

## **BACKGROUND CONDITIONS TO THE OUTBREAK OF THE FIRST WORLD WAR**

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This paper focuses on a comparative analysis of the attributes and capabilities of the major European states between the years 1870-1914. When war broke out in the summer of 1914 it was largely unexpected. The bipolarization of Europe into opposing camps—the Triple Entente and the Triple Alliance—had been conceived mainly as a precautionary diplomatic measure. Indeed, the prevailing sentiment in some circles was that current conditions and relations between states could not have been better.

In the space of six weeks, however, a seemingly localized dispute in the Balkans grew into a full-fledged European conflict, and over succeeding years the greater part of the world became involved. When fighting finally came to an end in 1918, the Austro-Hungarian monarchy was in dissolution, the Kaiser's Germany was on the point of collapse, and the whole world stood at a turning point.

The investigations described below are part of a larger study designed to identify and determine the dynamics involved in the outbreak of World War I. This paper is presented as a tentative first report. There are many more analyses to be done with the data.

Our intent is not to improve upon the historical accounts of a period which has been ably investigated by distinguished historians such as Sidney Fay and Luigi Albertini, nor to reopen old controversies about national responsibility and war guilt. Rather, the purpose is to focus on dimensions of inter-state behavior that have as yet not been fully examined.

Underlying the analysis is the assumption that World War I was not, in fact, an isolated incident but part of a long-range struggle and competition of Powers, and that these dynamics have meaning for the latter half—as well as for the opening decades—of the twentieth century. Among the many current explanations and assumptions with respect to war, its conditions and its causes, none is wholly adequate, yet none wholly irrelevant. The problem is to develop a model, and in the long run an adequate theory, to correlate individual behavior, nation state behavior, broad international affairs and environmental considerations in terms of their relevance to war. This paper is concerned with one aspect of inter-state behavior: some major sources of dissatisfaction and tension among nations in the system and the relationship of these sources to changes in each nation's military budget.

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## THE DYNAMICS OF INTERNATIONAL BEHAVIOR

States differ in their characteristics and capabilities, and similarly they differ in goal orientation and definition of their environments. Undoubtedly, the behavior of a state will be influenced to some considerable degree by its position in the world's configuration of power and by its role in the international system. The role of a state is defined in terms of the points of contact between the activities of that state and the activities of other states in the system. A Great Power expects—and is expected—to behave in some ways and not in others.

Generally, theorists of international politics focus on national capabilities as the most significant variables differentiating states<sup>1</sup>. Balance-of-power theorists suggest that the distribution of capabilities has an impact on the stability of the system<sup>2</sup>. A sharp increase or decrease in the power of any critical member leads to dissatisfaction and instability<sup>3</sup>. On the other hand, scholars emphasizing the hierarchical ordering of states argue that any attempt to alter the prevailing structure is likely to result in conflict. It is suggested that the dominant Power tends to be satisfied; that the challenger nations are the powerful and dissatisfied; that a rapid rise in power produces dissatisfaction in itself; and that the major wars are most likely to break out when there is an approaching balance between the dominant nation and a major challenger<sup>4</sup>. These assertions require one major qualification: the dominant Power may be expected to suffer dissatisfaction to the extent that it perceives itself being challenged, overtaken or threatened by another Power. Such perceptions are likely to become more salient if the dominant and challenging nations are members of opposing alliances.

States do not "stand still" relative to each other. Their major dimensions—area, population, national income, trade, level of technology and so forth—tend to be variable and to change differentially. Comparatively, dimension by dimension, some states are likely to be growing along a particular dimension, others—relatively, if not absolutely—declining, and these changes tend to keep the international system in a condition of perpetual alteration and adjustment. Differential changes in population, area, technological growth and military capability are likely candidates for influencing the power configuration

<sup>1</sup> For helpful comments and criticism we would like to thank John O. Field, Rod Fraser, Jeffrey Milstein, Gordon Sparks, Richard Van Loon and George Woodworth.

