

**Charting the Korean Peninsula:
A 1990-2000 Assessment of North Korea Event Interactions**

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Abstract

This paper introduces the VRATM *Knowledge Manager*, a real-time data development and analysis software system designed to process large volumes of text-based information. The system is designed to illuminate countries' vulnerabilities to natural and social hazards by monitoring global news wire service reports, assessing them and presenting up-to-the-minute intelligence in graphs, maps and tables. Following a short description of the system, a decade of North Korean events data analyzed using indicators of conflict carrying capacity, forceful action and conflict and cooperation.¹

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Project Background

In 1988, Doug Bond began working on what subsequently came to be called the Protocol for the Assessment of Nonviolent Direct Action (PANDA) project at Harvard University. The original mandate of the project was to "count and assess" the global incidence of nonviolent direct action in an effort to determine under what conditions and for what objectives nonviolent direct action might be "successful," and to search for evidence that it was diffusing across national boundaries. By 1991 we had determined that automated coding was the only way this objective could be realized so we became the primary beta test site for the public domain, sparse parsing software designed by Professor Philip Schrodt at the University of Kansas (The Kansas Events Data System or KEDS). Through 1995 we designed what came to be known as the Protocol for the Assessment of Nonviolent Direct Action (PANDA) to increase KEDS' sensitivity to the not yet violent, but coercive and contentious actions that often serve as precursors to violence.

In 1996 we established Virtual Research Associates, Inc. (VRA), a Massachusetts corporation, and began to develop the second-generation software needed to further our research. The co-authors retain affiliations with Harvard (D. Bond as a member of the research staff and J. Bond and C. Oh are affiliates), where the protocol development continues in the public domain. In 1996 the Harvard team began to work with a social movements scholar, Professor Craig Jenkins, from Ohio State University and Professor Charles Taylor, a political scientist and editor of the *World Handbook of Social and Political Indicators*, from Virginia Tech. Over the last four years we have developed the Integrated Data for Event Analysis framework (IDEA) that has effectively superseded PANDA. The IDEA protocol is used with the VRA™ *Knowledge Manager* software system, a real-time data development and analysis software system designed

to process large volumes of text-based information. The system can illuminate countries' vulnerabilities to natural and social hazards by monitoring global news wire service reports, assessing them and presenting up-to-the-minute intelligence in graphs, maps and tables. By spotting areas where instability or violence is likely to occur, the VRA™ *Knowledge Manager* is currently providing early warnings about potential international "hot spots" to government agencies, academic and humanitarian organizations.

The VRA™ *Reader* is one of three components making up the VRA™ *Knowledge Manager*. Its syntax frame-parsing engine handles large volumes of text and orders it into the appropriate syntactic and semantic units. The VRA™ *Reader's* output matrix of "events"--*who does what to whom when, where and why*--can then be analyzed by statistical and other means.²

In 1998 VRA was contracted by the Center of Excellence in Disaster Management & Humanitarian Assistance (COE), located at Tripler Army Medical Center in Hawaii to refine the software system in the field and work toward a real-time events monitoring capability for the Pacific region. Thanks to the COE support, we have deployed, extended and refined the software over the last two years. With additional support from other clients, we have been able to deploy an events reporting, monitoring, analysis and display system that currently offers monthly updates. By the end of this calendar year (2000) we plan to have the updates available fortnightly.

²The VRA™ *Reporter* and the VRA™ *Visualizer* make up the remaining components of the VRA™ *Knowledge Manager*. The VRA™ *Reporter* direct field reporting utility adds increased perspective and accuracy in evaluating dynamic conditions. Direct observations and event logs from agents' reports can be integrated into the internet-based tool for enhancing the value of relevant information through utilizing a variety of independent intelligence sources. The VRA™ *Visualizer's* provides interactive representation of multiple data components and their relationships, all linked to original source material with simple point and click tools. The VRA™ *Visualizer* offers flexibility for users regardless of location as it is enabled for the World Wide Web. The VRA™ *Visualizer* takes extensive archives of source text, analyzes the information matrices, and displays multiple layers of the resulting intelligence in the form of constantly updateable tables, graphs, text and maps. When using the VRA™ *Visualizer*, the user is never more than three clicks away from the underlying input data (i.e., the Reuters' reports).

In 1998 also, the COE entered into a memorandum of agreement with Harvard University's Program on Nonviolent Sanctions and Cultural Survival (where the PANDA project is still based) to jointly further the IDEA protocol development. One distinctive feature of IDEA is its backwards compatibility with both nominally scaled events data frameworks like World Event/Interaction Survey project (WEIS), KEDS and PANDA as well as the ordinal-scaled frameworks that originated with the Conflict and Peace Databank (COPDAB), and now include International Political Interactions project (IPI) and Global Event Data System (GEDS), among others. In other words, by auto-generating global events data with IDEA, one can select the output tailored to a number of specific theoretical approaches and statistical requirements. The COE, then, is sponsoring both the public domain protocol development based at Harvard as well as the deployment of its own in-house monitoring and analysis system dubbed Asia Specific Information Analysis (ASIA).

