Power Parity, Alliance, Dissatisfaction, and Wars in East Asia, 1860-1993

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Original power transition theory is extended by relaxing the restrictive assumption of the method of augmenting national power. The occurrence of war in East Asia from 1860 to 1993 is examined to see if the revised power transition argument holds for the conflicts in East Asia. Results show that conflicts in East Asia occur under the same general conditions that lead to war in the international system and that war is most likely when the dissatisfied challenger approximates the dominant power. The evidence also suggests that the role of alliances is crucial for mitigating or militating the risk of war, contrary to the standard power transition formulation. Because alliances play a central role in the risk of wars, the dangers of such a conflict in East Asia (or elsewhere) can be managed through skillful strategies of alignment and de-alignment.

Although the balance-of-power idea suggests that the equality of power among nations tends to discourage war in the international system, power transition and hegemonic stability arguments predict that conflict between states is more likely when power is more or less equally distributed, particularly when a challenger's power grows quickly enough to catch up with the dominant power (Organski 1968; Organski and Kugler 1980; Gilpin 1981; Kugler and Lemke 1996). Power transition arguments also suggest that the challenger's level of dissatisfaction, together with an equal distribution of power during the power transition situation, increases the likelihood of conflict (Organski 1968; Kim 1991, 1992, 1996; Kim and Morrow 1992; Lemke and Werner 1996; DiCicco and Levy 1999; Tammen et al. 2000).

The role of alliances in conflict situations is also viewed differently by balance-of-power and power transition theorists. Balance-of-power theorists contend that alliances are made in response to a perceived threat and are intended to preserve power parity among the competing coalitions. For balance-of-power theorists, alliance formation is a frequently used strategy for power augmentation and is crucial to the incidence of conflicts (e.g., Claude 1962; Gulick 1955; Kaplan 1957; Morgenthau 1973). On the other hand, power transition theorists consider internal development through industrialization to be the principal source of changes in power. External means of

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augmenting power, including alliance formation, are not considered critical. They suggest that even if alliances make a difference, they will not be effective because alliances cannot easily be made or unmade (Organski 1968; Organski and Kugler 1980).

Others criticize both the balance-of-power and power transition perspectives' exclusive focus on either means of augmenting national power. Most and Starr (1984), for example, emphasize the importance of foreign policy "substitutability." A nation can increase national capabilities through the internal buildup of military strength or alliance formation. Others suggest that each nation's power can be increased through external means as well as internal means. The growth and expansion of each nation's economy and population and increases in military strength fall into the category of internal means. Alignment and realignment of nations, by strengthening and enlarging each nation's alliances or weakening and shrinking opposing coalitions, fall into the category of external means of augmenting national power (Gilpin 1981; Iusi-Scarborough and Bueno de Mesquita 1988; Levy 1987; Russett and Starr 1992; Waltz 1979).[1]

Unlike balance-of-power theory, the power transition theory is based on three pillars of international politics—opportunity, willingness, and perception—that in my view provide it with analytic advantages (Most and Starr 1989; Russett and Starr 1992; Bueno de Mesquita 2000). Whereas balance-of-power arguments are based only on the opportunity factor, that is, the distribution of power in the international system, power transition theses not only capture the distribution of power among nations but dynamic changes in power distribution caused by the differential growth rates among states. In addition, power transition arguments include the willingness factor. Power transition theory suggests that power parity provides an opportunity for the rapidly growing power to challenge its rival, the dominant power. But it also suggests that only the "dissatisfied" challenger acts on its willingness to challenge the dominant power. The speed of the challenger's capability growth is another factor in assessing the likelihood of conflict in the power transition framework. In a situation in which the challenger grows quickly, perceptual problems may arise between the challenger and the dominant power in assessing their relative capabilities and, consequently, may increase or decrease the probability of conflict.

Many recent empirical studies on the causes of conflict have supported the power transition view of the relationship between the distribution of power and the outbreak of war (Weede 1976; Organski and Kugler 1980; Houweling and Siccama 1988; Kim 1991, 1992, 1996; Kim and Morrow 1992; Bueno de Mesquita and Lalman 1992; Geller 1992, 1993; Kugler and Lemke 1996; Lemke and Werner 1996; Lemke 1996, 1997; Benson and Kugler 1998). Among them, several empirical studies indicate that alliances do play a significant role in the onset of wars. It has been found that major war

1. Although Waltz (1979) emphasizes the importance of internal efforts under bipolarity, both internal and external efforts are considered important means of augmenting power. In addition, Russett and Starr (1981) emphasize internal rates of economic growth as much as alliance formation as sources of changes in power. Gilpin (1981) also points to internal growth rates and alliance as sources of changes in relative power, although he sees alliance formation as merely one of the countervailing forces that limit the expansion of a nation's power. Levy (1987) and Iusi-Scarborough and Bueno de Mesquita (1988) see economic growth as a long-term source of changes in power and alliance formation and a short-term source of changes in power. For more discussion, see Kim (1991).

is more likely when the two major powers, after taking into account alliance effects, have approximately equal power (Kim 1991, 1992, 1996; Kim and Morrow 1992). In this study, I first extend and elaborate the original power transition theory by relaxing the seemingly restrictive assumption of the method of augmenting national power. I argue that both the dominant power and the challenger in a rivalry take into account power parity in terms of alliances and not just power parity in terms of their own internal capabilities.