<sup>2</sup> Karl W. Deutsch, "Toward an Inventory of Basic Trends and Patterns in Comparative and International Politics," *American Political Science Review*, LIV (1960), pp. 34-57; Rudolph J. Rummel, Research Reports, Dimensionality of Nations Project, Department of Political Science, University of Hawaii; Bruce M. Russett *et al.*, *World Handbook of Political and Social Indicators* (New Haven: Yale University Press, 1964); Quincy Wright, *A Study of War* (Chicago: University of Chicago Press, 1942). These are only a few of an increasing number of studies focussing on indicators of national capability.

<sup>3</sup> See Morton A. Kaplan, *Systems and Process in International Politics* (New York: John Wiley and Sons, Inc., 1957); John H. Herz, "Balance System and Balance Policies in a Nuclear and Bipolar Age," *Journal of International Affairs* (1960), pp. 35-48; Kenneth N. Waltz, *Man, The State and War: A Theoretical Analysis* (New York: Columbia University Press, 1959), among others.

<sup>4</sup> A. F. K. Organski, *World Politics* (New York: Alfred A. Knof, 1958), pp. 320-328.

and balance in the international system. Relationships between Great Britain and Germany prior to World War I seem to be illustrative of these tendencies.

During the latter part of the nineteenth and the first decade of the twentieth centuries, Great Britain—for some time the strongest of the Great Powers—expected to protect this status by every means at its disposal. Germany, growing rapidly in science, technology, production, commerce and military capability, was determined to challenge and overtake the British. The crystallization of Europe into two opposing groups—the Triple Entente and the Triple Alliance—served as a reinforcing mechanism for the ongoing competition.

In this paper we postulate and seek partially to demonstrate that differing attributes and capabilities among states contribute in fundamental ways to dissatisfaction and tension among national leaders (and sometimes, also, the populace). Such dissatisfactions and tensions—often rendered salient by conflicts in objectives, goals, or values—in turn, affect national purposes and goals and are important factors in the making of national policy and the shaping of national behavior.

In defining goals—the preferred and pursued, but as yet unattained, state of affairs—national leaders are likely to compare: (1) the current conditions of their respective nations with those of other nations, especially the nearest rival—if one exists; (2) their current condition with possible future conditions; (3) their actual status and achievements with the status and achievements ascribed or attributed to them by other nations in the system; and, sometimes at least, (4) their current condition with memories of a “better” past. These four conscious or unconscious comparisons act as sources of dissatisfaction and of tension which, when exceeding a certain threshold, are likely to stimulate aggressive activity and conflict—perhaps head-on collision—with other nations.

Whatever the sources, we may expect increments of dissatisfaction or tension to impel the selection by national leaders of some activity or set of activities calculated to alter the environment to one degree or another and thus to reduce or eliminate the discrepancy (or their perception of it). Illustrative, during the 1870-1914 period, are the Kaiser's efforts to obtain colonies and to build a powerful navy; England's budget allocations for maintaining naval supremacy; Austria-Hungary's insistence on punishing Serbia; and Italy's decision to desert the Triple Alliance and support Great Britain, France and Russia. Leaders thus tend to choose responses calculated to move their nation in directions that will reduce discrepancies between the real state of affairs and the preferred state of affairs. Their means may be primarily economic, technological, diplomatic, military, or a combination of these.

Given two or more nations interacting with each other, we may expect their individual behaviors and the patterns of their reciprocal behaviors to be influenced by (a) their respective dimensions and resources, (b) by respectively perceived discrepancies, and (c) by the experience of their respective actions and transactions of the past as remembered and recorded and as built into their national institution and habit patterns.

This paper raises—but seeks to answer only in a preliminary fashion and in part—the following questions: to what extent did differing attributes and capabilities of Major States produce tension among them during the 1870-1914

period? What kinds of tensions are generated by changes in capabilities? What differences or sets of differences were the respective national leaders most responsive to? What attributes or sets of characteristics of other states was each state most responsive to? What are the major trends in the composite level of tension prevailing in the system?

