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Reputation, History, and War*

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This article investigates the role of direct and reputational information in the onset of interstate war. Scholars have recently identified the importance of separating the phenomenon of conflict from the rare event of war. Building on earlier work concerning the role of reputation and history in the onset of militarized interstate, this article argues that states in crises face competing pressures brought on by their history of interactions with their opponents and their opponents' reputations generated through interactions with other states. While historical conflict reveals private information regarding the credibility of state demands, this history also generates constraints upon the ability of governments to seek peaceful resolutions to the current crisis. An empirical analysis supports the hypothesis that both a direct history of conflict within the dyad and reputational histories for conflict increase the likelihood of war onset. These results hold for a sample including all dyads 1817–2000 and a sample including politically relevant dyads in the same period. The results also suggest that contiguous states are more likely to go to war with each other, as are pairs of major powers, while democracies and pairs of minor powers are less likely to go to war with each other. These results support previous findings on the influence of these factors on the likelihood of war onset.

Introduction

The role of historical violence between nations in the incidence of militarized conflict is well established. The entire rivalry literature, for example, is built upon the premise that politics among nations should be studied as long

temporal relationships, where multiple conflicts cannot be considered independent from one another (see Diehl & Goertz, 2000).¹ More generally, Crescenzi & Enterline (2001) demonstrate that a history of violence between nations is a powerful predictor of future militarized disputes. The argument is fairly intuitive: interstate conflict leaves an indelible mark on the nations involved, and these

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¹ For a description of the rivalry literature and an explanation of the differences between existing measures and our approach, see Crescenzi & Enterline (2001: 410–412). For a broader review of the rivalry literature, see Diehl & Goertz (2000) and Colaresi & Thompson (2002).

memories influence foreign policy decision-making in times of crisis. Further, recent research indicates that indirect historical violence may also impact the likelihood of interstate conflict (Crescenzi, 2007). Together, these two streams of information place crises and crisis behavior in macro-relational and historical contexts.

In this article, we focus on the question of whether these contextual sources remain important when states decide to go to war. Historical and reputation contexts may be relevant when political crises turn violent, but this does not necessarily mean that these contexts are also relevant when states consider taking the more severe step of going to war. Do these factors permanently inhibit the ability of states to negotiate their way out of crises, or does the specter of war induce caution?

Our expectation is that the historical and reputation contexts have an important inflammatory impact on the decision to go to war. That is, when states engage in crisis behavior within a context rich with direct and indirect historical conflict, the onset of war is more likely. We test this hypothesis using semi-parametric hazard analysis on data for war onset covering all international dyads from 1817–2000, as well as a sample containing only politically relevant dyads (Maoz & Russett, 1993). Our results indicate that a direct history of conflict between a dyad increases the odds of war onset considerably. Additionally, the odds of war onset increase when either state within the dyad has a reputation for being conflict-prone.

Before we endeavor to convince the reader of these findings, we begin in the next section with a brief discussion of the key concepts of this study: war, the direct historical relationship, and reputation history. We then provide a theoretical discussion of the causal ties between behavioral context and war, in order to produce specific, testable hypotheses. Our research design section addresses the use of semi-parametric hazard models to conduct

the analysis, as well as some issues surrounding the use of models that compensate for selection effects (in this case, the selection effect of entering into a dispute). The analysis follows, along with a brief discussion of the results and remaining research tasks.

Concepts

There are three concepts that are fundamental to this research. The first is *war*, the phenomenon for which we seek a partial explanation. Most readers have an intuitive understanding of this rarest form of conflict, and the modern discourse on the phenomenon of war is mature and relatively uncontroversial (Wright, 1965; Small & Singer, 1982). Here, we are concerned with the factors that lead states to engage in wars generally, and we distinguish between war and the broader concepts of conflict, such as disputes and crises. Interstate war is a label reserved for historical events between at least two nations where militarized violence is sustained and severe enough to generate significant casualties.² We do not address the characteristics of severity, intensity, or duration of war in this article, although we hope to do so in future work.

The second concept requiring explanation is the notion of a direct, dyadic *behavioral history*. Here we borrow directly from Crescenzi & Enterline's (2001) dynamic conceptual model of interstate interaction. This model defines the behavioral historical relationship between two countries as an evolution of information involving change motivated by shocks and decay. Interstate interactions inform the historical relationship in both conflictual and cooperative directions, and the lack of interaction degrades this information over time. In the absence of activity, the behavioral history between two states is defined as neutrality. The occurrence of conflict shocks this relationship negatively, but

² The casualty threshold we use to identify wars, as distinct from other militarized disputes, is 1,000 battle-deaths (Small & Singer, 1982).

the effects of this shock diminish over time. Similar shocks can occur as a result of cooperation. Together, these shocks and the information decay process provide a behavioral historical context within which two states operate. For any given dyad of states A and B in the international system, Crescenzi & Enterline specify their interstate interaction model as follows:

$$i_{abt} = \left(e^{-\alpha \left(\frac{\text{Event temporal distance}_t}{\text{Event history}_{ab} + 1} \right)} \right) i_{t-1} - \beta_1 \left(\frac{\text{Degree of conflict}_{abt}}{\text{Conflict temporal distance}_{abt}} \right) + \beta_2 \left(\frac{\text{Degree of cooperation}_{abt}}{\text{Conflict temporal distance}_{abt}} \right) \quad (1)$$

where the first component governs the decay of historical information over time, and the second and third components govern the impact of new conflict and cooperation on the overall AB relationship. The rate of decay is shaped by the amount of time since the last event (inactivity accelerates decay) and the overall accumulation of events or history within the dyad (accumulation dampens decay). The conflict and cooperation shocks are weighted by the degree of each event (e.g. the severity or intensity of the event) as well as the amount of time since the last event. This equation is then bounded to the -1 to 1 range for ease of interpretation (where -1 indicates extreme conflict history, 0 indicates neutrality or a lack of history, and 1 indicates extreme cooperative history).³

