently, a heated dispute on the floor of the American Congress produced language seemingly more common in a playground than in the political arena. Representative Pete Stark (D-CA) goaded Scott McInnis (R-CO) , challenging McInnis, “Oh, you think you are big enough to make me, you little wimp? Come on. Come over here and make me. I dare you. You little fruitcake. You little fruitcake. I said you are a fruitcake.” Apparently his language escalated beyond what can be published in a political science journal, ending with House Ways and Means Committee Chairman Bill Thomas calling in the Washington, D. C. police to break up the fight on the floor. Historically, we also have many examples of leaders exchanging hostile messages which did in fact lead to war. The classic case, of course, surrounds the letters sent back and forth, with painful delay, among the great powers just prior to the First World War.

Can such heated exchanges in fact provoke a crisis or conflict that might not have existed otherwise? Our experiment set out to test this question. We wanted to explore whether the nature of communications among adversaries might in fact affect the outcome of conflicts between them in substantive ways. Further, we sought to examine the effects of spending on the likelihood of conflict erupting. Is it the case that if one side builds up arms, the other side will do

so as well, or worse yet, start a conflict over these weapons? Finally, we also examined the effect of environmental circumstances on military procurement and strategy. Does the context in which leaders would need to fight affect whether or not they will do so?

In order to address these questions, we conducted an experiment testing the impact of the content of communications on the propensity for aggression in a simulated crisis game. In addition, we investigated the relationship between previous military spending and the outbreak of hostility. Finally, we examined whether the structure of the incentives might alter a player's strategy. Specifically, this experiment had two conditions, one which provided a territorial advantage, a pre-emptive incentive to attack. The second presented a situation of territorial disadvantage which encouraged a more conservative approach to conflict. Our sample included xx male and female subjects who participated in this experimental crisis simulation game in one of three types of dyads: male-male, female-female, or male-female. Participants were randomly assigned to stimulus material which manipulated the environmental and territorial structure in which they would play. In six rounds of play, subjects made procurement decisions, took an action in response to the conflict, and wrote messages to their adversary. The study found significant effects for condition, lagged declared military spending, and lagged communication.

Literature Review and Hypotheses

Hostile Communications

In 1966, Dina Zinnes published a fascinating study examining hostile behavior among decision makers in both historical and simulated crisis conditions. She found that the leaders do in fact recognize hostility when it exists for what it is; they are not fabricating it out of sheer paranoia. Zinnes also found that in both historical and simulated cases, three variables accounted

for a state's hostile action toward another: perceiving a hostile environment; receiving hostile messages; and the alliance system. Interestingly, she also found little difference in the perception and behavior of high school students and national decision makers, supporting the relevance of our study with undergraduates for understanding real world decision making outcomes. In conclusion, she states that, "the receipt of hostile messages play(s) a critical role in determining a decision maker's perception of his environment and that these perceptions in turn influence his decision to react aggressively toward the perceived offending state (1966, 499)."

In some relevant experimental work, Terhune & Firestone (1970) conducted a test of three experimental worlds, one of global war, a second of limited war and a third of peace. Results from these games generated a set of hypotheses related to hostile communications. They delineate these hypotheses as follows:

Systems experiencing pronounced and violent conflict will be characterized by high levels of (a) mistrust, (b) hostile communications between conflicting parties, and (c) communications by conflicting parties expressing hostility to their opponents, but directed toward third parties...

Indirect expressions of hostility tend to precede the outbreak of violent conflict, while direct expressions of hostility between opponents tend to co-occur with overt hostility. Systems characterized by peace tend also to be characterized by (a) trust, (b) infrequent hostile communications, and (c) few third party communications hostile to other actors (1970, 211).

In previous work that we have conducted ourselves (McDermott, Cowden & Koopman, 2002) we examined the impact of hostile communications in a similar but not identical experimental format. In that work, we found that the tone of message produced a significant effect on military spending. In this experiment, we seek to extend that work to determine if hostile communications impact the propensity to engage in violent action as well.