For the past three decades China's rapid economic growth and increased political capacity have signaled the possible future of the international political system (Tammen et al. 2000; Bueno de Mesquita 2002). Now, among other great powers, China, Japan, Russia, and the United States are deeply involved in international relations in East Asia. The locus of international conflict no longer seems to be only in Europe. In this study, I investigate the occurrence of war in East Asia from 1860 to 1993 to see if the power transition argument holds for the conflicts occurring in East Asia.

Originally, power transition arguments were developed mainly to help understand conflict among major powers in the international system. Recently, however, there have been a number of studies that apply the power transition framework to regional systems (Lemke 1996, 1997; Lemke and Werner 1997; Hwang and Kugler 1997; Kim 1997). For example, Lemke and Werner (1996) show that the power parity and dissatisfaction hypotheses can be applied both to major and minor powers. Lemke (1996, 1997) applies the power transition framework to the occurrence of regional conflict. DiCicco (1998, 8) suggests that a set of "all great powers and their allies, and even states loosely aligned with the great powers" may be included as test cases under the power transition framework. In this analysis, I also include not only great powers but minor powers in East Asia as well. Although the great powers have been actively involved in East Asian political and economic affairs, the region's minor powers have frequently expected support and assistance from great powers, especially their great power allies.

In this research, then, I reconstruct the power transition argument by suggesting that a nation's power can be augmented by both internal and external means. I also investigate the occurrence of war in East Asia from 1860 to 1993 to see if the revised power transition argument holds for the conflicts occurring in East Asia and present evidence that conflicts in East Asia occur under the same general conditions that lead to war in the international system.

REVISED POWER TRANSITION MODEL

The power transition theory considers internal development through industrialization as the principal means of augmenting national power. Power transition theorists do not consider alliance formation as an important means of change in power. Organski (1968) notes that

> one main quarrel with the balance of power theory was the assumption that the strength of each nation was relatively constant unless it won a war or made new alliances. In fact, however, internal changes of the most momentous sort are constantly occurring within modern nations, and many of these changes have great significance in terms of national power. Industrialization and political modernization are particularly crucial in this respect. (P. 339)

Although Organski's argument is reasonable in challenging the balance-of-power theory's reliance on external means of supplementing national power, his exclusive focus on internal means of augmenting national capabilities and his dismissal of such external means as alliance formation are too restrictive.

The view that a nation's power can be increased by both internal and external means relaxes an important restriction imposed by power transition theorists. Thus, the assumption that national power is augmented through both internal and external means leads to the revision of the power transition argument. The revised power transition argument is as follows.[2]

Among major actors in the system (whether regional or global), differences in the rates of growth result in changes in the power distribution among them. Internal growth through industrialization, socioeconomic and political modernization, and technological development causes relative capability changes among major actors (Organski and Kugler 1980; Gilpin 1981). Shifts in domestic coalitions in some major actors' domestic politics and the consequent changes in their national interests also undermine the status quo of the system (Gilpin 1981). Redistribution of capabilities and redefinition of interests provide opportunities for fast-growing actors to challenge the status quo. During the power transition phase, the fast-growing challenger makes expected utility calculations to decide whether to challenge the dominant actor in the system, with the cost-benefit calculation gradually shifting in favor of launching a challenge (Kim and Morrow 1992).

Redistribution of power among major actors in the system can also occur through realignment. A nation's capability can be augmented not only by internal development but also through alliance formation. As a fast-growing power increases its capabilities through internal development and alliance formation and overtakes the dominant power in available resources, it has an opportunity to challenge the leading power. Threatened by demands for changes in the existing systemic order, the dominant power has a large stake in preserving the status quo in which it and its allies share the benefits and privileges of both collective and private goods. The leading nation, with the support of its allies, tries to thwart the challenger's progress. During such a period of power transition—characterized by an equal distribution of power between the leading power and the challenging power after taking into account support from allies—war is more likely to occur (Kim 1991, 1992; Kim and Morrow 1992).

The speed with which the challenger catches up with the dominant power is another factor in assessing the likelihood of conflict. If the challenger's internal and external

2. For an excellent discussion of the evolution of power transition theory from the perspective of Lakatos's methodology of scientific research programs and a review of the alliance transitions model as a revised version of power transition theory, see DiCicco and Levy (1999).

capabilities are increasing slowly, there is a greater likelihood that the problems arising from a state's catching up with its rival can be resolved without resort to arms. However, if the challenger's capabilities are increasing rapidly, then both the dominant power and the challenger are caught unprepared for the resulting change in power distribution. Moreover, in that kind of situation, both the dominant power and the challenger may misperceive their relative capabilities vis-à-vis their adversary's. Therefore, war is highly likely when the difference in the growth rates between the challenger and the dominant power is big (Organski 1968; Organski and Kugler 1980).

The challenger's degree of satisfaction can also affect the likelihood of conflict. Some powers in the system are satisfied with the present order and its working rules, for they feel that the present order offers them the best chance of obtaining the goals they have in mind. The dominant power is necessarily more satisfied with the existing order than any other state because it is, to a large extent, the creator of its own systemic order. Others, however, are not necessarily satisfied with the status quo, especially if they have grown in power after the existing order was established. If the challenging power is dissatisfied with the existing order and is willing to refuse the existing rules and, in addition, the dissatisfied challenger successfully catches up with the declining dominant power, then both opportunity and willingness for the challenger to alter the existing order set up by the dominant power are met. Therefore, conflict between the challenger and the leading power is most likely (Organski 1968; Kim 1991, 1992, 1996; Lemke and Werner 1996; Tammen et al. 2000).

