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Journal of Peace Research, Vol. 35, No. 1 (Jan., 1998), 111-118.

Stable URL:
http://links.jstor.org/sici?sici=0022-3433%28199801%2935%3A1%3C111%3ARTARD%3E2.0.CO%3B2-4

Journal of Peace Research is currently published by Sage Publications, Ltd..

journal of peace RESEARCH

vol 35, no.1, 1998, pp. 111–118
Sage Publications (London, Thousand Oaks, CA and New Delhi)
[0022-3433(199801)35:1; 111–118; 003140]

Reconfiguring The Arms Race–War Debate

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A recent article by Susan Sample purports to resolve a debate that has generated a great deal of scholarly attention over the past two decades, whether arms races are associated with the escalation of militarized disputes to war. In response, we outline a research agenda designed to reconfigure the arms race–war debate rather than to perpetuate the controversy. We argue for better theoretical specification of the arms race–war relationship, and for empirical tests to sort out whether this relationship is direct, indirect, or spurious. We also advocate some methodological changes including more longitudinal studies, a broader spatial domain to include minor powers, less reliance on military expenditure data, and multivariate (rather than bivariate) tests of the arms race–war relationship.

The Arms Race–War Debate

A recent article by Susan Sample (1997a) purports to resolve a debate that has generated a great deal of scholarly attention over the past two decades, whether arms races are associated with the escalation of militarized disputes to war. This article makes a number of important contributions, not the least of which is that competing claims are tested against one another, multiple data sources and indices are employed, and critiques of the original work by Wallace (1979) are assessed. Furthermore, Sample's conclusions that arms races have a modest,[1] positive, and significant association with dispute escalation appear to be a solid and defensible middle ground between Wallace's unreplicated findings of arms races as virtual sufficient conditions for dispute escalation and those of some critics (e.g. Diehl, 1983) who find no significant association.

Although Sample's findings are valuable, especially with respect to putting to rest some of the methodological debates concerning the validity of Wallace's initial findings, they by no means resolve the overall debate on the arms race–war relationship. Just as stimulating as Wallace's work was in attracting scholarly attention, it has been just as stifling with respect to original work on arms races and war. Much of the debate has been centered on Wallace's cases, his indices, and other methodological concerns. Even if we can conclude with Sample that there is indeed a significant bivariate association between arms races and dispute escalation, a multitude of unanswered questions remain, such as: Is the arms race–war connection meaningful or spurious? How strong are the effects of arms races vis-a-vis the traditional correlates of war, such as power distributions or territorial issues? Can the findings on

[1] We characterize the relationships as modest given the low π coefficients and recognize that most of the strength of the Q coefficient and indeed the significance of the χ^2 statistic are attributable to a skewed distribution of cases, especially in the 'no arms race, no war' categories. We are especially hesitant to make strong inferences about any relationship that depends so heavily on cases in which the treatment and the predicted outcome are absent (as opposed to more 'positively' associated cases).

dispute escalation be generalized to broader patterns of international conflict?

Rather than offer another in a series of primarily methodological critiques (Altfeld, 1983; Weede, 1980), we hope to provide a more productive response. Outlined below is a research agenda designed to reconfigure the arms race–war debate rather than to perpetuate the controversy. In effect, we offer a proactive response to move the arena of arms race studies forward and to promote better integration with broader studies of war and peace. Our agenda includes theoretical as well as research design issues.

The Need for Theory

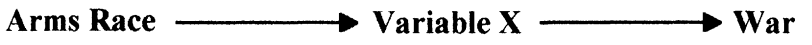
Little of the debate over the arms race–war relationship has been fought on theoretical grounds. For all the attention given this subject, very few of the authors since Richardson (1960) have developed a well-articulated theoretical argument that directly connects arms races with war in a causal fashion. Even if arms races are correlated with dispute escalation, we do not necessarily know *why* they are associated and whether the relationship is at all meaningful. Three different causal structures might define the linkage between arms races and war. The first is that the structure of the relationship between arms races and war is direct as well as causal. This appears to be the claim being made by Wallace (1979) and Sample (1997a). A second possible structure is an indirect and causal association. Third, the structure of this relationship between arms races and war may be spurious and therefore non-causal. The inferences from empirical research vary significantly across these three possible causal structures.

If there is a theoretical basis for assuming a direct relationship, it may derive from the spiral model of Jervis (1976), or from the action-reaction models of Richardson (1960). Some of those approaches have been applied, in part, to arms race studies (Sample, 1996). Generally, a social-psychological effect is postulated: decision makers in an arms race trust their opponents less, and as a result they are more likely to feel a preemptive urge, or they are more likely to perceive that a war is inevitable. As a result, decision makers are less likely to initiate, seek, or accept conciliatory actions in crises and therefore arms races undermine the possibility of peaceful outcomes. The arms race–war literature rarely articulates these ideas clearly and never tests them directly, recognizing that such cognitive explanations, as with misperception studies in general, are difficult to test empirically.