Our analysis focusses on five types of attributes indicating capability or potential capability: (1) population, area, density—denoting *territory*; (2) national income, per capita national income, level of production—denoting *productivity*; (3) military expenditure and men under arms—denoting *military capability*; (4) degree of diplomatic recognition—denoting *national status*; and (5) level of trade—denoting *commercial capability*.

We postulate that, in perceiving other states and comparing these with their own countries, national leaders tend to focus on these major attributes and that tension is likely to arise when discrepancies between perceived and preferred conditions are considerable. Tension is felt when the stronger state views the challenger nation as overtaking it on any major dimension; when the challenger is overtaking the dominant; and when the challenger loses ground after having overtaken or at least gained upon the stronger of any major dimension, or on a composite of these.

The dominant power experiences dissatisfaction to the extent that it perceives itself being challenged by the aspiring states, and tension arises when the distance between two powers decreases or increases on any salient dimension, or in a combination of these. Generally, when distance between two powers remains fairly constant both are likely to feel less dissatisfied than when distance between them changes. In short, tension is a function of *changing* distances and differences between nations. Thus,

The more frequently two nations interact and the more the distance between them on any salient dimension decreases, the higher will be the tension felt by both leaderships and the more likely it is that they will compete for power and influence—although a long history of good relations may inhibit this tendency.

- (a) A lessening of the difference in strength and effectiveness between the stronger nation and the weaker nation generates an increase of tension among leaders of the stronger nation.
- (b) A lessening of the difference in strength and effectiveness between the stronger nation and the weaker nation generates an increase of tension among leaders of the weaker nation.
- (c) At the point where the weaker nation, B, overtakes the stronger nation, A, each additional increment in B's strength will generate for B's leaders a perceived discrepancy between nation B's new level of strength and its previously ascribed tension to the extent that the leaders of B perceive that nation A is preparing to reestablish its previous superiority.
- (d) At the point where the weaker nation, B, overtakes the stronger nation, A, each additional increment in B's strength will generate for A's leadership a tension stimulating efforts to reestablish A's superiority.

With respect to competing nations, then, tension is likely to arise in at least three major ways:

$T_1$  = tension felt by the stronger nation as the weaker nation tends to overtake

it on a salient dimension.

$T_2$ =tension felt by the weaker nation as it tends to overtake the stronger nation on a salient dimension.

$T_3$ =tension felt by the weaker nation as it loses ground after a period of overtaking the stronger nation.

We postulate that tension from these sources contributes to the shaping of national goals and to the policies and action strategies undertaken by national leaderships.

In terms of these propositions it becomes evident, moreover, that once a weaker nation-state B engages in competition to overtake and surpass a stronger nation A on any salient dimension—and as long as competitive values are maintained—it has in effect locked itself into a situation where it cannot escape considerable tension. That is, to the extent that weaker state B gains upon A, both leaderships suffer tension. On the other hand, to the extent that B gains and then falls off (relatively), the leadership of B also suffers tension. If nation A overtakes nation B, the same dynamics pertain, but the roles are reversed. Differences between nations become particularly salient when they give rise to (or reinforce existing) conflicts in values and objectives. B's leadership has the possibility of experiencing lower tension insofar as it increases its lead over A. Under these circumstances, however, we may expect A's tension to increase. And to the extent that A displays evidence of possibly overtaking B and re-establishing its (A's) dominance, both A and B may be expected to experience tension.

We have referred also to a further source of tension:

$T_4$ =tension felt by a nation that perceives that its real capability is greater than its ascribed capability, rank or status.

These complex dynamics suggest some of the considerations which make intense international competitions—especially where the stakes are perceived as high by the participants—extremely volatile and difficult to withdraw from or escape<sup>5</sup>.