In terms of statistical analysis, we have shared our data with a group at the University of Minnesota headed by Professor John Freeman. They have used Markoff modeling techniques to demonstrate that our violence and conflict carrying capacity (Bond, Jenkins, Taylor and Schock, 1997) indicators portend changes in contemporary currency regimes in Indonesia. Of course, currency fluctuation is but one economic indicator that is influenced by government stability. Dr. Freeman and his colleagues are just beginning to analyze our matrices on Thailand, Malaysia and the Philippines. We are concurrently working with Harvard University Professor Gary King's Military Conflict Project, a project that was awarded an NSF grant to study the public health consequences of armed conflict.

In a related development effort, VRA has designed a web-based field reporting system, dubbed the VRATM *Reporter*, that facilitates direct entry of situation reports into a data matrix

that is congruent with our news report parsed output. In this way, we are able to use situation reports to triangulate the view "from above" (i.e. the international news reports) with the view "from below" (i.e. the field office situation reports). This field reporting system has been use in use in Central Asia since the beginning of the year and is now being implemented by the United Nations on a trial basis.

The IDEA framework is designed to pick up a broad range of politically significant events, including cooperative, conflictive and other (natural disasters, and biomedical events, for example). This approach is extensible to pick up, say, democratization events, just as we pick up conflict events. In other words, indicators of developmental assistance could be used to monitor progress in the field. Given the long-term nature of developmental assistance, we believe such auto-monitoring of aid efforts will prove to be cost-effective way at getting at the elusive phenomena of "successful" efforts to build local capacities.

This remainder of this paper describes the VRATM *Reader* offers illustrative examples of event interactions among North Korea, South Korea, China, Russia, Japan, and the United States over the past decade. We began by parsing Reuters' news reports for the six nations using the **I**ntegrated **D**ata **E**vents **A**nalysis (IDEA) protocol powered by the VRATM *Reader*, a full-syntax frame parser. Next, we charted the parsed information for the nations under investigation utilizing the Conflict Carrying Capacity and Forceful Action Coefficients as well as the Goldstein Average (Goldstein, 1992). The graphs were then assessed against the backdrop of analysts' qualitative interpretations.

Analytic Approach

Printed information is said to double every ten years. (Haisser, 1999) Even in specialized fields, the volume of new information is so immense that professionals can't possibly read it all. The VRA™ *Reader* operates at both syntax and semantic levels. At the semantic level, the VRA™ *Reader* assesses words for their meaning, but also for the meaning they derive from the structural context of the sentence. Semantics recognizes that most words have more than one meaning but that we can generally identify the appropriate one by looking at the rest of the sentence. This syntax frame parsing approach to natural language parsing (NLP) differs from the more common statistical approaches. The latter come in a variety of forms, ranging from hybrid models in which grammars are augmented with rule application probabilities derived from a corpus to parsers that utilize no grammar rules. Both approaches are aimed at identifying the most probable parse of a sentence, given that a single sentence can often be associated with multiple syntactic structures.

While data development and the empirical measurement of mass conflict have a rich tradition, efforts thus far have focused almost exclusively on lethal conflicts and/or crises between states. Worldwide, comparative data on "lower intensity" conflicts, acute conflicts among non-state actors and, especially, nonviolent struggle have not been adequately developed, with few exceptions. Analysts typically do not exploit the full complement of information embedded in the voluminous news (event) reports crossing their desks each day. Rather it is left to individual analysts to (implicitly) incorporate whatever bits of this information into their interpretation of each evolving situation. In an information scarce environment, this approach may be feasible. However, in the current information environment, where information overload poses a significant obstacle to identifying and tracking event trends, the visual trend assessment

and display functionality of the VRA™ *Knowledge Manager* offers an intuitively satisfying and easy-to-use means of supporting analysts.

The VRA™ *Reader* extracts information embedded in the news stories and compiles it into visual traces of evolving social, political and economic events. These events are presented in graphs, tables and maps, which in turn are linked to the underlying news stories from which they were derived. Starting from these visual news trend displays, users simply “point and click” to read the particular stories that contributed to the trends. More conventional search strategies are based upon filtering, either with literal terms or with indices of their related concepts. These searches can only identify information already known to be relevant or with parameters that can be specified in advance. No filtering approach can address the challenge of identifying information that is not yet known to be relevant to the larger context of which it is a part. In other words, the filtering techniques of conventional search approaches can readily find the proverbial "needle in the haystack," but only when that “needle” can be specified in advance, and also at the cost of knowing nothing about what lies next to the "needle." Only with a text parsing approach can one begin to “see” the overall contours of all the news or "haystack,” including all potentially relevant news events or needles in the proverbial haystack.