Note that here we are addressing the tone of the communication. Is it hostile, neutral or friendly? We assess the tone independent of the substantive content of the message itself.

We hypothesize that hostile communications will produce more aggressive outcomes between adversaries in subsequent rounds. We would not expect responses to increase in hostility until the following round because it will take this time for subjects to assimilate the message from the other side and decide how to respond to it. Further, communications which are neutral or friendly in nature will not similarly incite aggressive action between opponents.

Based on previous research by ourselves and others, we offer the following hypothesis:

H₁: Hostile communications will result in the greater likelihood of adversaries engaging in hostile action, including going to war in subsequent rounds.

Alternatively, there may exist not relationship whatsoever between the tone of communications and subsequent actions. For example, from a realist perspective, the tone and content of messages should prove irrelevant to subsequent government actions; only relative power determines outcome. The actions or dispositions of individual leaders are of little consequence from within this theoretical paradigm. Leaders share the same security goals and similar states confronting similar crises and threats will be expected to behave in the same way, regardless of the personal feelings or responses of a given leader. This opposing hypothesis can be represented as follows:

H₂: The tone of messages remains unrelated to the likelihood of engaging in hostile action, including war, in subsequent rounds.

Military Spending

A long-standing debate in the literature in international relations questions the

relationship between military build-ups, in the forms of arms races, and the initiation of military hostilities such as war (Diehl, 1985; Diehl & Kingston, 1987; Fearon, 1994; Huth, Gelpi & Russett, 1993; Huth & Russett, 1993; Fearon, 1994; Richardson, 1960; Sample 1997, 1998; Wallace, 1979, 1982; Bueno de Mesquita, Morrow & Zorick, 1997). This debate had often taken the form of a contest between the spiral model and the deterrence model (Jervis, 1978) . The first inspires the analogy of the First World War, where sustained arms races led leaders to believe in the importance of pre-emption in war. In that case, a small spark set off a world wide conflagration which few of the participants could have imagined, and none would have wanted. This model supports the phenomenon of the security dilemma, whereby states defensively build up arms to respond to the build up of other states who they perceive to be hostile in intent. All start out with a defensive aim and yet all end up feeling less secure as the arms race escalates. States end up inadvertently bringing about the very conflict they sought to prevent by arming in the first place. If arms build-ups increase the likelihood for conflict to emerge because a small spark can lead to a wider conflict easily, then it follows that spending less money on weapons may ironically bring more security, rather than less, but providing less of an incentive to strike first in a conflict. Susan Sample (1997, 1998) has examined this phenomenon and found a strong and positive relationship between preceding military buildups and dispute escalation to war. Based on these insights, we test the following reverse hypothesis:

H₃: States which spend less money on arms will be less likely to engage in hostile action.

The second model summons the analogy of the Second World, where arms build-ups prevent aggression. When tyrants attempt to force appeasement on weaker nations, only the strong survive. Draw a line in the sand, and be able to back it up with force, and others will not

threaten you as a result. The key feature of arms build-ups in this model rests on the assumption that aggression can only be met and blocked by aggression. Appeasement only represents weakness, and such weakness will be exploited by other expansionist and aggressive countries in the system.

Several bodies of research appear to support this perspective as well. Andy Kydd (2000) reported that arms races do not necessarily increase the likelihood of war and may in fact reduce it by diminishing each side's uncertainty about relative power. Huth, Gelpi & Russett (1993) examined great power wars between 1815-1984 and found support for the deterrence model, but not the realist one. Huth, Gelpi & Russett (1993) also examined enduring rivalries since 1945 where challengers initiated militarized disputes. Here, they found support not only for the rational deterrence model based on relative power, but also for the rational conflict initiation model, based on domestic politics, and a cognitive psychological model which emphasized risk orientation and misperception. More recently, Stam & Reiter (1998) examined the relationship between democracy, war initiation and victory between 1816-1982 and found that democracies are indeed more likely to win the conflicts they initiate, as well as those where they are targeted. This finding holds even controlling for strategy, terrain, and capability.