A well-developed body of deterrence theory may also connect arms races directly to war. Yet, other than political polemics, the application of deterrence theory has been largely absent from this scholarly debate (exceptions are Weede, 1980; and Wallace, 1981). Deterrence theory has only been crudely applied to the arms race–war question – e.g. simple propositions that arms races lead to war or they lead to peace – with none of the nuances of deterrence theory. Furthermore, following Wallace's lead, the research on arms races and war has concentrated on dispute escalation. That a militarized dispute has already occurred, in itself indicates a failure of general deterrence; arms races seem less relevant to immediate deterrence. Following Wallace's findings, scholars seem to assume that the arms race–war relationship would be positive. Little attention has been given to the opposite possibility of a negative relationship.

In existing work, theorizing a direct causal relationship between arms races and wars, the specification of the relationship is too weak or tenuous to warrant exclusive empirical focus. Yet, even with a strong, lucid argument that directly links the arms race as a causal factor for war, the remaining two possibilities need to be addressed. A second theoretical possibility is that arms races

Figure 1. A Third Factor as an Intervening Variable

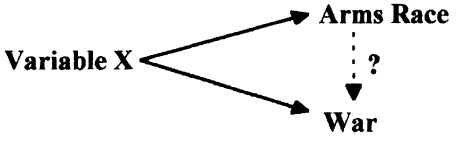


influence the outbreak of war indirectly by affecting a given variable that in turns leads to war, as illustrated in Figure 1.

The identity of the key intervening variable is clearly a product of the underlying theoretical logic. One possibility is the power distribution, which is most affected in the short run by changes in military capabilities through rapid acquisition of arms (e.g. arms races). Arms races mary precipitate a change in the power distribution between enemies (Diehl, 1985; Werner & Kugler, 1996). Rarely are arms races considered part of broader theoretical approaches that may specify an indirect relationship.

A third theoretical possibility is that the positive correlation between arms races and war is spurious, much as is the connection between ice cream sales and violent crimes, which are both products of hot weather (Figure 2).

Figure 2. A Third Factor as a Joint Cause



One of the most obvious specifications of a spurious relationship involves enduring rivalries. Arms races are more likely in the context of enduring rivalries (Goertz & Diehl, 1993). Both war in general and the likelihood of escalation in individual disputes are greater during enduring rivalries than in other conflict contexts (Goertz & Diehl, 1992). One hypothesis that emerges from this premise is that arms races and violent conflict are both manifestations of the enduring rivalries and thus not directly related to each other. This proposition is consistent with Sample (1997a) finding a large number of 'no arms race, no war' cases and with Horn (1987) reporting that longer arms races are associated with war. Enduring rivalry disputes may be inherently more prone to escalate than those earlier in the rivalry sequence (Hensel, 1996). Indeed, Sample reports that 'early' disputes between a given pair of states are unlikely to escalate even in the presence of arms races (1997a: 16).

As a preliminary investigation, we reexamined Sample's data (1997a: appendix B) to see whether arms races and dispute escalation occurred primarily within enduring rivalries.[2] By disaggregating the data into two groups – cases that are enduring rivalries, and cases that are not enduring rivalries – we found that evidence for a modest, positive, and statistically significant relationship between arms races and wars is largely confined to the enduring rivalry cases. Using an updated index of arms races (Diehl, 1983), we find that enduring rivalries yield a stronger and more highly statistically significant relationship (Yule's Q is 0.75, χ^2 is 9.44, $p <$ 0.002, and π is 0.25) than non-enduring rivalries (Yule's Q is 0.46, χ^2 is 3.98, $p <$ 0.046, and π is 0.19). Turning to the Horn (1987) index of arms races, this disparity becomes even more exaggerated. The enduring rivalry cases yield very strong results (Yule's

[2] For a list of enduring rivalries, we use the latest compilation of Goertz & Diehl, (http://wsi.cso.uiuc.edu/polisci/faculty/diehl/er.html) numbering 63 enduring rivalries overall and 11 major-major rivalries; enduring rivalries are those that involve six or more militarized disputes between the same pair of states over thea period at least 20 years. Note that this is a more restrictive definition than used in the original Diehl (1983) study, which had only a three-dispute minimum and no time limitation.