Based on the above power transition arguments, four modified power transition hypotheses can be stated:

Hypothesis 1: War is more likely when the dominant power is overtaken by the challenger, after taking into account support from allies.
Hypothesis 2: War is more likely when the growth rate difference between the challenger and the dominant power is bigger, after taking into account support from allies.
Hypothesis 3: War is more likely when the internal and external capabilities of the two states are equally distributed.
Hypothesis 4: War is most likely when the challenging power not only is dissatisfied but approximates the dominant power.

RESEARCH DESIGN

Cantori and Spiegel (1970) define *region* as an area of the world that contains

> geographically proximate states forming, in foreign affairs, mutually interrelated units. For each participant, the activities of other members of the region (be they antagonistic or cooperative) are significant determinants of its foreign policy; while particular members of certain regions may have extraregional concerns, their primary involvement in foreign affairs ordinarily lies in the region in which they find themselves. Under normal conditions they cannot accomplish successes elsewhere until they have achieved and are able to maintain a permanent position in their own area. (P. 1)

In international politics, according to Cantori and Spiegel (1970), there are the "dominant system" in the global arena and the "subordinate system" in the region. Each region consists of a core sector, a periphery, and an intrusive system.

> The core sector consists of a state or a group of states which forms a central focus of the international politics within a given region. . . . The peripheral sector includes all those states within a given subordinate system which are alienated from the core sector in some degree by social, political, economic, or organizational factors, but which nevertheless play a role in the politics of the subordinate system. . . . An intrusive system consists of the politically significant participation of external powers in the international relations of the subordinate system. . . . [Here, politically significant involvement is] expressed by the possession of a colony; economic or military aid producing an alteration in the balance of power in the region; formal alliance, troop commitment, or any agreement which causes the external power to act in ways which resemble the types of actions that would ordinarily be taken by a country indigenous to the region. (Pp. 20-26)

Cantori and Spiegel (1970) have divided the globe into fifteen subordinate systems, and the East Asian region is one of them. They include the following actors in the East Asian region: China as a core; Taiwan, North Korea, South Korea, Mongolia, Japan, Hong Kong, and Macao as peripheral actors; and the United States, Portugal, Great Britain, and the Soviet Union as members of the intrusive system. Because the domain of this study is East Asia, I include China, Japan, Korea (from 1888 to 1905), South Korea (from 1949), North Korea (from 1948), and Taiwan (from 1949) because they are physically located in East Asia. Mongolia is not included because it was either a part of China or a "micro-state," which "has little or no influence" even in subordinate systemic affairs (p. 16). Hong Kong and Macao are not included because they were either Chinese territories held as colonies by European powers or are parts of China. Among Cantori and Spiegel's list of the great power members of the intrusive system, the United States (from 1898), Great Britain, and the Soviet Union (or Russia) are included. Portugal is not included because it has never been politically significantly involved in East Asia (p. 26).

Although the United States, Great Britain, and the Soviet Union are included in Cantori and Spiegel's (1970) list of active players in East Asia, France and Germany are not. An investigation of international conflict data and diplomatic history suggests otherwise.[3] With the Correlates of War Militarized Interstate Dispute (COW MID) data, I have examined the number of cases of dispute in which each of the three great powers—Great Britain, France, and Germany—was involved, ranging from a threat to use force (coded as 2 in the data) to an interstate war (coded as 22) in the region. Great Britain was involved in 16 cases, France in 13, and Germany in 2.[4] With Gochman's (1975) conflict data set, Great Britain was involved in 10 cases, France in 8, and Germany in 3. Both data sets show that Great Britain, France, and Germany were actively involved in regional conflict cases.

3. Indeed, some argue that identifying the membership of any particular subordinate system is not easy and may involve a subjective judgement. See Cantori and Spiegel (1970, 6-7) and Bueno de Mesquita (1981, 95-96).

4. The Correlates of War Militarized Interstate Disputes (COW MID) data set is obtained from the EUGene data. See Bennett and Stam (2002).

I have also reviewed diplomatic history to investigate French and German participation in East Asian political, military, and economic activities as outside members of the East Asian region. Diplomatic history of the Far East during the mid to late 19th century supports their active participation. Vinacke (1936, 47) shows that not only Great Britain, Russia, and the United States but France had important contacts with China that played an important role in the opening of China in the 1840s. France was also an important player in the opening of Korea in the 1870s. Vinacke writes that "France was the first to try to force open the door into Korea" (p. 115). "From 1844 to about 1875, and especially after 1850, England, France, and the United States . . . cooperated in the advance on China with a view to breaking down the walls she had erected around herself" (p. 59).[5]

Vinacke (1936) also shows that Germany was deeply involved in the opening of China. In the agreement of March 6, 1898, with China, Germany obtained a lease for the area surrounding Kiaochow Bay for a period of ninety-nine years. China, though retaining the territory, agreed not to exercise its sovereign rights therein for the period of the lease.