Depending upon national history and culture, upon their assessment of the international system of which their country is a part, and upon their assessments of their country's own relative capabilities and other attributes, the leaders of a state will tend to use those strategies and styles which they have found to be effective in the past. Tensions will arise, however, to the extent that conditions have changed and formerly useful strategies are no longer effective.

#### COMMENTS ON METHODOLOGY

This paper centers primarily on relations between differences in national attributes and capabilities on the one hand and a particular response, namely, allocations to the military budget, on the other. Tension, which is useful for theoretical purposes as an intervening phenomenon, is inferred from the changing distribution of capabilities and changing distances between states on major dimensions. We do not have any indicators of tension in this paper, nor do we measure it in any way. Indeed, we confine ourselves here to a preliminary testing of the following somewhat limited hypothesis:

<sup>5</sup> Our intent is, eventually, to relate behavioral or action data to tension as defined above.

The defense allocations of states are responsive to distances between them on certain dimensions of national capability.

At this point our intent is to determine which distances or differences in attributes and capabilities account for the greatest variance in particular defense allocations over time. Throughout we focus primarily on differences between Powers in the two opposing alliances—the Triple Entente and the Triple Alliance. In so doing, however, we suggest only that alliance patterns are one of several contributory factors to the outbreak of conflict.

To compute the distance between states on each of the major indices of capability, we proceed from the formula of Euclidean distance: the square root of the sum of squared differences<sup>6</sup>. As suggested by Rudolph J. Rummel, there are two fundamental analytical categories indicating the level of analysis at which variables function: the *behavioral system* (or behavioral space) and the *attribute system* (or attribute space)<sup>7</sup>. “The behavioral system encompasses the international behavior of the governments and the people of nations toward each other. The attribute system comprises those characteristics of a nation that distinguish it from at least some other nations. The theory is that the Euclidean distance between two nations in the space of their attributes are forces acting on the location (components) of the dyad in behavior space.<sup>8</sup>”

In this paper we focus upon the component distances in the formula and not on the composite distance index<sup>9</sup>. In relating the attribute system to the behavioral system we use military budget as the dependent variable—as responsive to conditions giving rise to tension—and the difference scores for each dyad as independent variables. Through the use of regression and correlation analyses our intent is to determine which components of the attribute system—characteristics and capabilities—have the greatest impact on budgetary allocations for defense<sup>10</sup>. In subsequent analyses we propose to relate national attributes, differences in such attributes, and their impact on military preparedness, to overt behavior and interaction between states.

The basic source of data used in this investigation was the *Statesman's Yearbook*, a British publication based on the information submitted by each

<sup>6</sup> Rudolph J. Rummel, “Dyadic Study, Second Variable List,” Research Report No. 3, Dimensionality of Nations Project, Department of Political Science, University of Hawaii, August 1966, p. 3. For example, for each dyad (Great Britain-Germany, France-Germany, and so forth) the distance between two Powers on population, area, men under arms and the like, is measured over time according to the following formula:

$$\left[ \sum_{i=1}^p \left( \frac{a(A-B)}{i \ i \ i} \right)^2 \right]^{\frac{1}{2}}$$

where  $i$ =a particular dimension,  $p$ =the number of major variables being considered,  $a$ =the percentage of variance in military expenditure accounted for by a variable, and  $A-B$ =the difference in scores of  $A$  and  $B$  on a variable.

<sup>7</sup> Rudolph J. Rummel, “A Field Theory of Social Action with Application to Conflict Within Nations,” *General Systems, Yearbook of the Society for General Systems Research*, Vol. X, 1965.

<sup>8</sup> Rummel, “Dyadic Study, Second Variable List,” *op. cit.*, p. 1.

<sup>9</sup> *ibid.*, p. 3.

<sup>10</sup> W. J. Dixon (ed.), *Biomedical Computer Programs* (Department of Preventive Medicine and Public Health, School of Medicine, University of California, Los Angeles, 1964).

state and somewhat standardized for adequate comparability. Data on population, area, density, national income, per capita national income, production, men under arms, defense budgets, colonial possessions and national status have been collected for the major European states during the forty years prior to the outbreak of war, 1870-1914. These have been recorded at four year intervals, yielding a total of 14 data points.