According to Downs (1999: 253):

“The words ‘crazy,’ ‘irrational,’ ‘erratic,’ and ‘bizarre’ are too often used to describe North Korea’s negotiating behavior. None of them accurately characterizes the general effective, cleverly devised, skillfully implemented negotiating strategy pursued by this small, poor, and relatively powerless country.

In assessing event interactions and foreign policy strategies it is not enough to simply monitor events. A systematic measure of a regime’s viability or stability is required in order to provide the analyst with better historical perspective on the state of the regime. Specifically, the conflict carrying capacity trace indicates the capacity of a country to handle the conflict within its

institutional resolution procedures. A prolonged weakening of this capacity signals a vulnerability to contentious action, both violent and nonviolent in nature. Either capitulation or extra-constitutional direct action typically is used to prosecute conflict during troubled times. This concept differs from Robert Putnam's definition of democracy (1996), a definition that privileges openness, responsiveness and efficacy. Unlike Putnam's concept of democracy, our measure of conflict carrying capacity does not emphasize the openness or fairness of a regime. Rather it taps the efficacy of the regime's ability to manage internal and external pressures as indicated by reports of coercive and contentious forms of behavior. For example, Myanmar exhibits very high conflict carrying capacity, as does the United States. Yet, their respective mechanisms or means of managing conflict are very different.

Following the definition posited by D. Bond *et al.* (1997) we define conflict carrying capacity in terms of three factors: 1) the proportion of civil actions that are reported as contentious or "direct" challenges to the state's monopoly on conflict regulation (PDA); 2) the proportion of state actions that are reported as extra-institutional or "direct," both in response to direct challenges from the civil sector and as unilaterally initiated by a regime to repress opposition (state PDA); and 3) the proportion of physically forceful actions (i.e. violence) to all reported actions among all parties within the system (total PFA).³ These proportions are then subtracted from unity to facilitate interpretation (Bond et al. 1997, pp. 560-61).⁴

$$CCC = 1 - (((\text{civil PDA}) * (\text{state PDA})) * (\text{total PFA}))$$

For example, let's assume the following:

Civil PDA = 0.9

State PDA = 0.9

Total PFA = 0.9

³ The denominator for this third term is all reported direct action within the polity, by both the civil sector and the state. Also, the numerator, all reported forceful action, is defined as a subset of direct action.

⁴ This is the latest iteration in a series of formulas first proposed by Bond and Voegelé (1995).

The above scores suggest extremely high levels of direct action (e.g., killing, protest demonstrations, strikes, etc.) as opposed to “routine political action” (e.g., voting, transactions, discussions, etc.) on the part of both the state and civil society in addition to very high levels of physical force. These scores yield a very low conflict carrying capacity score:

$$0.27 = 1 - (((0.9) * (0.9)) * (0.9))$$

Contrast this with low levels of civil and state direct action and low levels of forceful action:

Civil PDA = 0.1

State PDA = 0.1

Total PFA = 0.1

The above scores suggest extremely low levels of direct action on the parts of civil society and the state and low overall levels of physical force. These scores yield a very high conflict carrying capacity score:

$$0.999 = 1 - (((0.1) * (0.1)) * (0.1))$$

According to Bond *et al.* (1997: 560):

One striking feature of the range of scores...is their stability in the upper range of 0.9 to 1.0 even when extreme contentiousness is driving a conflict. For example, in a conflict consisting of 90% direct action with minimal (10%) violence, the carrying capacity score is still 0.91. However, in a conflict with only a third as much direct action (30%), of which 50% is violence, the score drops to 0.85. In other words, relatively large changes in contentiousness are less significant in the score than even small changes in the proportion of violence the actions employ.

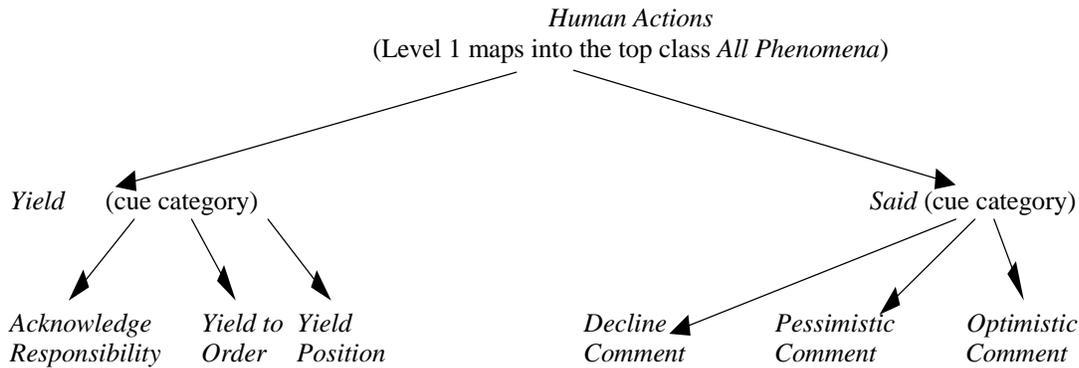
Bond *et al.* (1997: 560) go on to explain that “[t]here appears to be a vulnerable system threshold score of around 0.90, at least with our preliminary event data for the last decade.”