> Germany reserved the right to restore the territory to China at any time and to secure, as compensation, a station at some other point on the coast. The territory was never to be sublet to any other Power. Instead of exclusive railroad and mining rights in the province, specific concessions for the building of roads and the opening and operation of mines were given to Germany. (Pp. 138-39)
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> The first step looking toward the partition of such a state as China is likely to be the marking out of the country into spheres of special interest, and these several agreements between the Powers and China resulted in the application of that term to various parts of the Empire. Thus Manchuria was said to be Russia's sphere of interest, Shantung the sphere of Germany, etc.[6] (P. 140)

Based on Cantori and Spiegel's (1970) definition and an additional investigation of the international conflict data (including the COW MID data) and diplomatic history, I decided to include not only the United States, Great Britain, and Russia (or the Soviet Union) but France and Germany as members of the intrusive system in the East Asian region.[7] China, Japan, Korea, South Korea, North Korea, Taiwan, the United States, Great Britain, Russia (or the Soviet Union), France, and Germany are included in my empirical analysis. Because of the availability of national capability data, I cover the time span from 1860 to 1993 in my empirical analysis.[8] Table 1 indicates the period each nation-state is included in this analysis.

5. For other sources of French involvement in the East Asian regional political, economic, and military affairs, see Buss (1955, chap. 15) and Steiger (1944, chap. 19).

6. For other source of German involvement in the East Asian regional political, economic, and military affairs, see Buss (1955, chap. 15).

7. For British or American involvement in the East Asian regional political, economic, and military affairs, see Buss (1955, chaps. 14, 20), Steiger (1944, chaps. 19, 27), Clyde (1958, chap. 11), Greene (1957, chap. 18), Cameron et al. (1952, chap. 19), and MacNair and Lach (1955, 69-83).

8. The national capability data for China, a "core" actor in East Asia, and Japan are available from 1860, and the data for all states included in the analysis end in 1993. For more details, see the EUGene data by Bennett and Stam (2002) or Small and Singer (1982).

TABLE 1
Members of the East Asian Region, 1860-1993

Nation-State	*Period*
China	1860-1993
Japan	1860-1945/1952-1993
Korea	1888-1905
South Korea	1949-1993
North Korea	1948-1993
Taiwan	1949-1993
United States	1898-1993
Great Britain	1860-1993
Russia/Soviet Union	1860-1917/1922-1993
France	1860-1940/1945-1993
Germany	1860-1918/1925-1945/1991-1993

SOURCE: EUGene data (Bennett and Stam 2002).

To create the set of test cases, the whole period is divided into 10-year intervals.[9] Then, in each 10-year period, each nation-state is paired with each other power. This procedure creates 385 dyad-periods. Table 2 shows test periods, nation-states included in each test period, and the number of dyads.

The objective is to separate the dyad-periods that include a war from those that do not. The observations in this analysis include all possible pairs of the actors listed in Table 1 and not just those that eventually fought. Hence, the dependent variable in this analysis is a dichotomy of "war" or "no-war."

The interstate wars fought in East Asia during the test period are identified based on the EUGene interstate war list (Bennett and Stam 2002). Thirteen wars included in the analysis are as follows: the Sino-French War (1884-1885), the Sino-Japanese War (1894-1895), the Boxer Rebellion (1900), the Sino-Russian War (1900), the Russo-Japanese War (1904-1905), World War I (1914-1918),[10] the Sino-Soviet War (1929), the Manchurian War (1931-1933), the Sino-Japanese War (1937-1941), the Changkufeng War (1938), the Nomohan War (1939), World War II (1941-1945),[11] and the Korean War (1950-1953).

9. Organski and Kugler (1980) argue that a long period of time, approximately a 20-year period preceding each war, is required to produce sufficient changes in the power distributions between possible adversaries for war to break out. Based on this argument, power transition researchers who have conducted empirical analyses on power transition and great power war have used the 20-year time period in their analyses (Howeling and Siccama 1988; Kim 1991, 1992, 1996; Kim and Morrow 1992; Organski and Kugler 1980). However, Vasquez (1996, 38) criticizes that a 20-year period is "very long and raises the possibility that any association between a power transition and war could be coincidental" and suggests a 10-year lag for the empirical analysis. Lemke (1997) and Lemke and Werner (1996) have used a 10-year period for their analyses of power transition and regional conflict. I also use a 10-year period in this analysis because this analysis includes not just great powers but also regional actors whose national capabilities are much weaker than those of great powers. As is suggested by Vasquez (1993), for weaker powers, too many things can happen in 20 years.

10. For World War I fought in Asia, see Steiger (1944, chap. 30), Vinacke (1936, chap. 19), MacNair and Lach (1955, chap. 4), Cameron et al. (1952, chap. 21), and Clyde (1958, chap. 23).

11. For World War II fought in Asia, for example, see Buss (1955, chap. 22).

TABLE 2
Test Periods, Nation-States, and Number of Dyads

Test Period	*Nations-States*	*Number of Dyads* (N = *385)*
1860-1869	CHN, JPN, ENG, RUS, FRN, GER	15[a]
1870-1879	CHN, JPN, ENG, RUS, FRN, GER	15
1880-1889	CHN, JPN, ENG, RUS, FRN, GER, KOR	21
1890-1899	CHN, JPN, ENG, RUS, FRN, GER, KOR, USA	28
1900-1909	CHN, JPN, ENG, RUS, FRN, GER, KOR, USA	28
1910-1919	CHN, JPN, ENG, RUS, FRN, GER, USA	21
1920-1929	CHN, JPN, ENG, RUS, FRN, GER, USA	21
1930-1939	CHN, JPN, ENG, RUS, FRN, GER, USA	21
1940-1949	CHN, JPN, ENG, RUS, FRN, GER, USA, NK	26[b]
1950-1959	CHN, JPN, ENG, RUS, FRN, USA, NK, SK, TW	36
1960-1969	CHN, JPN, ENG, RUS, FRN, USA, NK, SK, TW	36
1970-1979	CHN, JPN, ENG, RUS, FRN, USA, NK, SK, TW	36
1980-1989	CHN, JPN, ENG, RUS, FRN, USA, NK, SK, TW	36
1990-1993	CHN, JPN, ENG, RUS, FRN, GER, USA, NK, SK, TW	45