The third major concept, *reputation history*, is the most subtle. Here we rely on Crescenzi's model of *reputation information* (2007). At the heart of this concept is the idea that states observe each other behaving outside their direct dyadic experience. For example, North Korea

observes the USA's behavior toward Iraq and uses this behavior to inform its direct dyadic relationship with the United States. In effect, Iraq serves as a proxy for North Korea, and there are as many proxies available as there are states in the system outside the immediate dyad. Some proxies are more useful than others, and this utility is driven by similarities between the principal and proxy (North Korea and Iraq) along dimensions such as power and interest. Thus, North Korea assembles reputation information about the United States that is both dynamic over time and specific to North Korea.

More generally, the *reputation information* (RI) model uses two streams of information to reflect the way states perceive the reputations of their enemies in times of crisis. The primary stream of information is the extra-dyadic behavior of one's enemy (using the example above, this would be the USA's behavior with states other than North Korea). This raw historical information is then weighted by a second set of information designed to maximize the role of good proxies in determining reputations. Specifically, the model uses information about power similarity and policy preferences to identify the best proxies for a state that is assessing its enemy. Thus, North Korea may find Iran and Iraq to be good proxies with which to learn about the reputation of the United States, but it may not glean much useful information from US behavior toward China (because China is so much more powerful than North Korea) or Canada (because Canada's policy preferences are so different from North Korea's).

The RI model aggregates all of the available extra-dyadic behavior for each directed-dyad-year, weights each stream of behavioral information using these proxy relevance dimensions, and generates a normalized score between -1 (a purely hostile reputation) and 1 (a fully cooperative reputation). While the true process of perceiving the reputation of one's enemies is undoubtedly more complex and nuanced than this, the *RI*

³ $\alpha \geq 0$ For a complete description of the *Interstate Interaction Model*, see Crescenzi & Enterline (2001).

model provides a transparent approximation of reality. For any given AB dyad, this discussion is stated formally in the following equation:

$$RI_{abN} = \frac{\sum_{c \neq a,b}^N \rho_{bc} \phi_{ac} \psi_{ac}}{N - 2} \quad (2)$$

where N is the size of the system

ρ_{bc} is the relationship between B and C ,
 $\rho_{bc} \in (-1, 1)$,

ϕ_{ac} is the policy similarity between A and
 C , $\phi_{ac} \in (-1, 1)$,

ψ_{ac} is the power similarity between A and
 C , $\psi_{ac} \in (0, 1)$.

The three variables in the model, ρ_{bc} , ϕ_{ac} , and ψ_{ac} , capture the extra-dyadic relationship and the qualities of policy and power similarity, respectively. Together, their product is the weighted information that A seeks regarding B 's extra-dyadic behavior. This product is calculated for every state C in the international system besides A and B . The products are then aggregated and normalized for system size. $RI_{abN} \in (-1, 1)$, where 1 indicates B 's extra-dyadic behavior is perfectly compatible with A , and -1 indicates perfect incompatibility. Normalizing in this fashion not only brings the aggregated products within the intuitive -1 to 1 range, it allows us to compare scores across different system sizes.

A more specific formulation of this reputation history is laid out in the research design section of this article. With these concepts in mind, we turn now to a discussion of how direct dyadic behavioral history and indirect reputation history inform states in their decision to engage in war.

Conflict, Learning, and the Inability to Commit to Peace

Whether historical and reputation contexts are especially salient to the onset of war is

the empirical focus of this research. While the notion of a direct history between states influencing war onset is well established (Thompson, 1995; Diehl & Goertz, 2000; Crescenzi & Enterline, 2001), the question of how reputation affects war is more controversial. On the one hand, Schelling (1966) galvanized the concept of manipulating one's own reputation to deter potential foes from using violence. Recently, however, Press (2005) has argued that policy/makers ignore historical reputation in favor of the immediate concerns of a crisis. We, of course, have a third perspective. In making the decision to go to war, states often must react quickly to unfolding events. To do so, they rely upon information obtained from prior interactions and extra-dyadic observation. This information provides a base of knowledge from which states draw when choosing strategies for confronting their adversary and anticipating reactions to those strategies. This line of argument is similar to Schelling, but we deviate from his position that a reputation for violence is needed to deter foes. Instead, we will argue below that violent reputations tend to signal problems of credibility that may exacerbate crises and make war more likely, not less.

We are primarily interested in how conflictual histories and reputations affect the propensity of states to resolve their disputes, either through peaceful means or war. It is not immediately obvious how the contexts of conflictual interactions and reputations translate into the willingness of states to pursue peace or initiate war. From a rationalist perspective, information about each disputing state's resolve, bargaining range, and reservation points is critical to explaining the peaceful or conflictual outcomes of dyadic interactions. While states are likely to gain useful information from observing one another's historical interactions and reputations, those reputation histories that

are marred by conflict create a commitment problem between dispute partners that overwhelms any informational benefits provided by dyadic and extra-dyadic histories of interaction. As we show below, a history of violence may, in fact, represent the inability of states to reliably commit to future peaceful interactions. We clarify this commitment problem by focusing on the way in which policymakers and their selectorates learn to prefer coercive interaction strategies over peaceful conflict resolution.