Based on this deterrence model, we test the hypothesis:

H₄: States which spend more money on arms will be less likely to engage in hostile action.

We tested slightly different versions of these hypotheses in our earlier version of this experimental test (McDermott & Cowden, 2001). In that study, while we did not find a relationship between spending in one round increasing spending in sequential rounds past a certain point, we did find confirmation of the hypothesis that increased arms procurement

increased the likelihood of engaging in hostile action. Here we try a replication and further extension of our previous test but exploring the reverse side of the coin: if higher spending leads to more hostility, does less spending lead to less hostility?

Territorial Context

There has been some discussion in the international relations literature about the relationship between likelihood of success and the decision to go to war. While arguments which come out of the democratic peace literature suggest that democracies are more likely to win fights they enter (Stam & Reiter, 1998), there are various explanations as to why this might be the case. Is it because democracies only enter fights they can win? Or is it that democracies somehow possess some kind of institutionally greater capacity to fight and win once they decide to militarily enter a conflict?

As noted above, Stam & Reiter (1998) find the expected relationship between democracy, war and victory. In subsequent work, Reiter (1999) examined the precise relationship between military strategy and the initiation of conflict. He argued that military strategy does influence the outbreak of conflict. By examining cases of maneuver oriented military strategies, such as the German Blitzkrieg offensive strategy, Reiter finds that such strategies do in fact lead to more conflict prone actions by states. Reiter investigated cases of initiation and escalation of militarized interstate disputes between 1903-1992. He concluded that states with maneuver oriented military strategies proved significantly more likely to initiate disputes in general, although not necessarily disputes that escalated to force. However, once in a dispute, participants who possessed a maneuver oriented military strategy appeared significantly more likely to escalate those disputes to war if their opponents invoked a military strategy of attrition. For our

purposes, the territorially advantaged condition provides an experimental operationalization of a maneuver oriented military strategy.

This part of our experiment seeks to test whether decision makers are indeed affected by the likelihood of victory when deciding whether or not to escalate to war once in a conflict. In this test, we hypothesized that the likelihood of victory might affect such a decision:

H₅: Structural incentives to attack increase the likelihood of a decision maker deciding to engage in hostile action, while structural incentives which do not favor war will make decision makers less likely to engage in hostile action.

The alternative hypotheses assumes that there is no relationship between structural incentives, such as the probability of victory, and the likelihood to engage in war. Recall that again the democratic peace literature argues that tyrants and other types of authoritarian or totalitarian leaders appear more likely to go to war because they are not required to respond to the will of the people in the same way they would have to in a democracy. As a result, leaders who wanted to achieve certain goals and aims might not be affected by the likelihood of victory; they may simply pursue those aims which they desire the most, regardless of cost of possibility of loss. This hypothesis might be presented as follows:

H₆: Structural incentives to attack or not do not affect a leader's decisions about whether or not to engage in hostile action.

Methods

This study involves a crisis simulation game. The manipulations surrounding territorial context offered a genuinely experimental forum. The nature of communications between subjects and their level of military spending across rounds represents a quasi-experimental

format, as the interaction within the game reduces the amount of experimenter control over these elements as the game takes on a life and dynamic of its own as play evolves.

We believe that this process allowed us to examine the questions we sought to answer from within a controlled context which would reduce the number and severity of extraneous factors on the variables under investigation. Acknowledging that no single experiment can begin to address all these questions fully, we are building on our previously published experiments examining the effect of sex and uncertainty (McDermott & Cowden, 2001) and hostile communications and framing (McDermott, Cowden & Koopman, 2002) to cumulate some knowledge about decision making under conditions of conflict. This study represents one part of a larger research agenda which includes additional experiments which we have conducted, but not completely analyzed, examining other aspects of behavior in a crisis simulations game, including testosterone and cortisol levels, facial expression, and sex. While also recognizing that many criticize experiments for lacking an adequate degree of external validity, this study clearly engaged subjects in a meaningful way, maximizing experimental realism within the context of an internally valid study (McDermott, 2002a & b).