The data used in this study was derived from the IDEA framework. IDEA consists of 169 political, social and economic events and includes 32 macro (or cues⁵). Event forms are mapped in a hierarchical fashion consisting of five levels, beginning with the top class *All Phenomena*.

⁵ See McClelland (1976) and Tomlinson (1991) for a discussion.

Three classes make up the first level: human conditions, other incidents and human actions, animal death and animal illness.⁶ A tree of selected events is illustrated below in Figure 1.

Figure 1. IDEA Events Top Classes



Human Actions, a level one class, maps to *All Phenomena*, the top most class. *Yield* and *Said* are second level event forms also dubbed *cue categories* (see Figure 1.). Below the cue categories are three event forms associated with the *Yield* class: *Acknowledge Responsibility*, *Yield to Order*, *Yield Position* (level three events). Similarly, the level three events *Decline Comment*, *Pessimistic Comment* and *Optimistic Comment* are subsets of the *Said* class. In some cases there are even lower level event forms present. For example, the level four event form *Arbitration* maps to the level three event form *Discussions* which, in turn, maps up to the level two event form *Consultation*. *Consultation*, a cue category, is subset of *Human Action* that, in turn, is a subset of *All Phenomena*. This hierarchical scheme gives protocol developers the flexibility to map lines of protocol up or down the hierarchy depending on the specificity of the content.

Unlike the Protocol for the Assessment of Nonviolent Direct Action (PANDA), IDEA utilizes a class-based and semantic-based approach to political events mapping. Rather than

⁶ Twenty-eight of the thirty-two IDEA cue categories map to Human Actions.

mapping a single noun to a single verb, we map sets of nouns [classes] to sets of verbs [*synsets*].⁷ Unless the various combinations of subject-verb-direct object are spelled out *a priori*, they will not be identified and thus not mapped. A class of nouns titled GUNS, for example, may contain hundreds of entries ranging from handguns to ballistic missiles. This class, in turn, is mapped to IDEA event forms that may contain dozens of different verbs. The basic parameters for mapping words include: 1) Subject (a noun class), 2) Direct Object (a noun class), 3) Indirect Object (if any), 4) Event (a verb class or verb *synset*) and 5) Verb Frame. When combined these components constitute an event mapping.

To illustrate the relationship between the five parameters let's look at the verb *kill*. According to WordNet,⁸ the verb *kill* has fourteen discrete senses or meanings, the most common of which is "cause to die" or "put to death" (e.g., "This man has *killed* several people when he tried to rob a bank"). Unlike other *synsets*, this sense contains only one entry, the verb *kill*. In order to map the above sense of the verb *kill* we begin by selecting an appropriate verb frame: *Somebody kills Somebody* [as opposed to *Somebody kills Something* or *Something kills Somebody*]. Next, we select the most appropriate IDEA event form. In this case *Physical Assault* is the most appropriate selection. The next task is to specify the subject and direct object. We assign the noun class *True Agents* to both the subject and direct object. This mapping instructs the parser to find a match corresponding to the *synset kill* (sense #1) and with a subject and an object that refers to *somebody* (*true agents*). Using the same verb but substituting the verb frame with the *Something Verbs Somebody* verb frame we can insert the noun class *Weather Condition*

⁷ A *synset* is a set of words that share a common meaning. For example, the noun "love" contains 6 senses, one of which means "a beloved person; used as a term of endearment." This sense contains six discrete noun entries: love, beloved, dear, dearest, loved one and honey.