NOTE: CHN = China; JPN = Japan; ENG = England (or Great Britain); RUS = Russia (or the Soviet Union); FRN = France; GER = Germany; USA = United States; KOR = Korea; NK = North Korea; SK = South Korea; TW = Taiwan.

a. ${}_6C_2 = 15$ where C is combination.

b. JPN/NK dyad and GER/NK dyad are deleted because Japan and Germany do not share their years of inclusion in the 1940-1949 test period with North Korea. Although South Korea's and Taiwan's memberships in the region start from 1949, as shown in Table 1, neither country is included in the 1940-1949 test period because growth rates cannot be calculated for the 1940-1949 period.

To estimate each nation-state's power, the following procedure is used. First, a nation's internal capabilities are measured with the Composite Capability Index developed by the COW project and updated by Bennett and Stam (2002). Second, the support that nation expects from other powers is added to its internal capabilities. The amount of support a particular third party contributes to a nation depends on its own capabilities and the closeness of relations between the two.[12] Countries with great internal capabilities can contribute more, and those with better relations contribute a greater fraction of those capabilities.

The following equations represent nation *i*'s and nation *j*'s adjusted national capabilities, which consist of both internal and external capabilities of each nation:

$$NC_i = IC_i + EC_i \text{ and } NC_j = IC_j + EC_j,$$

where

$$EC_i = \sum_{k \neq i,j} IC_k \times (S_{ki} - S_{kj})/2 \text{ if } S_{ki} \geq S_{kj} \text{ and } S_{ki} > 0$$

$$EC_j = \sum_{k \neq i,j} IC_k \times (S_{kj} - S_{ki})/2 \text{ if } S_{kj} \geq S_{ki} \text{ and } S_{kj} > 0,$$

12. Here, a particular third party is limited to the actors included in this analysis. For the list of the actors, see Table 1.

where *i* (or *j*) is nation *i* (or *j*) in each dyad and *k* is a third party; NC_i (or NC_j) is *i*'s (or *j*'s) adjusted national capabilities; IC_i (or IC_j) is *i*'s (or *j*'s) internal capabilities; EC_i (or EC_j) is *i*'s (or *j*'s) external capabilities; IC_k is *k*'s internal capabilities; S_{ki} (or S_{kj}) is the shared interest of *k* attached to *i* (or *j*) calculated as the Signorino-Ritter score (or S-score) between *k* and *i* (or *j*).

These adjusted national capabilities, NCi or NCj, are calculated based on the distance-adjusted internal capabilities of each nation. When a nation is not contiguous with China, a "core" actor in East Asia, that nation's internal capabilities are distance-adjusted. That is, that nation's internal capabilities measured with the Composite Capability Index are distance-adjusted by using Bueno de Mesquita's (1981, 103-8) measurement procedure.[13] IC_i, for example, is calculated as (nation *i*'s Composite Capability Index)$^{\log[(\text{miles/miles per day}) + (10 - e)]}$, where the transport range for the years from 1816 to 1918 is 250 miles per day; for 1919 to 1945, 375 miles per day; and after 1945, 500 miles per day.[14] Here, intercapital distances are used because capital cities are generally where mobilizations originate and terminate (Bennett and Stam 2002; Lemke 1997). These distance data are obtained from the EUGene data.

The adjusted national capabilities of nation *i* in a dyad, denoted NC_i in the equation, add the proportion of third-party resources that nation *i* can draw on to augment its internal capabilities. That portion is based on those third parties believed by *i* to prefer *i* to *j*. It is estimated as the sum of the products of the capabilities of each such third party multiplied by nation *i*'s approximation of each third party's intensity of preference for an outcome favoring *i* over *j*. But there is room for a third party *k*'s noninvolvement. The above measurement procedure indicates that when S_{ki} is equal to S_{kj} or when both S_{ki} and S_{kj} are negative, *k* supports neither side.[15] The adjusted national capabilities, then, measure a nation's internal capabilities, augmented by the assistance it expects from other nation-states. Here, each third party's intensity of preference for an outcome favoring *i* over *j* or a measure of shared interests between a third party *k* and *i* (or *j*) is based on the S-score that improves on the Bueno de Mesquita Tau-b coefficients for similarity in alliance portfolios. This adjusted capability measure is called the S-score

13. Because this research focuses on the occurrence of war in East Asia, all nations included in the analysis are distance-adjusted as long as they are not contiguous with China, the "core" country in East Asia. Let me explain the France-Germany dyad case in my data, for example. France and Germany are external powers actively involved in the core sector of the region. In case each of them wants to maintain her sphere of influence by assisting her allies in East Asia or is involved in conflicts in East Asia, she has to project her capabilities to that region. In this analysis, I am not interested in the cases in which France and Germany are involved in conflicts only in their European territories. I am interested in the cases in which they are involved in conflicts in East Asia or the cases in which conflicts started in East Asia and escalated to their European territories. So internal capabilities of France and Germany are distance-adjusted. When internal capabilities of France and Germany are distance-adjusted, intercapital distances between France and China and between Germany and China are used, and the data are obtained from the EUGene data.