Subjects

This study involved 90 undergraduates who were students in various courses at Cornell University in the spring of 2001. There was no deception in this experiment and all participants signed informed consent forms. All participants' data was anonymous and confidential. All students volunteered for this experiment. Based on our prior experiments with this population, we sought an incentive which would sufficiently inspire students to take the experiment seriously. We did not have enough money to accomplish this goal with so rich a population. As

a result, we decided to offer course extra credit for student participation in this experiment. While no student's grade could ever be harmed by their refusal to participate, or their poor performance, students did receive more or less extra credit depending on how well they performed in the game. The total amount of extra credit possible never amounted to more than 3% of their total number of points in the courses in which they were enrolled. We obtained human subjects consent for this strategy, and no student ever complained.

Procedures

As noted, subjects participated in this experiment in one of three sets of dyads: male-male, female-female, and male-female. In addition, these pairs were assigned to one of two experimental conditions. In the territorially advantaged condition, the probability of winning if the person decided to go to war was manipulated in such a way as to provide a structural incentive to attack. In the territorially disadvantaged condition, the probability of winning if the person decided to go to war was manipulated in such a way as to provide an incentive to be cautious in attacking. In other words, in this condition, there exists no structural incentive to attack.

In this game, subjects were instructed to role play the leader of one of two fictitious countries who are in conflict over a newly discovered oil field on a disputed territory between them. In the territorially advantaged condition, the territory is essentially open desert, while in the territorially disadvantaged condition, the territory covers difficult and dangerous mountains. Subjects were given background information about the conflict, and instructed to resolve it. The way in which it was to be resolved was left up to the subjects. Performance in the game was determined by how many points each player accumulated in their social infrastructure account.

The number of points then translated into a certain number of extra credit points in their class. All subjects were aware of these rules prior to the initiation of play.

Subjects were given \$100,000 at the start of every round. A battalion cost \$10,000. During the course of the next six rounds of play, subjects had to make a set of decisions. Subjects were allowed about five minutes per round to make their decisions; this time limitation was imposed to help simulate the stress of real life crisis decision making. In their decision making, subjects were required to state how many military battalions they wanted to buy or eliminate. In addition, they had to make decisions about how much money to put into their social infrastructure at each round. They were told that if they did not put enough money into this infrastructure, they risked the possibility of a coup in their capital. If this happened, they would be forced to move at least one battalion of troops back from the front to protect the capital, and this battalion would then not be able to fight in any wars at the front. The probability of this coup was 10% if the person's infrastructure account fell below a certain threshold, and it did not occur during this experiment. Subjects could always buy more weapons with the money in their infrastructure account. They could also disarm weapons into money for the social account at a 50% discount rate, to account for the cost of decommissioning.

Subjects also had to take an action related to the conflict. They could do nothing, negotiate, make a threat, go to or continue war, or surrender. No subject ever surrendered. In addition, they filled out a questionnaire concerning their perception of their own and their opponent's level of aggressiveness, hostility, competitiveness and trustworthiness. At each round, they also wrote a message to their opponent. In these messages, they were supposed to tell their opponent about their level of military armaments. We allowed subjects to bluff within

certain established parameters. In other words, they were allowed to lie to their adversaries about how many weapons they had. They were not required to do so, but they were allowed to do so if they so desired.