The data on population, area and density are usually fairly accurate. National income figures and per capita income are less so. Estimates for Russia and Austria-Hungary are generally unavailable for certain indices<sup>11</sup>. Income data for other countries have been standardized for comparability with 1906 as base year. Production data include yield for coal, steel, iron-ore and iron<sup>12</sup>. Men under arms are recorded as the sum total of army and navy enlistments for conditions of both war and peace. National status scores are reported as rank orderings based on a study of diplomatic recognition by J. David Singer and Melvin Small<sup>13</sup>. The data used for military budget are percentages of total budgetary expenditures allocated to defense. The use of percentage scores yields a more accurate reflection of the relative importance of military allocations in the budgetary expenditures of each state. Trade data, essential to the larger study of which this paper is only an introduction, are not included at this point.

In examining the relations between differences in national attributes and capabilities on the one hand, and military allocations on the other, two distinct but related analyses were undertaken. The first, a dyadic analysis of states in opposing alliances, was designed to determine which differences were salient to each state with respect to nations in the other alliance individually. Accordingly, we examined dyads over distances over time. Each nation's military budget was used as the dependent variable and dyadic distance scores as independent variables. For example, differences between Germany and Britain, Germany and France, and so forth on each of the indices were considered in terms of their impact on the respective military budgets. The results of the primary investigation revealed those differences in attributes having the greatest impact on each state's military allocations. On this basis a secondary analysis was then undertaken, focusing not on dyads but on opposing alliances. The military budget of every state was considered as the dependent variable, and the distance scores recorded in the primary analysis of dyads as the most salient were used as independent variables. For example, with Britain's defense budget as the dependent variable, and the salient distances—those accounting for the greatest variance in military allocations in the British-German, British-Austria-Hungarian, and British-Italian dyads—were used as independent variables, and similarly for other states. Finally, we attempted to assess the overall impact of this set of critical distances—three for each state—on the military budgets of the

<sup>11</sup> Other sources of data include *Almanach de Gotha*, *Annuaire International de Statistique*; Michael Mulhall, *Balance-Sheet of the World for Ten Years* (London: 1881); *World Almanac*.

<sup>12</sup> Production figures taken from *Annuaire Statistique de la France, 1932*. Data reported are compiled from the publications of each country.

<sup>13</sup> J. David Singer and Melvin Small, "The Composition and Status Ordering of the International System: 1815-1940," *World Politics*, Vol. XVIII, No. 2, 1966, pp. 236-283.

European powers throughout the last decades of the nineteenth century and the first decade of the twentieth<sup>14</sup>.

#### THE INTERNATIONAL SYSTEM: 1870-1914

It is generally agreed that the Major Powers in the forty years prior to World War I were Great Britain, France, Germany, Austria-Hungary, Russia and Italy. Being in close interaction, these states were not unaware of each other's respective capabilities. By the end of the nineteenth century European possessions and territories were no longer considered sufficient indicators of power. It was now widely asserted that a major prerequisite for national effectiveness was the possession of overseas territories. Accordingly, the European states interacted in a dual environment—the Continent and the Colonies. The prevailing ethos defined colonial possessions as a significant indicator of prestige, status and capability. By this standard Great Britain was undoubtedly the dominant Power, while Germany, undeniably a Major Power, considered her condition inferior to that of Britain. In Organski's terms, Britain was the dominant and strong nation; Germany, the challenging and increasingly powerful state; France, the third strongest nation; and Russia, Austria-Hungary and Italy trailed as Major Powers<sup>15</sup>. We suggest that changes in their critical attributes and distances between them in such attributes contributed to a changing international environment, an environment in which competition for resources and capabilities *set the conditions* for an outbreak for which the more direct stimuli were incidents or provocations and hostilities emerging from reaction processes. As the nations began trading threats, these threats themselves shaped the nature and intensity of the interchanges, and the reaction process began to generate dynamics of its own—to a point where earlier issues, peculiar to the basic, longer range competition of nations, were almost lost sight of.