Information, Commitment Problems, and Dispute Outcomes

The bargaining and signaling literatures offer insights on the role of information availability and the potential for war initiation.⁴ The initial assumption is that war is costly for all combatants, and, given the opportunity, states would prefer to settle disputes peacefully on satisfactory terms, rather than invest their resources in a war of which they cannot know the outcome with certainty (Fearon, 1994, 1995; Schultz, 1998; Werner, 1999; Wagner, 2000). Information about each state's willingness to fight and its relative resolve to win is privately held. Furthermore, each state has an incentive to misrepresent this information in order to achieve more attractive settlement terms (Fearon, 1995). Thus, wars may result from these information asymmetries, even when potential settlements exist that both states would prefer to conflict.

From this perspective, gaining information on an opponent's willingness and resolve is essential to avoiding the costly gamble of war. It is here that rationalist explanations of

war often emphasize the importance of audience costs. When states come into dispute, information about one another's preference for settlement or war is gained as the dispute escalates into a public contest, creating audience costs for each crisis participant. The attention of an influential domestic audience can be costly to state leaders, as decision makers may be punished for failed foreign policy. In this sense, the willingness (or reluctance) of decisionmakers to risk greater audience costs by escalating a crisis provides critical information about each state's willingness and resolve to engage in war (Fearon, 1994). Thus, the more leverage domestic audiences have over the ability of decisionmakers to remain in office, the more informative (and costly) is the signal of crisis escalation.⁵

However, judging one another's sensitivity to audience costs is not the only way that states can learn about each other's otherwise private information. Dyadic interactions do not occur in a vacuum, but rather in the context of historical relationships. States accumulate valuable information about one another through previous interactions and by observing one another's relationships with extra-dyadic states. Learning from prior interactions with a particular state or observing its previous interactions with other states provides important information with regard to the state's military capabilities, the credibility of its diplomatic signaling, and its resilience in pursuing its goals through military confrontation. In this sense, behavioral and reputation histories may act as a source of information from which each state can gain a better understanding of one another's bargaining ranges and reservation points. This knowledge subsequently produces opportunities for achieving peaceful negotiated settlements, as states become more capable of making offers of

⁴ While we focus on research in the rational choice tradition here, this work is consistent with the broader literature on historical information and learning (e.g. Jervis, 1976; Dixon, 1983; Leng, 1983, 1988, 1993, 2000; Huth, 1988; Maoz, 1990, 1996; Neustadt & May, 1986). Jervis's work is an excellent backdrop to the *reputation information* model employed here, in that the *RI* model reflects that information is *diffuse* and *vicarious*, and the processing of that information (Jervis and others often label this as learning) is modeled separately from the actions taken once the information is processed.

⁵ By this intuition, democratic states are more capable of sending credible signals to their crisis partners, since they are more sensitive to their domestic audiences than are decisionmakers in autocratic states.

peaceful resolution that both prefer to war. Therefore, from a strictly information asymmetry perspective, observed behavioral and reputation histories may provide useful information from which states can draw in attempting to avoid the costly gamble of war.

However, as Powell (2006) argues, even in instances of perfect information, war may still occur. The fact that engaging in war is costly ensures that a bargaining range exists in which states can peacefully resolve their disputes, but war may still obtain as a result of the disputing parties' inability to *commit* to peace. This is especially evident in the case of prolonged conflict. Each party to a conflict may use the initial months or years of fighting to demonstrate its resolve in an effort to secure a preferred outcome. During this period, each side is likely to gain a substantial understanding of the other side's capabilities, resolve, and reservation point. However, some wars drag on for many years, leading to the conclusion that information asymmetries alone cannot explain a long war's persistence. Instead, it is each state's inability to credibly commit to peace that causes the long wars to endure.

A dyadic or extra-dyadic history of hostilities is congruent to Powell's account of prolonged conflict. When states have a long history of conflictual interactions, a great deal of information is revealed about each state's capability, resolve, and its willingness to employ violent interaction strategies. From an informational perspective, this wealth of knowledge should translate into a state's improved ability to settle a current dispute by proposing agreements that are acceptable to both parties, thus avoiding the costs of war. Yet, a conflictual history or reputation can itself be a roadblock to successful crisis resolution, creating pressures that make it extremely difficult for states to commit credibly to peace. This commitment problem created by historical conflict may overwhelm the aspects of information about prior conflicts that are conducive to peace.

We argue that, because histories of conflict make it difficult for states to commit credibly

to peace, prior hostilities should increase the likelihood of war initiation between states, despite the fact that they also reveal useful information conducive to settlement. To uncover the way in which historical conflict creates a commitment problem for states at the brink of war, we explain below the role of state policymakers and selectorates in creating pressures that make commitment to peace difficult.⁶

Policymakers

As states build hostile behavioral and reputation histories, policymakers in these states come to view one another as enemies. Histories that are characterized by conflict create contexts within which states learn to expect future confrontation, generating pressures to choose hostile interaction strategies. Leng (1983, 1988, 1993, 2000) provides support for this proposition by arguing that policymakers in states embroiled in a dispute are guided by *realpolitik* belief systems. In other words, states are driven by power and interest, and the goal of dispute bargaining is to win. The parties in dispute distrust one another's intentions, and they are thus skeptical of any potential commitment to peaceful resolution strategies on the part of their crisis partners. As a result, decisionmakers believe that coercive bargaining strategies are their best option in attempting to achieve a successful outcome to the pre-war bargaining process. Yet, these very strategies are those that are most likely to lead to war onset. Furthermore, belief systems determine the lessons that policymakers are likely to learn from past events. Since these *realpolitik* belief systems are highly resistant to change, policymakers learn to employ increas-