If subjects decided to go to war, we had the battle outcome determined by the toss of fair die. Subjects were allowed to roll one die for each battalion they had placed at the front. If the die threw a six, they “won” the battle, which meant that this subject removed one battalion from the other side’s forces, and transferred 10,000 dollars from their opponent’s industrial infrastructure into their own. This was true for each six that was thrown. Likewise, their opponent was allowed to do the same, and they might lose battalions and money to the other side as well, depending on how many battalions their opponent had committed. If subjects chose to negotiate, they were allowed to divvy up additional resources from the profits of the new oil field as long as they would agree on the appropriate allocation between them. Therefore, this game had no dominant strategy for victory. A subject could accumulate the points necessary for obtaining the maximum amount of extra credit either through negotiation or going to war and being victorious. War involved some element of chance, but could be effective if subjects strategized carefully about how many battalions to commit in each condition.

At the end of six rounds, the game was terminated. Subjects were not aware of when the game would terminate in advance. Six subjects earned the maximum amount of extra credit possible. They were all women who negotiated throughout the crisis.

Measures

Subjects completed a number of measures at the end of each round which constituted our dependent measures of interest. At the end of each round, subjects filled out a form indicating

how many battalions they wanted to buy or sell, as well as how much money they wanted to place in their industrial infrastructure. They also took an action: do nothing, negotiate, in which case they often named an amount to split the oil money, make a threat, go to, or continue war, or surrender. As noted, no one ever surrendered. Subjects also wrote messages back and forth to one another. These messages were later coded by two people along eighteen different dimensions, the most important of which involved assessing whether the message was friendly, neutral or hostile. If the message was hostile, we also coded for whether the hostility was of a personal nature or not. Inter-rater reliability on the coding of 10% of the messages was over 85%. Finally, subjects filled out a questionnaire asking them to assess their own and their partner's level of hostility, competitiveness, aggression, and trustworthiness after each round. As noted, although subjects were required to tell their opponent about their level of military forces, they were allowed to bluff plus or minus 10%. They were not required to do so, but they were allowed to do so if they so desired.

Results

Based on our hypotheses, we propose a test of the following model:

where Y_{jt} is the propensity of dyad j to wage war at time t ; X_{1j} takes on the value of 1 if dyad j is in the territorially disadvantaged condition and 0 otherwise; X_{2j} takes on the value of 1 if dyad j is a mixed gender and 0 otherwise; X_{3j} takes on the value of 1 if dyad j is female and 0 otherwise; X_{4j} is communications measure, indexed both by j and by t , and increasing scores of which indicate accelerating verbal hostility; X_{5j} is the reported level of military spending within dyad j

at time t ; finally, u_{jt} is a random draw from a normal distribution. The lagging of the last two independent variables reflects that fact that, for any given dyad, an individual receives the communique and reported military spending of their opponent's for round t at its denouement.

Two problems of estimation need to be addressed before we proceed.. First, our measure of the propensity to wage war is bounded from above and below, ordered but discrete, and but 7 mutually exclusive and exhaustive categories. Under these conditions ordinary least squares may not possess any desirable small or large sample properties, thus making it a statistically questionable choice. An alternative is available. Given our assumption about the stochastic process governing the disturbance term, and provided that we are willing to make two small identification restrictions, we may characterize the relationship between our dependent and independent variables probabilistically. In the model of which we speak, the probability that the propensity to aggress assumes one of its mutually exclusive values is a curvilinear function of the independent variables and their associated parameter estimates, that function being the cumulative standard normal. Using Φ to characterize the cumulative normal and μ_{k-1} the cut-points that partition the distribution into the same number of categories (k) as the dependent variable, we may express the probabilities for each of the k values of Y as follows:

The second problem which merits our attention concerns the disturbance term. With experiments this component of the model often fails to draw much attention because random

assignment all but eliminates concern over its contents. By virtue of the fact that ours is a panel, however, we need to address the possibility that our units of observation are not independent of one another. Given the construction of the experiment and subsequent simulation, it is reasonable to assume that the observations from different dyads are independent of another: this avoids a problem which sometimes manifests in pooled time-series cross-sections from the real world. There is another problem that we cannot so easily dismiss. Conditional on the dyad, it would appear a safe bet to assume that the observations are correlated with one another. Under such circumstances the standard errors will not be correct on average or in the limit and thus need to be adjusted. It would be ideal if the appropriate correction could be made without one's having properly to specify the nature of the relationship between error terms of different time periods. Such is indeed possible with White's "sandwich" of the error covariance matrix, hence our employment of it.