The overall relative position of nations in a system affects their goals and aspirations, as does their position on particular dimensions of national capability. At the turn of the century, Germany, particularly sensitive to differences between itself and Britain on their respective overseas territories, concentrated its energies on equalizing a situation that was overwhelmingly in Britain's favor. Britain, on the other hand, became disturbed less by Germany's expressed policy to acquire colonial possessions than by its decision to increase its military allocations and, most particularly, the navy budget<sup>16</sup>. Differences in capa-

<sup>14</sup> We are aware of the problems involved in the two-step procedure and in the statistical analysis. One advantage of this method, however, is that it would enable us in the long run to identify types of tensions generated by changing distances between two states (such as the dominant and the challenger) and the attributes and capabilities salient to each. One major disadvantage is that it isolates a dyad from possible effects of other states. An alternate method would be to examine the relationship between military allocations and national capabilities for each state by taking into account attributes of all other states, or, preferably, of states in the opposing alliance. In the long run, however, we intend to take into account all possible dyads. Pending the results of further analyses currently being undertaken, the findings presented below are tentative and preliminary.

<sup>15</sup> Organski, *op. cit.*

<sup>16</sup> Lewis F. Richardson, *Arms and Insecurity* (Pittsburgh: The Boxwood Press, 1960).



bilities salient to Britain and Germany were not necessarily those critical to other states—such as France and Austria-Hungary. Furthermore, the tensions generated in the colonial context may have been different, though in no way independent, from those prevailing in the European system.

In deference to the prevailing ethos at the time, a dual analysis is undertaken focusing in turn on the European system and on the wider colonial context. This distinction is artificially imposed only to a certain extent and is not necessarily incongruent with various historical analyses<sup>17</sup>. For our purposes this distinction allows us to determine in considerable detail the relationship between national attributes and military preparedness. The following tables indicate the responsiveness of each state's military budget to differences on indices of national capability. Where the effects of environment appear relevant, attributes particularly salient in the Continent or the Colonies are identified. Where the same indices account for the greatest variance in military budgets we may assume that the Continent-Colonies distinction is not significant. Tables 1 and 2 present the results for Britain, France and Russia as recorded in the European and colonial contexts, and Tables 3 and 4 those for Germany, Austria-Hungary and Italy. Italy's decision to join the Triple Entente during the

TABLE 1: The Impact of Differences in National Capability  
on Military Budget:  
The Triple Entente in Europe

Military Budget	Opposing State	Salient Distances in Primary Analysis	Correlation between Military Budget and Differences	R Squared corrected <sup>a</sup> (Variance in Military Budget Accounted for)	F Ratio <sup>b</sup> (Analysis of Variance for the Regression)
BRITAIN	Germany	Population*	.61	.83	21.9
	Austria-Hungary	Military Expenditures	-.74		
	Italy	Military Expenditures	.91		
FRANCE	Germany	Production	.88	.78	16.0
	Austria-Hungary	Area	.72		
	Italy	Density*	.75		
RUSSIA	Germany	Status	.45	.97	136.5
	Austria-Hungary	Military Expenditures	-.87		
	Italy	Military Expenditures	.98		

\* Different attributes account for the variance in military budget when examined in the colonial context

(a)  $R^2$  corrected for degrees of freedom =  $(1.0 - (1 - R^2) \left( \frac{N-1}{N-(K+1)} \right))$

(b) Unless otherwise specified the F ratio is statistically significant at .01 level; for d.f. = 3.10 the critical region is 6.55 at .01 level and 12.55 at .001.

<sup>17</sup> Luigi Albertini, *The Origins of the War of 1914*, Vols. II-III (New York: Oxford University Press), 1953.