⁶ It is not our contention that the following discussion universally applies to all instances of war onset in the shadow of conflictual reputation histories. However, the following discussion helps to elaborate domestic mechanisms by which a commitment problem between competing states is likely to obtain. Therefore, the following discussion provides a more nuanced understanding of the working assumptions behind the hypotheses that are tested in the empirical results section.

ingly coercive bargaining strategies in future crises.⁷

Vasquez (1993) and Senese & Vasquez (2003) highlight a similar role for elites and decisionmakers in this process. They argue that wars result only after a prolonged history of hostility between states. Such a history of conflict increases the influence of hardline policymakers who promote assertive and confrontational policies directed at the other crisis participant. Additionally, crisis participants become increasingly distrustful of one another's intentions. This leads to a mutual perception within the dyad of a mounting threat, thus making war initiation more likely. From this perspective, the information inherent in each state's behavioral and reputation history does little to produce opportunities for achieving a peaceful negotiated settlement. Instead, this information contributes to the tension and hostility present in the dispute, further exacerbating the inability of the states to commit to a peaceful settlement process.

Colaresi (2004) identifies a more strategic motivation for the tendency of leaders to get locked into coercive bargaining. He finds that, within rivalries, leaders face new risks when cooperating with the other country. Leaders who demonstrate cooperation that is not reciprocated toward a rival face an increased probability of being removed from office. This result holds only for rivalries, meaning unreciprocated cooperation toward non-rivals goes unpunished. The implication from the research by these scholars is clear: histories of violence and rivalry push leaders toward violent foreign policies rather than deter them from conflict. But how can we

link these arguments to expectations about indirect reputations for violence? One way to think about this link is to ponder why it would be missing. That is, why would we expect policymakers to ignore extra-dyadic information that is otherwise similar to the histories that drive rivalry? The dimensions of trust, perception, and expectation that influence the choice of foreign policy strategies in times of crisis are all affected by information. Information about a potential enemy's reputation for violence should have a similar impact on these dimensions.

Selectorate

The second phenomenon through which historical conflict makes commitment to peace more difficult manifests itself among the selectorate, be they the general public in more democratic states or the ruling coalition in authoritarian states. Previous research has uncovered the tendency of state selectorates to unify their focus on an external enemy when faced with a threat to the state's security.⁸ In this sense, selectorates become more cohesive in their orientation to the outside threat. As they learn from the historical hostility of their dispute partner, selectorates will become increasingly averse to compromise and peaceful negotiation as a means for settling their differences. A history of disputes and violence, created by an external threat, challenges the selectorate's sense of national pride, strengthening its preference for military action. Compromise and negotiation, on the other hand, are likely to be viewed as conciliatory and weak. This aversion to peaceful negotiation among the selectorate then translates into further pressure upon decisionmakers to pursue ever more coercive crisis bargaining strategies. This increases the possibility that policymaking

⁷ More specifically, Leng holds that policymakers believe that international outcomes are a result of the policies that they employ. Policymakers thus learn to repeat successful policies in future crises while discarding unsuccessful policies in favor of other options. Consistent with this logic, he finds that crisis participants learn from prior interactions by repeating coercive strategies that were successful in past crises and adopting even more coercive strategies when previously employed coercive tactics were unsuccessful.

⁸ See Coser (1956) for a discussion of group dynamics with regard to external threats, and see Mueller (1970), Kernell (1978), and Brody (1984) for a related discussion of the link between external security threats and the 'rally around the flag' effect.

officials become 'locked in' to pursuing escalatory policies, as policymakers are obliged to satisfy the foreign policy interests of the selectorate in order to remain in office.⁹ Under such pressure, the ability of policymakers to commit to peaceful resolutions decreases. As a result, overtures for cooperative interactions are seen as lacking credibility by each state's dispute partner.

While histories of conflict between states may reveal useful information about capabilities and resolve, we argue that these histories also often lead to a commitment problem that overwhelms states' ability to reach a peaceful settlement, resulting in war. Specifically, policymaker learning and selectorate pressures in the context of historical conflict combine to make a credible commitment to peace more difficult. In this way, histories of conflict are both a sign of commitment problems in the past and a source of commitment problems in the present.

Under these circumstances, a cycle of coercion results. In the context of behavioral and reputation histories characterized by conflict, policymakers learn, from previous experience and extra-dyadic observation, to use increasingly coercive strategies in managing crises with their dispute partner. In addition, the selectorate's preference for coercion increases the pressure on policymakers to defend their national pride by using coercive methods. These pressures produce escalating levels of coercion that are increasingly likely to culminate in war, as states are increasingly unable to credibly commit to peaceful means of conflict resolution. This leads to our two primary hypotheses about the probability of dyadic war onset:

H1: War onset is more likely when states have a dyadic history of conflictual interactions with one another.

H2: War onset is more likely when states have conflictual extra-dyadic reputations with other nations similar to their dyadic partners.¹⁰

We now turn our discussion to research design and empirical tests of our hypotheses.

Research Design

In our basic analysis, we use a semi-parametric Cox event-history model. While other event-history models are available, the Cox model is a flexible and widely used option. The Cox model is useful because, like all duration models, it is competent at handling the occurrence of rare events (in this case, war), and it imposes very few restrictions in its estimation. It also provides an intuitive representation of the problem being studied: war onset is treated as a 'failure' in the data. The unit of analysis is the non-directed dyad-year.