The results of our analysis are presented in Table 1. The signs of the coefficients are in keeping with our prior expectations, and each of them is considerably larger than the associated panel-corrected standard error. All other things being equal, the consequence of moving from a territorially disadvantaged to a territorially advantaged condition produces a statistically significant increase in the probability that the dependent variable will assume its largest value: that associated with all-out war within the dyad. The lagged value of declared military spending also has a statistically significant effect on war-making: a dyad in which declared – not necessarily actual – military spending is at its peak is more likely to be at war than is a dyad in which military spending is at its nadir. Of particular concern to us is the consequence of communications, and here as well our initial hypothesis is borne out warmly. With an increase in

verbal hostility in the immediately preceding time period is a statistically significant jump in the prospect of all-out war.

– Insert Table 1 About Here –

While the signs of the coefficient are as they should be, and their magnitude sufficient given the size of the associated standard errors, the ultimate arbiter of substantive interest is not these quantities per se but the effect sizes of the various independent variables on the prospects for total war. While this is often a straightforward demonstration, there is in the case of ordered probit analysis the vexing fact that the relationship between the probabilities associated with all the categories of the dependent variable are conditional on the values taken by each and every independent variable in the model. To put the matter somewhat differently, for no single variable will there be but one effect. Because this is so even when all other variables are held constant at predetermined values, some care needs to be taken in the selection of illustrative examples. Little is learned by corraling the dramatic but atypical effect in the front row.

As our indicator of effect size we have chosen the so-called first-difference statistic. The procedure has its name because the probabilities that the dependent variable takes on each of its values are computed twice, once holding all of the independent variables constant at some fixed values, and then a second time holding all but one of those variables at the same value. The resulting “first difference” between these two sets of probabilities constitutes the effect size of the one variable that takes more than one value. In our view this measure has two things to recommend it. For one it has the virtue of wide application, having appeared in various sub-fields of political science and even across some branches of the social sciences. For another, it is easy to adjust the values at which other variables are held to be common, one mathematical

rendering being “central tendency.” By holding other variables at either their mean or the median, we can see how shifts across the range of the independent variable we are interested in effects change in the quantity $P(Y=k)$.

In Tables 2 and 3 we present two different sets of first difference analyses: in the first of these tables the first difference statistics are calculated by holding all variables other than the one of interest constant at their means; in the second of the tables, the same basic exercise is repeated, save that all variables but one are held constant at the medians. Because these two sets of results quite similar to one another, we will focus our attention on those contained in Table 2.

– Insert Table 2 and Table 3 About Here –

Moving from a territorially advantaged to a disadvantaged condition has a non-zero effect on the probabilities for each category of Y . Of particular interest is the consequent effect of a shift in terrain rewarding quick strikes to that smiling on defensive posture-taking on the probability of all-out war ($Y=7$). Holding other variables constant at their medians, such a shift has the effect of reducing an admittedly small probability to one that is effectively zero.

Reported levels of logged and lagged military spending exerts more substantively substantial leverage on the dependent variable. The probabilities associated with the first three categories of the dependent variable are dampened as a consequence of a shift across the range of the military spending variable: in the case of category 3, the reduction is profound, almost .16. For all other categories of the dependent variable the associated probabilities are increased as the result of shifts in logged and lagged reported military spending. Although to be sure none of these shifts enjoys the same magnitude as that observed for category 3, they are nonetheless impressive individually, and for the overall story they tell. Whatever their intent be deterrent or

aggressive, reports of military spending are destabilizing insofar as peace and negotiations are concerned.