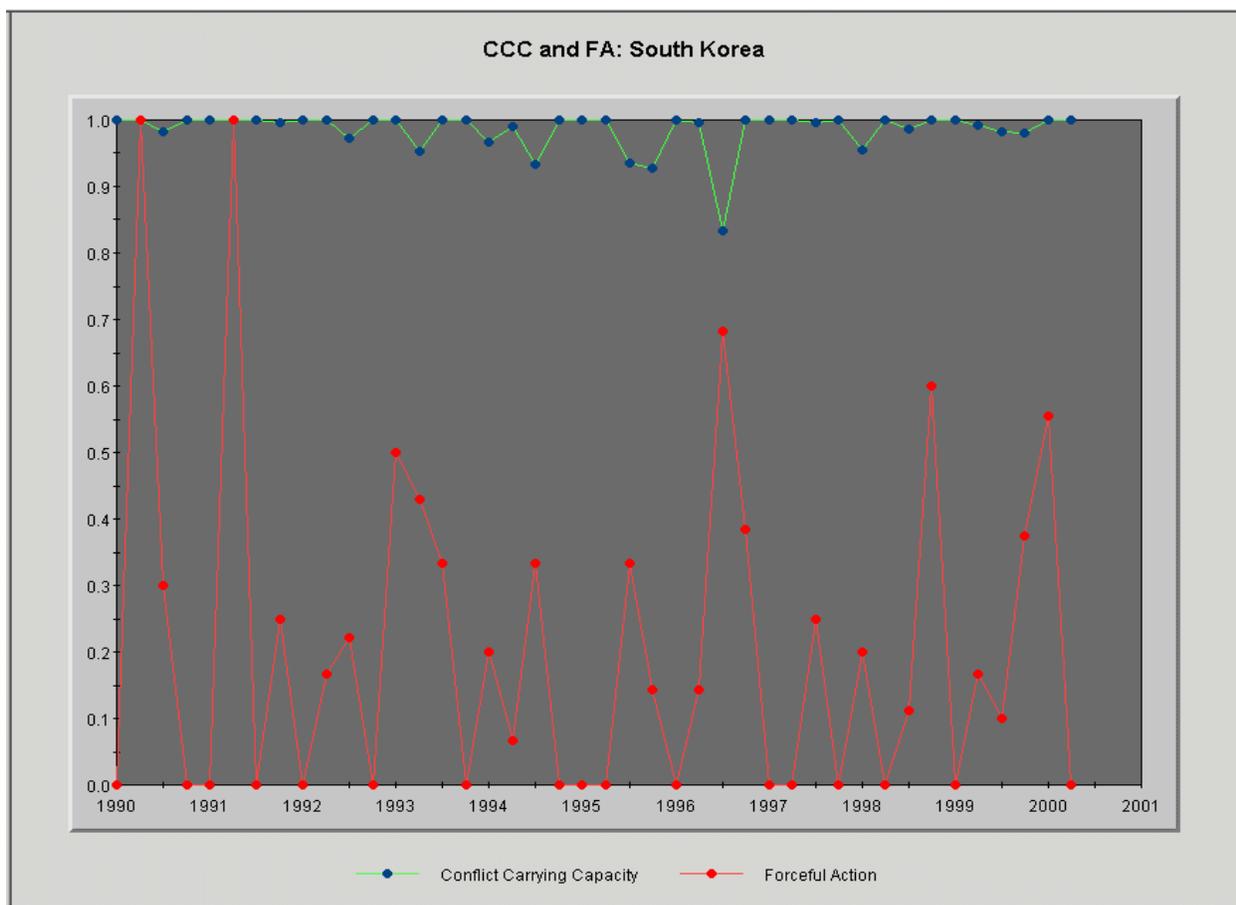
⁸ See <http://www.cogsci.princeton.edu/~wn/>

as the subject and the event maps to the IDEA event form *Natural Disaster* (e.g., "a tornado killed five persons in Kansas today.").

North Korean Event Interactions

We began by generating a decade-long time series of conflict carrying capacities scores for South Korea, North Korea, USA, Japan, China and Russia in order to facilitate retrospective interpretation. Figures 2 – 7 depict the conflict carrying capacities juxtaposed with the use of forceful action for all six countries.⁹

Figure 2. CCC and Forceful Action: South Korea



A series of both domestic and internal events, particularly as they relate to North Korea, are attributed to South Korea's diminished conflict carrying capacity by mid-1996. Although

South Korea appears to have adopted a “carrot policy” toward the North,¹⁰ by the end of April. By the close of the first quarter of 1996, cooperation between the North and South began to deteriorate. Beginning in the second quarter of 1996, the North began to witness a surge in defections to the South culminating in the defection of Hwang Jang Yop, a member of the Central Committee of North Korea’s ruling Workers’ Party in February 1997.¹¹ The defection of Hwang Jang Yop, the highest-ranking official ever to defect from North Korea, placed China in an awkward position. According to Zhang (1997: 81-82):

During the 1980s, Pyongyang maintained a closer relationship with Moscow than with Beijing. By 1989, however, an increasing rift between North Korea and the Soviet Union had emerged as the latter gradually distanced itself from its old communist alliance and moved towards East-West détente. At the juncture of shifting relationships, CCP General Secretary Zhao Ziyang visited Pyongyang for a week in April at the invitation of North Korean President Kim Il Sung. The summit of the two party leaders not only renewed their pledge of friendship but also prepared for the two countries’ co-operation after the unexpected Tiananmen incident.

The North Korea and China realignment was first tested in August 1992 when the latter departed from the “One Korea” policy by recognizing South Korea. Hwang Jang Yop’s move to seek asylum in the South Korean Embassy in Beijing prompted the “Chinese police to seal off the South Korea’s Embassy, while Pyongyang warned of an unspecified attack” (Zhang, 1997: 84). About one month later, Beijing defused the situation by handing over the North Korean defector to the Philippines.