We are aware that hazard analysis of war that is accomplished by using the Cox model is an imperfect research design for the question of war onset. Specifically, previous research (Crescenzi, 2007) has shown that both the key independent variables and the control variables have an impact on the onset of militarized disputes (a broader, less severe definition of conflict among nations). Without controlling for the factors that influence only the selection into the first stage of conflict (disputes), we run the risk of attributing these influences mistakenly or in overstated fashion to the onset of war. Previous studies (e.g. Reed 2000; Kinsella & Russett 2002) have used statistical techniques that account for the possibility that

⁹ See Bueno de Mesquita Siverson & Woller (1992) and Bueno de Mesquita & Siverson (1995) for a formal account of the relationship between the success or failure of a leader's foreign policy initiatives and her ability to remain in office.

¹⁰ It should be noted that these hypotheses are not intended to address the specific actions taken or strategies employed by crisis participants. In fact, states have alternatives within the conflict-cooperation dichotomy addressed here. While we note that these facets of the interaction process are important to an understanding of war onset, we reserve them for future research, believing that the analyses in the following pages provide a strong foundation upon which to address these more specific research questions.

war onset results are biased if the causes of war onset are related to the causes of militarized interstate dispute initiation.¹¹ However, the models used to address this possible selection bias have come under increasing criticism for their instability, and our own application of such models found no evidence of selection bias – a finding that is in line with the results of Senese & Vasquez's research on war (2003).

Data

We employ two different samples of the population of dyads in the international system. The first version includes all possible dyads, 1817–2000. The second sample is spatially limited and includes only politically-relevant dyads, 1817–2000. This sample allows us to investigate whether our results hold for the most politically active sample of dyads in the system. This two-pronged approach allows us to test the hypothesis that any given result is driven by dyad selection by political relevance and maximizes our ability to compare our results with those of other studies in the literature.

Dependent Variable

The dependent variable in our study is the initiation of an interstate war as measured in Maoz's Dyadic Militarized Interstate Dispute (v.1.1) dataset (1999). If a war begins between the members of the dyad in question in the year in question, this discrete variable takes on a value of 1. At all other times, its value is 0.¹² Wars are defined by the COW project as militarized conflict involving at least 1,000 military battle-deaths in a calendar year.

¹¹ The selection model used by Reed (2000) and Kinsella & Russett (2002) is designed to address problems associated with logistic regression, not event-history analyses such as the one estimated in Table 1. It is unknown to what extent selection problems affect the estimates produced by event-history analysis, and a new model that allows for event-history analysis with selection is only now being developed (see Boehmke, Morey & Shannon 2006).

Key Independent Variables

We are interested in two key independent variables: one to represent the concept of *reputation history* and a second to represent the concept of *direct behavioral history* within the dyad.

Reputation History

We operationalize the notion of *reputation history* using Crescenzi's (2007) *reputation information (RI)* model. This is a model in which states learn about their dyadic partners by observing their behavior outside of the dyad and by judging the relevance of that behavior to their own situation. Recall that the *RI* model incorporates three components to reflect the information available to states as they try to learn about their interaction partners:

$$RI_{abNt} = \frac{\sum_{c \neq a, b}^N \rho_{bct} \phi_{act} \psi_{act}}{N - 2} \quad (3)$$

The first component, ρ_{bct} is the historical relationship between *B* and *C* (a state outside of the *AB* dyad) at time *t*. We measure this component here using the *interstate interaction score (IIS)* (Crescenzi & Enterline, 2001), modified to include changes in joint IGO membership as an indicator of cooperative behavior.¹³ This measure quantifies the overall tenor of the relationship between *B* and *C*, incorporating information about both conflictual and cooperative past interactions. Because the behavioral information stream uses Crescenzi & Enterline's (2001) *IIS* model, this information is dynamic and allows reputations to be influenced by

¹² We drop dyad-years in which dyads continue to be at war, meaning that dyads are 'at risk' for the outbreak of war only when they are not already fighting. We also use the default EUGene setting of excluding 'joiner' dyads since joining wars after they begin can be voluntary or involuntary as coded (Bennett & Stam, 2005: 67).

¹³ See Crescenzi, Enterline & Long (2006) for a detailed description of the modified measure.

history.¹⁴ The *IIS* has a potential range of -1 (maximum historical hostility) to 1 (maximum historical cooperation) and an actual range of -0.94 to 0.42 . The second component, ψ_{acb} is the policy similarity between *A* and *C* at time *t*. This component speaks to the relevance of the interactions that *A* observes between *B* and *C*. We measure this using Signorino & Ritter's (1999) *S-similarity score*, which ranges from 1 (completely similar foreign policy portfolios) to -1 (completely opposite foreign policy portfolios).

The final component, ψ_{acv} is the power similarity between *A* and *C* at time *t*. This component also speaks to the relevance of the interactions that *A* observes between *B* and *C*. We measure this as $1 - |\text{CINC}_A - \text{CINC}_C|$, the result of which ranges from 0 to 1 , with 1 representing perfect power similarity and 0 representing perfect power dissimilarity. Thus, as *C* is more similar to *A* in terms of power, it is a more valuable source of information for *A*.

The product of these three components, controlling for system size, produces the *relational interdependence score (RISc)*¹⁵:

$$RISc_{ab} = \frac{\sum_{c \neq a,b}^N IIS_{bc} S_{ac} C_{ac}}{N - 2} \quad (4)$$

Updating occurs at every time period, which in this case is every year. Note that this score is directional, so we take the smaller of the two directional dyadic scores to represent the non-directional score for the dyad.