TABLE 2: The Impact of Differences in National Capability  
on Military Budget:  
The Triple Entente in the Colonial Environment

Military Budget	Opposing State	Salient Differences in Primary Analysis	Correlation between Military Budget and Differences	R Squared <sup>a</sup> Corrected (Variance in Military Budget Accounted for)	F Ratio <sup>b</sup> : Analysis of Variance for the Regression
BRITAIN	Germany	Men under arms*	.63	.76	15.2
	Austria-Hungary	Military expenditures	-.77		
	Italy	Military expenditures	.89		
FRANCE	Germany	Production	.87	.72	12.2
	Austria-Hungary	Area	.65		
	Italy	Area*	.62		
RUSSIA	Germany	Status	.54	.96	133.1
	Austria-Hungary	Military expenditures	-.90		
	Italy	Military expenditures	.98		

\* Different attributes account for the variance in military budget when examined in the European context.

(a)  $R^2$  corrected for degrees of freedom =  $(1.0 - (1 - R^2) \left( \frac{N-1}{N-(K+1)} \right))$

(b) Unless otherwise specified the F ratio is statistically significant at .01 level; for d.f. = 3.10 the critical region is 6.55 at .01 level and 12.55 at .001.

course of the war may eventually necessitate a separate analysis. These tables are based on results of the secondary analysis. Included are the salient distances recorded in the primary analysis, correlation coefficients between distance scores and military budget for each dyad, the proportion of variance in military allocations accounted for by an empirically determined set of critical distances, and analysis of variance for the regressions.

Comparing Tables 1 and 2 and Tables 3 and 4, it seems that the distinction between the Continent and the Colonies seems to have been of lesser relevance to the Triple Entente than to the Triple Alliance. For Great Britain, France and Russia, attributes salient in the European context were generally equally critical in the overseas environment. Several exceptions should be noted, however. Britain's military budget seems to have been responsive, at least in part, to differences between British and German populations, these contributing to (.61) of the variance in British defense allocations<sup>18</sup>. In the European context, density differences between France and Italy appeared salient to the latter, whereas in the colonial context differences in area were more critical. On the other hand, environmental distinctions had minimal impact on Russian military allocations.

<sup>18</sup> It should be noted that these analyses taken no account of naval data from the Anglo-German naval race.

TABLE 3: The Impact of Differences in National Capability  
on Military Budget:  
The Triple Alliance in Europe

Military Budget	Opposing State	Salient Distances in Primary Analysis	Correlation between Military Budget and Differences	R Squared <sup>a</sup> Corrected (Variance in Military Budget Accounted for)	F Ratio <sup>b</sup> : Analysis of Variance for the Regression
GERMANY	Britain	Military Expenditures*	.80	.92	48.6
	France	Military Expenditures	.95		
	Russia	Status*	-.87		
AUSTRIA-HUNGARY	Britain	Military Expenditures*	.56	.12	1.57 <sup>c</sup>
	France	Military Expenditures	.48		
	Russia	Area*	-.22		
ITALY	Britain	Production*	-.59	.59	7.15
	France	Density	.56		
	Russia	Military Expenditures*	.75		

\* Different variables account for the variance in military budget when examined in the colonial context.

(a)  $R^2$  corrected for degrees of freedom =  $(1.0 - (1 - R^2) \left( \frac{N-1}{N-(K+1)} \right))$

(b) Unless otherwise specified the F ratio is statistically significant at .01 level; for d.f. = 3.10 the critical region is 6.55 at .01 level and 12.55 at .001.

(c) Statistically non-significant.