Q is 0.91, χ^2 is 25.95, $p < 0.000$, and π is 0.42); while non-enduring rivalry cases show a weak and statistically insignificant relationship (Yule's Q is 0.29, χ^2 is 1.29, $p < 0.255$, and χ is 0.11). Furthermore, all but one of the arms race–war cases among the non-enduring rivalries were so-called contagion cases, in which the rivals joined an ongoing war between two or more major powers, further undermining the causal connection between arms races and war in this context (Vasquez, 1996). In contrast, most of the arms race–war cases among enduring rivalries involved the initial outbreakof war between the two rival major powers.[3]

Clearly, the presence or absence of an enduring rivalry has a dramatic impact on whether or not arms races and dispute escalation are correlated. Several plausible, but competing, conclusions may be inferred from these results. One is that the relationship between arms races and wars is completely spurious, with enduring rivalries causing both phenomena. Another is that an interactive effect ensures that arms races remain important causal factors of war, but only in the presence of enduring rivalries. A third is that arms races have a causal effect on dispute escalation, but arms races truly only occur in enduring rivalry contexts (Goertz & Diehl, 1993) and that military buildups in other contexts are probably misclassified as arms races and only confound empirical results when included in analyses.

Whatever the 'true' relationship is between arms races and war, we will never uncover it without explicit theoretical grounding. A future research agenda should include specific theoretical models that link arms races and war. Different models of arms races and war must also be tested against one another to sort out competing explanations.

[3] For the analysis of contagion, we look here to the first outbreak of war between major powers, the object of study in arms race studies; this is a much looser standard, and one more favorable to Sample and other authors, than considering the outbreak of war between any two states. Based on this criteria, USA–Japan (1941) was the only clearly non-contagion case in the arms race–war category among non-enduring rivalries.

An Improved Research Design

We have criticized the arms race–war debate for being primarily fought on methodological grounds; yet such concerns are not unimportant. Rather, issues of research design must be subordinate to broader theoretical concerns. Some fundamental changes are needed in order to sort out competing theoretical positions and perform valid tests of derivative propositions. We outline an incomplete list of these methodological issues below.

Longitudinal Studies

One of the key problems with the original Wallace (1979) research design, and one duplicated by all his critics, has been to focus just on dispute escalation and therefore select only cases in which a dispute has already occurred. Such a cross-sectional design with an inherent bias toward conflictual actions prevents scholars from identifying instances in which arms races help deter the onset of militarized violence. The prior presence of conflict in all the cases examined creates a risk of introducing a kind of selection bias. King et al. argue that 'any selection rule correlated with the dependent variable attenuates estimates of causal effects on average' (King et al., 1994: 130). The selection rule to look only at cases in which a dispute has occurred also limits the kinds of questions that can be asked about arms races and war. We are unable to assess the role arms races may play in the onset, termination, and reoccurrence of violent conflict.

In order to address these concerns, we advocate the adoption of more longitudinal studies of arms races (Sample, 1997a, provides an example when she introduces lags in

her measure of arms races) to replace the static and cross-sectional designs of Wallace and his successors. One way would be to select arms races as the unit of analysis and trace whether conflicts arise, reoccur, escalate, and terminate over time and under what conditions. Yet this poses several problems from a design point of view. If most arms races lead to war (which is yet to be demonstrated), there is little variation on the relevant dependent variable. Furthermore, without any control groups of conflicts that occur irrespective of arms races, we cannot draw valid conclusions about the unique effects of arms races.

A better approach in our view is to focus on rivalries or protracted conflicts (Goertz & Diehl, 1995). These present the opportunity to look at the same pair of states over time; we can then determine when arms races might deter the onset or escalation of militarized disputes. In this design, there are natural control groups present: one can compare periods of the rivalry with and without militarized conflict (or escalation) and usually with and without arms races; furthermore, most of the other characteristics of the rivals are held constant across time, allowing scholars to detect the effects (if any) of arms races more precisely. Looking at rivalries or protracted conflicts also helps detect potential spurious associations. For example, most analysts (e.g. Lambelet, 1974) argue that the Anglo-German arms race informally ends in 1912; a cross-sectional analysis using lagged data may improperly link armsraces to the outbreak of war two years later in 1914. A longitudinal perspective provides a fairer test of a broader range of propositions about arms races and war.

A Broader Spatial Domain

A second research design limitation is that the arms race–war debate focused exclusively on major power conflict. There is no reason why the logic should not apply equally well to minor power conflict. There are also several benefits to expanding the domain of cases to all types of conflict. Looking at minor power conflict greatly expands the number of cases, and thereby considerably lessens the likelihood that the results will be contaminated by contagion or controversial war dyad cases from the two world wars. Indeed, much of the previous debate centered on whether those cases should be included in the analysis or not. Second, including minor powers will allow better consideration of nuclear deterrence concerns and permit assessment of whether arms races involving nuclear weapons are less dangerous than other arms races or even pacifying. After 1945, an exclusive focus on major powers leaves few cases in which one or both of the disputants did not possess nuclear weapons.