Direct Dyadic History

The second key independent variable of interest in this study is the *interstate interaction score*

¹⁴ Note that even though this model uses the *IIS* model, it is never representing the same dyadic information as the direct historical relationship discussed above. Specifically, the direct history for the *AB* dyad is while the *IIS* component of the reputation information model is i_{bc} .

¹⁵ For simplicity of presentation, we have removed the *t* subscript, indicating that the *RISc* score is updated at each time period.

(*IIS*), which operationalizes the concept of a direct dyadic behavioral history. This variable represents the overall tone of a dyadic relationship, here between *A* and *B*. Note that this is also a component in the *RISc* variable, but the *IIS* score used above represents the relationship between *B* and *C*, the extra-dyadic state. Since we also posit that the direct historical interactions between dyadic partners affect the probability of war onset, we must include a measure of their relationship that is separate from the *RISc* variable. As noted above, the *IIS* includes information about both past conflict and cooperation between the states in the dyad. Conflictual information is drawn from the Militarized Interstate Disputes dataset (Jones, Bremer & Singer, 1996) using a model that incorporates information about the frequency and hostility levels of militarized disputes, decaying over time towards zero influence. Cooperative information is drawn from data on changes in joint IGO membership derived from version 2.1 of the International Governmental Organization dataset (Pevehouse, Nordstrom & Warnke, N.d.).

Additional Independent Variables

A model that includes only these two independent variables runs the risk of attributing causality to variables that have no such influence or, equally dangerous, failing to show causality where it exists. Only in the context of a set of control variables widely accepted as causes of war onset can we parse out the individual effects of our key independent variables. We employ a set of controls representing some of the most widely confirmed results in the literature on the causes of war onset, which we describe briefly below.

Contiguity is measured here by *contiguous*, which is a discrete variable that takes a value of 1 if the states in the dyad have a COW contiguity level of less than 5 , meaning that they are contiguous by land or by up to 150 miles of water. If they are non-contiguous or contiguous by more than 150 miles of water, it takes a value of 0 . The

second and third control variables, *major power-major power* and *minor power-minor power*, represent the power relationship between the states in the dyad (following Senese & Vasquez 2003). If both have major-power status according to the Correlates of War project, *major-power-major power* takes a value of 1 (rather than 0), while, if both are minor powers, *minor power-minor power* equals 1 (rather than 0).¹⁶

The fourth control variable addresses the effects of regime type. The variable *polity_L* provides the minimum *polity* score within the dyad, and as such it represents the minimum level of domestic constraint present in the dyad (see Oneal, Russett & Berbaum 2003).¹⁷ We use the Polity IV data for this measure (Marshall & Jaggers, 2000). Finally, the variable *S-score* is the Signorino & Ritter (1999) *S*-similarity score representing foreign policy similarity. This variable controls for the possibility that direct foreign-policy similarities and the interactions that these similarities represent are correlated with war onset and behavioral and reputation history within the dyad.

Results

Cox Event-History Analysis

Table I presents the results of the Cox event-history analysis of three specifications of our model. In Model 1, we examine the impact of our two key independent variables on the probability of war onset for all possible dyads between 1817 and 2000. As we predicted, rep-

utation history (*RISc*) is negative and statistically significant at the 0.001 level, meaning that the onset of a war between *A* and *B* is more likely when *B* has hostile historical relationships with countries similar to *A*. War onset is less likely when *B* has cooperative historical relationships with countries similar to *A*. Also as we predicted, war onset is more likely when *A* and *B* have a direct history of hostile interactions, but less likely when they have a direct history of cooperative interactions. This finding is also highly significant (at the 0.001 level).

In Model 2, we estimate a more complete model specification that includes the control variables described above. If the apparent roles of extra-dyadic information, direct historical interactions, or their interaction are caused by other unmeasured but possibly correlated factors, the addition of these variables should remove the appearance of causality. Even controlling for contiguity, relative power, and the effect of regime type, our findings remain statistically significant and in the expected directions. Both of the key independent variables remain statistically significant, are of magnitudes similar to Model 1, and retain their expected signs.¹⁸

Turning back to the coefficients in Table I, it is clear that Model 2 also provides confirmation of much of the conventional wisdom regarding other causes of war. The results suggest that states that are contiguous are more likely to go to war with each other, as are pairs of major powers, while democracies and pairs of minor powers are less likely to go to war with each other. While our categorical power variables are not the only way to measure power relationships between

¹⁶ These categorical variables reflect the hypothesis that major powers have greater opportunities for conflict, given their wider spheres of interest. Major powers are also more likely to be capable of engaging in wars with distant opponents (Senese & Vasquez, 2003: 291). These measures share some conceptual ground with other measures of opportunity, but we believe that, because of the ability of major powers to project power over large distances, they are not identical to measures like *contiguity* (included as a separate variable here) or alternatives like great circle distance.

¹⁷ Note that the *polity* variable is the result of subtracting each state's *autoc* score from its *democ* score, a widely adopted but imperfect practice for scholars using the Polity data.

¹⁸ We tested the model for violations of the proportional hazards assumption using Schoenfeld residuals and found that, while several variables appear to violate the assumption, the *RISc* variable does not. When we interacted each variable with the natural log of the year variable and added those interactions to Model 2 individually, the model remained generally stable. While the addition of each interaction tended to inflate the coefficient for the original variable and sometimes change its significance or sign, the other variables in the model retained their sign, significance, and coefficient magnitude with very few exceptions.