14. Bueno de Mesquita's distance adjustment procedure takes into account three considerations: (a) a nation's power declines monotonically with distance, (b) the rate at which decline occurs must be greater the weaker the nation is at home, and (c) the rate of decline decreases with major advances in technology. For more details, see Bueno de Mesquita (1981, 103-6).

15. This measurement procedure is an improved version of that used in Kim (1991, 1992, 1996) and Kim and Morrow (1992) because it takes into account the possibility of a third party's noninvolvement. I am indebted to an anonymous referee for his (or her) suggestion on this measurement procedure.

version of the adjusted capabilities hereafter (Bueno de Mesquita 2000; Signorino and Ritter 1999; Bennett and Stam 2000).

The S-score version of the adjusted capabilities seems to improve in one way on the alternative measure of simply adding the capabilities of a nation's allies to its own. Nations often expect aid from other states not formally allied with them.[16] The measure used here includes these contributions by considering all third-party nations as possible contributors. The S-score measure ($S_{ki} - S_{kj}$) in the equation above provides a rough measure of aid from those not formally allied but nevertheless having shared patterns of alliance commitments (Altfeld and Bueno de Mesquita 1979; Signorino and Ritter 1999; Bueno de Mesquita 2000).

However, this S-score version of the adjusted capability measure seems to have a weak point as well. Based on this measure, *allies* does not necessarily mean nations that have a bilateral formal treaty. *Allies*, here, refers to nations that have shared interests (or a common alliance pattern) even if they are not formally allied with each other. Some may argue that this measure does not represent the concept of the alliance as described in the above, justifying the revised version of the power transition model. To solve this potential measurement problem, another measure for the adjusted national capabilities is employed by simply adding the capabilities of a nation's actual allies to its own. Hereafter, I call this adjusted capability measure the "simply added version" of the adjusted capabilities.

The following equations represent the simply added version of nation *i*'s and nation *j*'s adjusted national capabilities, which consist of both internal and external capabilities of each nation:

$$NC_i = IC_i + EC_i \text{ and } NC_j = IC_j + EC_j,$$

where

$$EC_i = \sum_{k \neq i,j} IC_k \text{ if } k \text{ has a formal alliance relationship with } i \text{ but not with } j$$

$$EC_j = \sum_{k \neq i,j} IC_k \text{ if } k \text{ has a formal alliance relationship with } j \text{ but not with } i,$$

where *i* (or *j*) is nation *i* (or *j*) in each dyad and *k* is a third party; NC_i (or NC_j) is *i*'s (or *j*'s) adjusted national capabilities; IC_i (or IC_j) is *i*'s (or *j*'s) internal capabilities; EC_i (or EC_j) is *i*'s (or *j*'s) external capabilities; and IC_k is *k*'s internal capabilities.

That is, if a third nation, *k*, has a formal alliance relationship with nation *i* but not with nation *j*, then nation *i* expects support from nation *k*. In this case, the adjusted capabilities of nation *i* are the sum of nation *i*'s internal capabilities and nation *k*'s internal capabilities. Of course, each nation's internal capabilities are distance-

16. For example, right before the outbreak of the Franco-Prussian War 1870, France expected support from third parties. Although France had no formal alliance relationship at that time, France "supposed that Great Britain and Russia would look on with favour, if not with support; that Austria-Hungary and Italy would enter the war as their allies; and that south Germany would remain neutral" (Taylor 1971, 206).

adjusted as explained above. In the case where *k* has formal alliance relationships with both *i* and *j*, *k* supports neither of them.[17]

By using the two different measures for the adjusted capabilities of each nation, three independent variables employed in this analysis—alliance parity, alliance transition, and alliance growth rate—are operationalized as below.

One independent variable, alliance parity, considers the equality of power between the two nations in each dyad after taking into account alliance effects. It is measured as the ratio of the two nations' mean adjusted national capability scores during each 10-year period. The ratio is defined as the mean adjusted national capability of the weaker power divided by the mean adjusted capability score of the stronger nation.

Another independent variable, the power transition between the two nations in a dyad after considering alliance effects, is defined as the overtaking of one nation's adjusted capability by the opposing nation's adjusted capability. When a less powerful nation in terms of adjusted capability grows more powerful than the opposing nation during the 10-year interval, a transition of power between the two is said to have occurred and is coded as 1. Otherwise, it is coded as 0.

The alliance growth rate variable is defined as the difference between the growth rates of the two nations *i* and *j* after taking into account their allies' support. The average growth rate of each power for each 10-year period is calculated by $\{\sum[(NC_{t2} - NC_{t1})/NC_{t1}]\}/10$, where NC_{t1} is each power's adjusted capability for the year $t1$. The difference is measured as the smaller average growth rate of one power subtracted from the larger average growth rate. So if the growth rate of one nation is high and that of the other is low, the difference will be great; whereas if the growth rates of both nations are low or high, the difference will be small.

Organski (1968) argues that the dominant power is the nation more satisfied with the existing order, and if a nation is in favor of the status quo, it is "satisfied" too. On the other hand, if a nation that does not like the status quo seeks to upset the existing order and establish a new order in its place whenever it has power to do so, it must be a "dissatisfied" nation. Based on this argument, I suggest that the dominant nation is always satisfied. The dissatisfied challenger is the nation that has little or no common interest with the dominant power. The more dissatisfied a challenger is, the less common interest it shares with the dominant nation.