By far the most salient factor contributing to the South Korea’s diminished conflict carrying capacity is the bloody conflict that ensued following the September 18, 1996 discovery of a North Korean submarine grounded on rocks. By November 5, 1996, only one of the 26

⁹ Figures 2-7 were generated with the VRA™ Visualizer.

¹⁰ *Reuters Business Briefing* (4/26.96)

¹¹ Beginning around May 1996 and lasting through February of the following year, the South Korean government also increased its number of arrests of South Korean student “dissidents.”

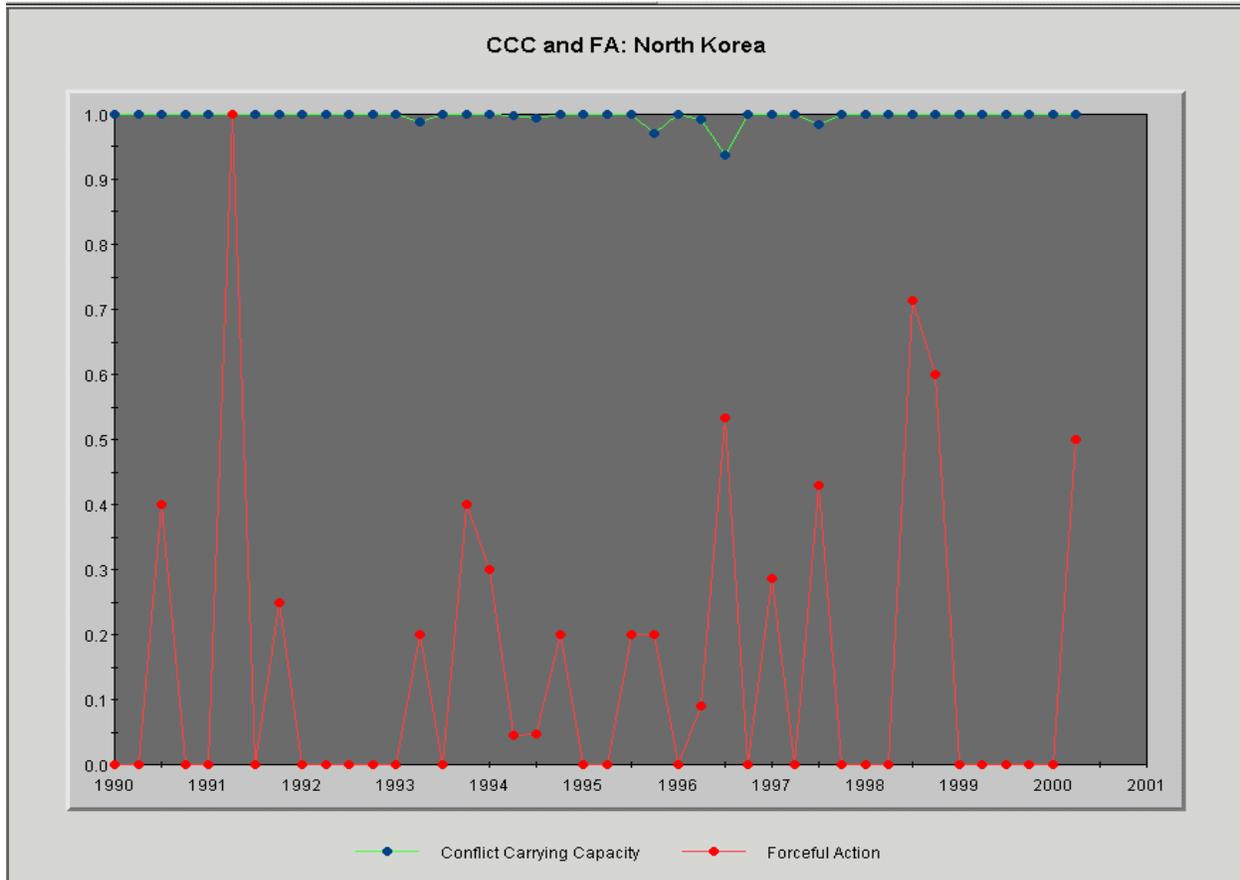
remains at large. Twenty-two of the 26 agents had been killed and one captured alive.¹² Exacerbating an already tense situation was the murder of a South Korean diplomat in Vladivostok. The South pointed the finger at the North, claiming the latter had carried out the assassination in retaliation over the clash that ensued from the submarine incident. On October 1, 1996, Kim Young-sam launched a full review of all aid to North Korea.¹³ Tensions between the North and South continued to plague Kim Young Sam's presidency until February 1998 when former South Korean dissident turned President Kim Dae-jung took the presidential oath of office.