Table 1. Cox Survival Analysis of Dispute Onset

Variable	1	2	3
	1817–2000 All dyads	1817–2000 All dyads	1817–2000 ¹ Politically relevant dyads
RISc	-11.13*** (1.81)	-12.88*** (1.37)	-11.57*** (1.39)
IIS	-3.90*** (0.32)	-2.35*** (0.30)	-2.06*** (0.27)
Contiguous		2.10*** (0.21)	1.22*** (0.22)
Major power-major power		1.07*** (0.31)	1.39*** (0.28)
Minor power-minor power		-1.88*** (0.19)	-0.45* (0.27)
PolityL		-0.01*** (0.002)	-0.01***
S-score	(0.0002)	-0.11 (0.37)	-0.44 (0.37)
N (failures)	634,374 (275)	615,040 (271)	84,675 (231)
Log likelihood	-2,152.4	-1,841.4	-1,361.9
χ^2 (Wald)	419.22***	1,147.46***	397.30***

Coefficients presented in log-relative hazard format.

Standard errors adjusted for clustering on dyad in parentheses.

***significant at the .001 level; **significant at the .01 level; *significant at the .1 level.

states, models using continuous measures of the dyadic power differential yield results similar to those presented here. Specifically, using the lagged log of the ratio of capabilities between the stronger and weaker states produces results for Models 2 and 3 that show the same signs and traditional levels of significance for all of the other variables except the *S-score*, which gains in its traditional level of significance in both models, and *contiguity*, which loses in its traditional level of significance but remains significant

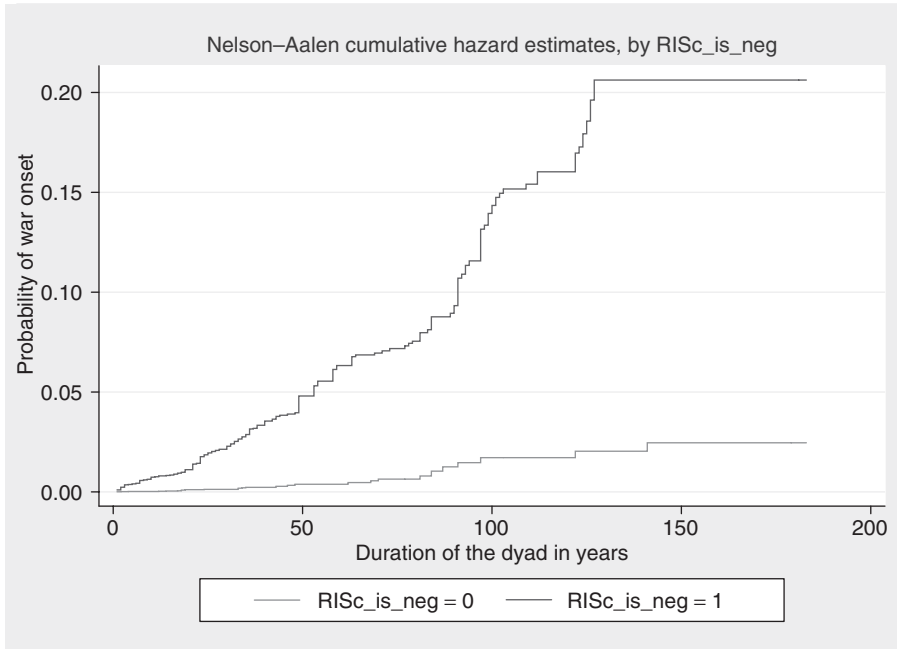
($p = 0.012$) in Model 3. In both models, the capability ratio measure has a negative sign and a significance of $p = 0.000$.¹⁹

Figure 1 provides a visual interpretation of the results in Model 2 of Table I as they pertain to the reputation history between states. Using a dummy variable that takes a value of 1 if the RISc score is negative and a value of 0 if the RISc score is not negative, it is possible to compare the shape of cumulative hazard function when the variable takes

¹⁹ We also ran Models 2 and 3 with our categorical power dummies and the CINC ratio measure to check for the robustness of the results. Model 2 remains largely the same, with most variables retaining their signs and traditional levels of significance (with only minor changes in the coefficients). The exception in Model 2 is the major-major categorical power dummy, which becomes insignificant when a CINC ratio measure is added. In Model 3,

the major-major categorical power dummy loses in its traditional level of significance ($p=0.014$) and minor-minor gains in its traditional level of significance ($p=0.000$), with the other variables remaining the same except for small changes in their coefficients (no changes in sign or traditional significance level). The CINC ratio measure itself is negative and highly significant ($p=0.000$) in both models.

Figure 1: Cumulative Hazard Estimates by Negative RISC Score Nelson–Aalen cumulative hazard estimates, by RISC_is_neg



these values. While we caution the reader against placing too much emphasis on the exact predicted hazards that come out of the Cox model,²⁰ the cumulative hazard function in Figure 1 shows that for cases when the reputation history is negative ($RISC_is_neg=1$), the cumulative hazard of war over time is significantly higher than the hazard for cases in which the reputation history is either zero or positive ($RISC_is_neg=0$). Overall, these results point us to the conclusion that a conflictual (negative) reputation within a dyad increases the likelihood that the pair of states will end up fighting a war.