To measure the level of dissatisfaction, I first determine which nation is dominant in each 10-year period. The dominant nation is, of course, the nation whose national capability score is the highest in that period. Then the weaker power, *j*, in each dyad is paired with the dominant nation, and an estimate of the S-score between the two is calculated. If the mean S-score over a 10-year period between the dominant nation and

17. Here, formal alliance relationship includes a defense pact, neutrality, a nonaggression pact, and entente. Data for formal alliances are obtained from the EUGene data (Bennett and Stam 2002). I have also developed another version of the adjusted capability data by differentiating a defense pact from other types of formal alliance. In this measure, for example, if *k* has a defense pact relationship with *i*, whereas *k* has an entente relationship or a neutrality pact or a nonaggression pact with *j*, then *k*'s internal capabilities are simply added to *i*'s internal capabilities. In this example, I assume that nation *i* expects support from *k* because *k* and *i* have stronger alliance ties with each other than *k* and *j*. Results of the logit analysis of model 1 based on this adjusted capability measure also parallel those reported in Table 3. Again, this finding demonstrates that results reported in Table 3 are empirically robust.

TABLE 3
Logit Equations for the Occurrence of War

Independent Variable	*S-Score Version*	*Simply Added Version*
Intercept	–3.19	–2.662
Alliance transition	0.49 (0.97)	0.06 (0.11)
Alliance growth rate	–0.26 (–0.27)	–0.012 (–0.08)
Alliance parity	–0.11 (–0.09)	–0.51 (–0.49)
Alliance Parity × Dissatisfaction	1.49 (2.47)*	1.31 (1.73)*

NOTE: Numbers in parentheses are *z* statistics.
*Significant at the .05 level, one-tailed test.

nation *j* is positive, then the weaker power *j* is a "satisfied" nation. If the mean S-score for a 10-year period is negative, then the weaker power *j* is a "dissatisfied" nation for that period. With this measurement of the level of dissatisfaction of each nation, the dissatisfaction variable is coded as 1 if the weaker power is dissatisfied and 0 if it is satisfied.[18]

DATA ANALYSIS

To test the four modified power transition hypotheses described above, a model is specified as follows. In model 1, the alliance parity variable, the alliance growth rate variable, the alliance transition variable, and an interactive term of the two variables—alliance parity and dissatisfaction—are included to test the revised power transition arguments.

Model Specification 1:

$$\text{War} = \beta_1 + \beta_2 \times (\text{Alliance Transition}) + \beta_3 \times (\text{Alliance Growth Rate}) + \beta_4 \times (\text{Alliance Parity}) + \beta_5 \times (\text{Alliance Parity} \times \text{Dissatisfaction}) + U,$$

where β_is are parameter estimates and U is the stochastic error term.

18. For more details about the definition and measurement of the dissatisfaction variable, see Organski (1968) or Kim (1991, 1992, 1996). According to DiCicco (1998), this measure "continues to elicit the approval of power transition testers." But I do not suggest that the measurement for the dissatisfaction variable in this analysis is a perfect one or the only measure available in the power transition literature. Power transition theorists have made a number of efforts to operationalize the level of dissatisfaction and incorporate it into their models. Other than the dissatisfaction variable included in this analysis, there are Werner and Kugler's (1996) dissatisfaction indicator based on extraordinary military buildups, Gibler's (1998) joint alliance and status inconsistency measure, and Lemke and Reed's (1996) assessment of the similarity of domestic structures. I could attempt to test the revised power transition model with these dissatisfaction indicators or try to improve my measurement procedure further, but I reserve such efforts for future research. For discussion about the advantages and disadvantages of the measurement of the level of dissatisfaction, see Benson (1998); DiCicco (1998); DiCicco and Levy (1999); Lemke and Reed (1998); and Oneal, de Soysa, and Park (1998).

Because the dependent variable, war, is dichotomous, maximum likelihood estimates are employed. Logit analysis estimates the affect of each independent variable on the log of the odds ratio of the dependent variable using the maximum likelihood procedure. Results of the logit analysis for model 1 are summarized in Table 3. I report two versions of the logit analysis results for model 1. As described above, the S-score version of the adjusted capabilities is based on shared patterns of alliance commitments, whereas the simply added version is based on actual alliance commitments. Statistical significance levels are reported based on one-tailed tests because I have expectations about the direction of predicted effects as well as their magnitude.

Results of model 1 show that the parameter estimate of the interactive term of the alliance parity variable and the dissatisfaction variable is statistically significant at the .05 level for both the S-score version and the simply added version. Here, results of the S-score version parallel those of the simply added version. Results of model 1 thus indicate that the alliance parity variable and the dissatisfaction variable have an interactive effect on the likelihood of war, and this finding is empirically robust.[19]

The value of the maximum likelihood estimate of the interactive term of the two variables—alliance parity and dissatisfaction—in the S-score version of model 1, for example, is 1.49. This means that the likelihood of war increases about 32% for one unit change in both the alliance parity variable and the dissatisfaction variable, holding other variables constant.[20] That is, war is more likely when the capabilities of the two sides, after considering their allies' support, are approximately equal and the challenging power is dissatisfied with the existing order.