Third, a broader spatial domain allows consideration of major-minor arms races. This set of cases presents some intriguing questions given that arms races in this context will rarely be designed to alter the prevailing power distribution dramatically, and such cases may provide a basis for identifying the existence and conditions surrounding minimum deterrence requirements. Such concerns are not easily addressed with an exclusive focus on major powers.

Including minor power arms races in the domain of study is not without complications. It may be necessary to incorporate arms transfers into the equation rather than relying only on indicators of indigenous military expansion. Minor powers may also be just as likely to increase their arms for internal security reasons as for external ones, thereby confounding the detection and effects of an external arms race. Nevertheless, these measurement problems are outweighed by the theoretical benefits that may be derived from including minor powers in the analysis.

Breaking the Reliance on Military Expenditure Data

Traditionally, arms races have been measured by reference to abnormal increases in military expenditures. Yet, empirical findings can be significantly altered by changes in the basic military expenditure data from one version of the data set to the next. As Sample (1997a: note 1) indicates, what Diehl (1983, 1985) reports as an insignificant relationship becomes significant when she uses updates on Soviet and Japanese military expenditure data for the 1930s. There is serious doubt now on whether the Correlates of War Project capability data should be used to make the kind of nuanced distinctions in high versus medium level increases in military expenditures that are the cornerstone of most arms race indices.[4] It is often difficult to get the necessary data on military expenditures, and the validity of precise estimates is further open to question when those data must be converted to a common currency or adjusted through power purchasing ratios in the case of non-convertible home currencies.

An analysis of arms races might be better conducted with an analysis of weapons stockpiles (see Ward, 1984 for an example) or military personnel as is appropriate. Because states are threatened by actual arms rather than arms budgets, this would allow greater validity in measurement and allow the analyst to detect weapons-specific arms races (e.g. Dreadnoughts or MIRVs) masked in the aggregate military expenditure totals. Moving to weapons stockpiles or personnel may still leave some data problems, but relying on military expenditure alone will further center the debate on unreliable data rather than on broader theoretical concerns.

Multivariate Models

A final methodological item on the reconfigured research agenda is a logical corollary to the plea for more theory: the arms race–war relationship must be tested in multivariate analyses. Too many previous studies have only looked at bivariate associations between the key variables. Arms race studies must now catch-up with the rest of the international conflict field and recognize that no single variable (arms races or otherwise) is likely to explain all wars. Without expanding our empirical investigations as such, we run the risk of almost certainly introducing omitted variable bias (King et al., 1994) into our research designs: The failure to 'explicitly and *simultaneously* control for all relevant variables' (King et al., 1994: 172) leads to biased inferences from our empirical work.

Multivariate models serve several purposes. They are essential in testing propositions that specify an indirect relationship between arms races and war. Without multivariate analysis we can only empirically investigate the first of the three possible causal structures discussed in the previous section. Second, including other variables as controls may be necessary in order to assess whether the alleged positive relationship between arms races and war remains or disappears. Third, including other factors in the model permits an assessment of the relative strength of the arms race variable in predicting war, thereby allowing us to understand the 'substantive' as well as the 'statistical' significance of the impact of arms races on wars.

Sample (1997a: 15) largely agrees with the need for multivariate analyses. Indeed, in a follow-up study (Sample, 1997b), she includes previous disputes, conflict issues, various indicators of capabilities and changes in that capability distribution, defense burdens, and the presence of nuclear weapons as well as arms races in a predictive model of dispute escalation.[5] Morrow (1989) provides still another

[4] We are grateful to Stuart Bremer for first making this point.

[5] Importantly, she still finds the arms race variable to have a significant positive effect on dispute escalation, even in the presence of these other variables.

candidate for inclusion in multivariate models of the arms race–war relationship: the risk attitudes of the two states involved.

Conclusion

The debate over the impact of arms races on war has been narrowly drawn over the past twenty years, confounded largely by controversies over case selection and data. Susan Sample (1997a) has lain to rest much of that debate with her analysis, but the larger questions about arms races and war remain. Answering them will require breaking the mold of past studies and reconfiguring the debate along more theoretical lines and testing competing ideas with improved methodological rigor. The agenda we set forth here calls for explicit theory building on when and how arms races may cause wars, to be followed by empirical tests that have more potential than basic bivariate tests to evaluate the plausibility of the derived theoretical implications. The agenda also calls for these empirical tests to be conducted on broader (spatially as well as temporally) sets of cases with more appropriate units of analysis. Only through this three-dimensional tack – theory, data, and method – can we hope to gain purchase on Sample's goal of resolving the debate on the causal relationship between arms races and wars.

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