It is evident from Figure 3., below, that the event interactions between the North and the South had a reciprocal effect on the conflict carrying capacities of each. Both countries exhibit high levels of physical force and their respective conflict carrying capacities appear to mirror one another.

¹² *Reuters Business Briefing* (10/5/1996).

¹³ *Reuters Business Briefing* (10/1/1996).

Figure 3. CCC and Forceful Action: North Korea



Note that the conflict carrying capacity for the South is, on average, less than its counterpart in the North. While this may seem counter intuitive to some, it does logically fit. Reports of violence taking place from within North Korea are extremely rare as are reports of direct action. Thus, it is safe to infer that the bulk of North Korea's diminished conflict carrying capacity can be attributed to the contentious behavior directed outside its own borders (i.e., against the South). In contrast, reports of contentious action in South Korea on the part of civil society and the government are widespread. Although our data does not necessarily imply that North Korea is more stable than its southern counterpart, it does suggest that the North is less impeded by internal dissent than its southern neighbor. Most dissent in the North takes the form of political flights whereas in the South demonstrations and clashes with police are relatively commonplace.

Our data suggests that 1996 constituted the most dangerous year for the Korean peninsula during the last decade of the 20th century. Tensions between the two nations, manifest in both verbal and physical behavior, reached an all-time high. Increased internal dissent, evidenced by a significant increase in defections from the North and increased arrests of dissidents in the South, created a further strain on both nations. In December 1996 U.S. CIA Director John Deutch went as far as predicting that within three years North Korea would be at war with South Korea, collapse as a state or be on the road to reunification.¹⁴ Testifying before the U.S. Senate Intelligence Committee, Deutch argued that within the next three years North Korea would either:

...invade the South over one issue or another -- war will break out. Or it will collapse internally or implode because of the incredible economic problems that the country faces. Or, third, it will over time lead to some peaceful resolution and reunification with the South.”¹⁵

While one could argue that Deutch’s prediction covered all possible bases, it also substantiates the tense state of affairs.¹⁶

Figures 4 – 7 depict conflict carry capacities juxtaposed with physical force for Japan, United States, China and Russia. These four profiles lend support to the argument that baselines for each country should be established before making cross-country comparisons.

¹⁴ *Reuters Business Briefing* (12/11/1996).

¹⁵ *Ibid.*

¹⁶ China’s role in mediating the autumn 1996 crisis is often overlooked. Beijing’s decision to endorse the Security Council’s expression of “‘serious concern’ by addressing the general situation on the Korean peninsula for the first time since the end of the Korean War in 1953,” no doubt had a positive effect on Pyongyang’s subsequent actions (Zhang, 1997: 93).