To see if there is any serious multicollinearity problem for model 1, I calculate correlation coefficients for all possible pairs of the variables in the model. The S-score version of model 1 does not seem to have any serious multicollinearity problem. In the S-score version, the correlation coefficient between the alliance transition variable and the alliance parity variable is the highest at .54. The correlation coefficients for all other pairs are less than .3. However, in the simply added version of model 1, there are two correlation coefficients that are greater than .5. The correlation coefficient between alliance transition and alliance parity is .64, and the correlation coefficient between the interactive term of the two variables—alliance parity and dissatisfaction—and the alliance parity variable is .53. So the significance tests used here, especially in the simply added version, should be viewed as a heuristic device to suggest the relative strength of associations.[21]

19. To examine the importance of the alliance factor on the outbreak of war, I have conducted two more analyses by adding three additional variables that are measured based on each nation's internal capabilities alone—power transition, the rate of growth, and power parity—to each equation of the S-score version and the simply added version of model 1. Results of these two analyses parallel those reported in Table 3. Results of these two analyses indicate that only the parameter estimate of the interactive term of the two variables—alliance parity and dissatisfaction—is statistically significant at the .05 level.

20. The minimum value of the relative adjusted national capability ratio in this data is about .15, and the maximum value is almost 1.00. So by changing the value of the alliance parity variable from .15 to 1.00 and the dissatisfaction variable from 0 to 1, I obtain approximately a .32 increase in the probability of war, holding other variables constant: $p = 1/(1 + e^{-1.0 \times 1.49}) - 1/(1 + e^{0 \times 1.49}) = .82 - .5 = .32$.

21. If an independent variable is nearly a linear combination of other independent variables in the model, it can be said that there is a multicollinearity problem. In the case of multicollinearity, the sample variance of the estimated coefficients increases as the correlation between the independent variables increases, giving less precise estimates of the true coefficients. But this tendency does not become serious

Findings from model 1 support the main argument that war is most likely when the dissatisfied challenger approximates its rival, although they also indicate that the alliance parity variable, the alliance growth rate variable, and the alliance transition variable do not have individual effects on the occurrence of war. These findings suggest that the opportunity factor alone is not enough for explaining the likelihood of war. The opportunity factor and the willingness factor together explain better the occurrence of war in East Asia. One of the arguments of the power transition theory that is overlooked by both Organski and Kugler's (1980) and Houweling and Siccama's (1988) empirical analyses regards the interactive term of power parity and dissatisfaction. Organski (1968) argues that when the challenger's power becomes more or less equal to the capabilities of the dominant power, if it is satisfied, the power transition can be resolved without conflict. However, if the challenger is not satisfied, war is most likely. This argument is strongly supported in the analyses.

CONCLUSION

Many recent studies have found a general link between power parity, alliance, dissatisfaction with the status quo, and war. The evidence in this investigation indicates that conflicts in East Asia occur under the same general conditions that lead to war in the international system. That is, the alliance transition model, a revised version of the power transition theory, is not just useful for explaining and predicting great power conflict in the Eurocentric international system. The evidence in this study shows that the revised power transition model can be applied to East Asia, where regional minor powers meet external great powers and live together.

The evidence in this analysis also suggests that power parity provides an opportunity to initiate a conflict. In addition, the dissatisfied challenger acts on its willingness to challenge its rival. Thus, "both opportunity and willingness are required" for conflicts to occur (Russett and Starr 1992, 23). Together with these opportunity and willingness factors, the dynamics of power transition cannot be understood in a vacuum apart from the alliances that the states form. Alliances are vital ingredients in the decision to engage in war and thus play a critical role in understanding wars in East Asia as elsewhere.

The Sino-Japanese rivalry, conflict in the Taiwan Straits, or war in the Korean peninsula may very well materialize in the near future if both the opportunity and willingness factors are satisfied. China's rapid growth and its dissatisfaction with the status quo may lead to a cataclysmic war. Taiwan's declaration of independence may induce China's attack on Taiwan's soil and escalate into a war in which most of the great powers participate. A clash in the demilitarized zone (DMZ) in the Korean peninsula may spark a war between great powers as well. As long as a power parity situation emerges

until the correlation coefficient exceeds .5. Also, precise estimates of the coefficients for the relatively uncorrelated variables can still be obtained even when there is a high collinearity between two specific variables in an equation. This means that in the S-score version of model 1, precise parameter estimate can still be obtained for the interactive term of the two variables—alliance parity and dissatisfaction. See Hanushek and Jackson (1977).

between China and Japan or between South Korea and North Korea, and either side in a dyad is willing to change the status quo, a war in the region is highly likely and may escalate into a bigger war.

The evidence of this study suggests, however, that the future is not so bleak. Because not only internally derived capabilities but also alliances are sources of power, the risk of war may be manipulated and prevented through both internal and external means of augmenting national capabilities. Through alignment and realignment of nations, by strengthening and enlarging each power's alliances, or by weakening and shrinking opposing coalitions, wars that might otherwise result from periods of power transitions could be prevented.

Thus, this study highlights three significant conclusions. First, although transitions of power and the difference in the growth rates between the two sides have no statistically discernible effect in this analysis, the evidence in this research strongly supports the main argument of the revised power transition theory: that the challenger's level of dissatisfaction, together with an equal distribution of power between the two rivals after taking into account alliance effects, increases the likelihood of conflict.[22] Second, the evidence in this study supports the concept of foreign policy substitutability (e.g., Most and Starr 1984). Alliances, as well as internally derived capabilities, provide power. Therefore, the role of alliances is crucial to mitigating or militating the risk of war, contrary to the original and standard power transition formulation. Third, because alliances play a central role in the risk of power transition wars, the dangers of such a conflict in East Asia (or elsewhere) can be managed through skillful strategies of alignment and de-alignment.

22. In this study, I do not claim that balance-of-power arguments are empirically useless or not supported. To test the empirical usefulness of the balance-of-power hypotheses, it would be necessary to construct another equation fully specified for balance-of-power theory.

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