No other variable in the model has the same bang for the buck as communications. When all other variables are held at their medians and lagged communications are at their most friendly, there is only a very small probability that the dependent variable will assume any of its highest three values, and a very high probability that the dependent variable will assume its lowest three values. And in the flip side of the coin, when all other variables are held constant at their medians, and lagged communications are at their most hostile, there is no effect probability that the dependent variable will take on either of its two lowest two values, and a very high probability – more than .65 – that a dyad will be in an absolute state of war. Huge shifts in the likelihood of war and peace are thereby effected merely by a change in the tone of communications.

Discussion and Conclusions

Our experiment provided confirmation of several of our initial hypotheses. First, the tone of messages affected the likelihood of decision makers engaging in hostile action. Specifically, subjects who received hostile messages were significantly more likely to make a threat or go to war during the subsequent round than subjects who received messages with either a neutral or friendly tone. Note that the causal impact of hostile rhetoric runs contrary to much of established international relations theory, even if it might appear obvious to career diplomats. This finding lays waste to the old childhood adage that, “Sticks and stones may break my bones, but names can never hurt me.” In fact, it appears that while force might in fact break bones and other valuable, words can hurt. Hostile words can indeed provoke the use of sticks and stones during

following rounds of play. The implication of this finding is clear: hostile words can take on a life of their own, perhaps beyond their speaker's intent. And they might precipitate a response that the speaker does not, in fact, want.

We suspect that the mechanism behind this phenomenon appear obvious from a psychological standpoint. Hostile messages, particularly those which seem personal in intent, make the recipient emotionally agitated. The person may experience anger, humiliation, resentment, and even fear. While oftentimes emotions serve us well as effective heuristics to speed the accuracy and efficiency of judgments and decisions, extreme emotions, particularly negative ones, might work in the opposition direction. Those who have been hurt often feel the desire to hurt back, and such hostile interchanges may require little ignition before starting a physical conflict.

Second, military spending was significantly related to the propensity to engage in hostile action during the following round. In particular, subjects whose partners declared military purchases did not increase substantially over time were less likely to engage in hostile action during the following round than those whose partners declared additional military spending. Recall that declared spending differs from actual spending in this experimental scenario. Declared spending is what one partner tells another that he or she possesses in military force. Because subjects were allowed to bluff, such declared values may differ from actual values by as much as 10%.

Interestingly, subjects often bluffed in a way which overestimated, rather than underestimated the number of battalions they possessed. This kind of saber rattling was clearly intended to frighten and threaten an adversary into submission by appearing to be stronger than

the leader was in reality. Given the results which indicated that less spending, rather than more, led to less hostile outcomes, such a strategy appears counter-productive in retrospect, as long as the analyst assumes that the player wanted to avoid conflict through such an overstatement.

Third, we found that condition exerted a significant effect as well. In other words, subjects placed in the territorially disadvantaged condition were significantly less likely to engage in hostile action than were those in the territorially advantaged condition. In other words, players' strategies were noticeably impacted by structural factors which increased or decreased the probability that victory would result from the initiation of conflict.

The findings of this study build on our previous work to confirm the relationship between military spending, and arms build-up and the likelihood of hostile action. This study also expands our earlier findings to demonstrate that context in the form of environmental constraints exerts a tremendous impact on the likelihood of engaging in hostile action as well. And finally, this work emphasized and highlights the importance of tone in triggering action. Mood reflects itself in this experiment in many ways; our interactions mirror our expressions. Nice produces nice, and hostile produces conflict. Just as a warm and receptive baby engenders more loving parenting than a irritable and rejecting child will, cooperative gestures will induce more cooperative responses than bullying will. Clearly, our results and findings suggest new ways to validate previous findings and offer new avenues to explore in future work.

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