In contrast, members of the Triple Alliance reflected greater awareness of the Continent-Colonies distinction. Differences in military expenditures had the greatest impact on Germany's defense budget in the Continent, whereas in the colonial context differences in overseas territories were more significant. In terms of various tensions generated by distances in capabilities, it seems that Germany's military allocations were more responsive to increases in territorial differences—especially in comparison with British gains—rather than to decreases in such differences. In the colonial context, critical distances between Italy and the Triple Entente states centered on density, whereas production and military expenditure differences featured prominently on the Continent. Generally, our analysis of the 1870–1914 period indicates that the Austria-Hungarian military budget may well have been responsive to factors other than differences in attributes and capabilities. In the European environment alone, only 12% of the variance in military budget is accounted for by attribute distances, and 15% in the colonies. Generally, these results indicate that the Imperial military budget's responsiveness to distance scores “behaves” differently than do other state's defense allocations. This, in part, is a function of the high ratio of defense allocations to the Empire's total expenditures. Throughout this period the military budget ranged from 70% to over 90% of all budget-

TABLE 4: The Impact of Differences in National Capability  
on Military Budget:  
The Triple Alliance in the Colonial Environment

Military Budget	Opposing State	Salient Differences in primary Analysis	Correlation between Military Budget and Differences	R Squared <sup>a</sup> Corrected (Variance in Military Budget Accounted for)	F Ratio <sup>b</sup> : Analysis of Variance for the Regression
GERMANY	Britain	Area*	-.90	.92	51.4
	France	Military expenditures	.96		
	Russia	Area*	.87		
AUSTRIA-HUNGARY	Britain	Area*	.57	.15	1.8 <sup>c</sup>
	France	Military expenditures	.50		
	Russia	Status*	.27		
ITALY	Britain	Density*	-.82	.59	7.5
	France	Density	-.77		
	Russia	Density*	-.80		

\* Different attributes account for the variance in military budget when examined in the European context.

(a)  $R^2$  corrected for degrees of freedom =  $(1.0 - (1 - R^2) \left( \frac{N-1}{N-(K+1)} \right))$

(b) Unless otherwise specified the F ratio is statistically significant at .01 level; for d.f. = 3.10 the critical region is 6.55 at .01 level and 12.55 at .001.

(c) Statistically non-significant.

ary expenditures. To some extent this is the outcome of the Empire's financial administration. The sovereign states—Austria and Hungary—controlled their own budget leaving common areas, primarily defense, under central jurisdiction. On the whole, the results are not statistically significant and suggest the need for other lines of inquiry.

An analysis of the types of tensions generated by differences in attributes is beyond the scope of this paper. At this point, however, several comments are of relevance. The high negative correlation between the German defense budget and British-German differences in overseas territories indicate that the increasing distances between British and German colonial possessions had a significant impact on the German budget. In 1914 Britain was well ahead of Germany, and the difference between them had reached a peak. To the dominant state this distance was not salient, but to the challenger it was crucial. Thus, an increase in differences on critical attributes may have considerable impact on defense allocations—a finding that is not incongruous with the broader theoretical framework of this study.

Other high negative correlations are also revealing, shedding light on the directional relationships between attribute distances and defense allocations. The negative correlation between Italian-Russian density differences and Italy's

military budget is a function of increasing density, with Italy significantly ahead, in contrast to a relatively stationary and at times decreasing Italian military expenditure. Similarly, the negative correlation between Austro-Hungarian-Russian distances in military expenditures and the Russian defense budget—in both contexts—reflects the initially high difference between these two state's defense allocations, decreasing slightly over the forty year period and matched by Russia's increasing military allocations.

On the whole, there is sufficient evidence to support the hypothesis examined briefly in this paper—the responsiveness of military budget to differences in indices of national capability. The next step is to take into account *directional changes* in attributes and capabilities. In evaluating our results a word of caution is in order at this point. It is not unlikely that certain artifacts may be produced by (1) the relative size of (a) the base magnitude of the variables, (b) increments in magnitude at each time period; (2) the statistical non-independence of the magnitude of each variable across time; and (3) the nature of the primary analysis. These and related problems can be handled, at least in part, by (1) substituting differences in ratio of change for simple differences; (2) using rates of change in cross-lagged correlations; and (3) using rates of change in two-step cross-lagged correlations; and (4) using of changes in the rates of change throughout. Further analyses are currently being undertaken along those lines.