Are these results a product of our sample selection (all possible dyads)? Some scholars

²⁰ It is important to remember that these predictions are based on the variables included in Model 2 and the data sample used in the research design. Changes to either dimension of the analysis can yield predictions that are quantitatively, but hopefully not qualitatively, different. As such, we suggest the reader view the information in Figure 1 as a rough qualitative statement.

have suggested that a more appropriate research design considers only cases in which dyads are politically relevant, or connected by proximity or major-power ties. This dramatically reduces the n available to researchers but may also reduce the risk of attributing peaceful relations to states that simply have no opportunity to engage in conflict, such as small powers separated by large geographic distances. As a robustness check, in Model 3, we re-estimate the full model using only politically relevant dyads (PRDs) as its sample of cases (Maoz & Russett, 1993). Our central results do not appear to be a result of sample selection, as they remain statistically significant and retain their expected signs. The use of PRDs has mild effects on our control variables, with democracy losing some statistical significance and joint minor-power status approaching insignificance, but these effects could be the result of the drop in observations

between Model 2 and Model 3 (from 615,040 to 85,675).

To test for the possibility that selection effects are biasing our results, we use two alternative models, but we do not present the results formally here. The first test uses separate GEE *logit* models for disputes and wars. The GEE model, predicting war, yields results that are very similar to those for the Cox regression shown here, and the results for disputes are consistent with our expectations and with existing theory. The second test examines a unified model of dispute and war onset, using the full information maximum likelihood (FIML) *probit* model with selection, and yields somewhat unusual results. Specifically, only regime type has any statistically significant effect in the stage predicting war. More importantly, however, the ρ value in the second model is insignificant, suggesting that a selection model is unnecessary in this case, although the accuracy of such test statistics in models containing similar variables in both phases has also been criticized (Brandt & Schneider, 2004). On balance, we believe that the GEE results, combined with the insignificance of the ρ value in the selection model, strongly suggest that the Cox model used here is appropriate.

Our results suggest that, as states learn from the behavior of their dyadic partner with other states similar to themselves, and as they interact with their dyadic partner directly over time, these interactions create pressures to enter into war, overriding any learning process conducive to peace. Historical interactions inside and outside of the dyad reveal important information about states' intentions, capabilities, and resolve. This information, however, seems to be overwhelmed by the influence of the commitment problem created by those same historical interactions. In the presence of historical conflict, elites learn to adopt more coercive policies and domestic constituencies equate compromise with policy failure, pre-

venting states from committing to a peaceful settlement.

Conclusion

The basic premise of this article is that states learn about their dyadic partners through observation and experience. We argue that states build behavioral and reputation histories over time, and these traits provide important information with regard to each state's tendency to resolve their disputes through peaceful or violent means. This information is particularly important during times of interstate crisis, as states must make educated decisions and respond promptly to crisis developments. We hold that states translate the information inherent in behavioral and reputation histories through a learning process that affects state behavior and consequently affects international outcomes.

The bargaining and signaling literatures (Fearon, 1994, 1995; Schultz, 1998; Werner, 1999; Wagner, 2000) give us reason to believe that behavioral and reputation histories characterized by conflict can, in fact, provide valuable information to states that helps them avoid crisis escalation and settle disputes peacefully. Since rationalist explanations emphasize the importance of informational asymmetries to explain war occurrence, one could argue that the information inherent in states' behavioral and reputation histories provides states with a better understanding of each other's preferences and reservations. Such knowledge may produce opportunities for crisis partners to find and agree to diplomatic solutions that both prefer to war, as behavioral and reputation histories reveal otherwise private information.

The possibility that historical interactions reveal information that can help states avoid conflict suggests that states can learn in a way that is conducive to peaceful interactions. Unfortunately, these effects appear to be overpowered by pressures that make it very

difficult for states to commit credibly to peace. Policymakers, guided by their realpolitik belief systems, increasingly influenced by political hardliners and pressured by progressively more belligerent selectorates, become increasingly likely to go to war as their behavioral and reputation history with their dyadic partner is increasingly defined by conflict.

Our results are consistent with this proposition. In each model of war onset, we find consistent and strongly significant evidence that as states' international behavioral and reputation histories of interstate interaction become increasingly characterized by hostility, the likelihood of war increases, lending strong support to our hypothesized relationship that conflict begets conflict. Although the informational benefits inherent in states' reputation histories may indeed allow crisis participants to gain a better understanding of one another's preferences and resolve, these benefits are not sufficiently strong to counteract the commitment problem that states with conflictual histories face.

Our findings also speak to practical issues of interstate negotiations and interactions in times of instability and crisis. While states and their policymakers may believe it fruitful to portray a resolute and coercive posture toward their dyadic crisis partners, as a means of achieving more attractive outcomes to their crises, our results indicate that such posturing significantly increases the likelihood that crisis participants will become embroiled in war, even when controlling for regime type. War is a costly gamble that most states would prefer to avoid, but our results suggest that, in the context of conflictual behavioral and reputation histories, they become reluctant participants in an upward spiral of escalation.

More broadly, our findings provide further support for the premise that states in the international system are relationally and temporally interdependent and that these effects, even outside of the dyad, can be salvaged from

the error term and measured and tested empirically. States engage in a process of observational and experiential learning, in which they observe the extra-dyadic reputation of and recall their dyadic historical interactions with their crisis partners. This learning process has real effects on international outcomes and need not be seen as an econometric problem in need of an econometric solution. Consistent with other recent work, these results demonstrate the utility of incorporating relational- and time-specific information into models of interstate behavior.

Many avenues for future research arise from these findings. War onset is but one facet of the conflict process to which an understanding of behavioral and reputation histories is likely to be relevant. In particular, issues of war duration and termination are pertinent areas of application, raising several research questions. Are warring dyads with increasingly conflictual histories more likely to experience wars of longer durations? Are third-party intermediaries essential to conflict resolution as a means of resolving the security dilemma? If so, how do the behavioral and reputation histories of third-party states, vis-à-vis the warring states, affect their mediation abilities?

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