Figure 4. CCC and Forceful Action: Japan

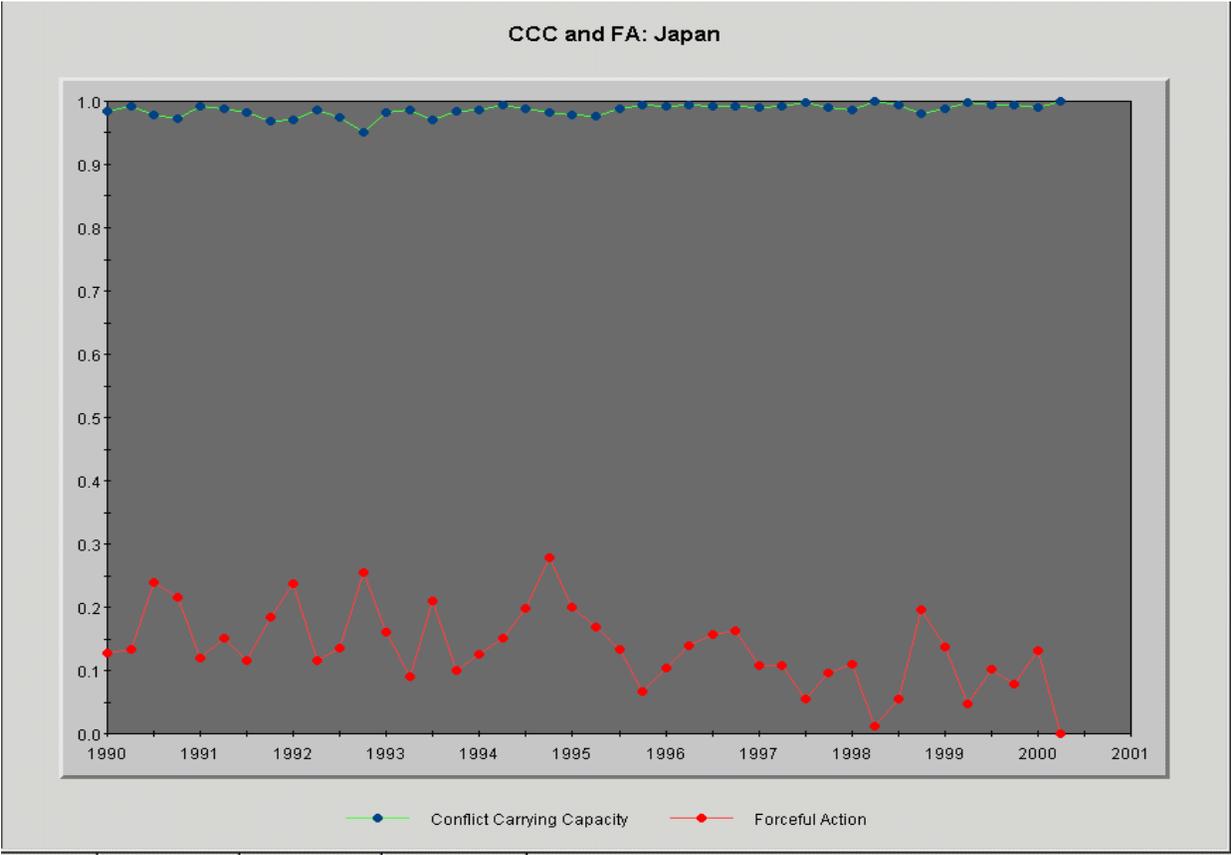
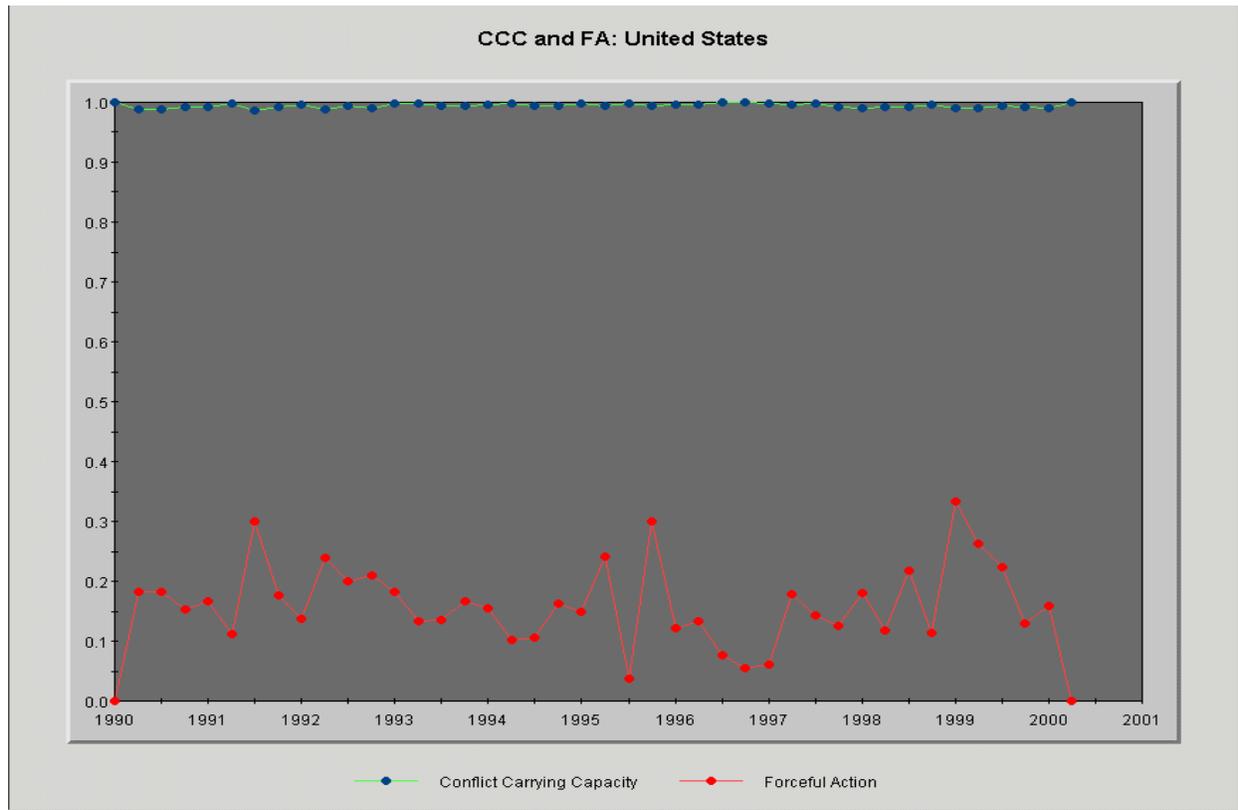


Figure 5. CCC and Forceful Action: United States



Figures 4 and 5 depict two nations (i.e., Japan and the United States) with high conflict carrying capacities coupled with moderate levels of violence. The data suggests that these two countries are relatively successful in mediating conflict within their borders. Contrast these nations with China and Russia (see Figures 6 and 7, respectively).

Figure 6. CCC and Forceful Action: China

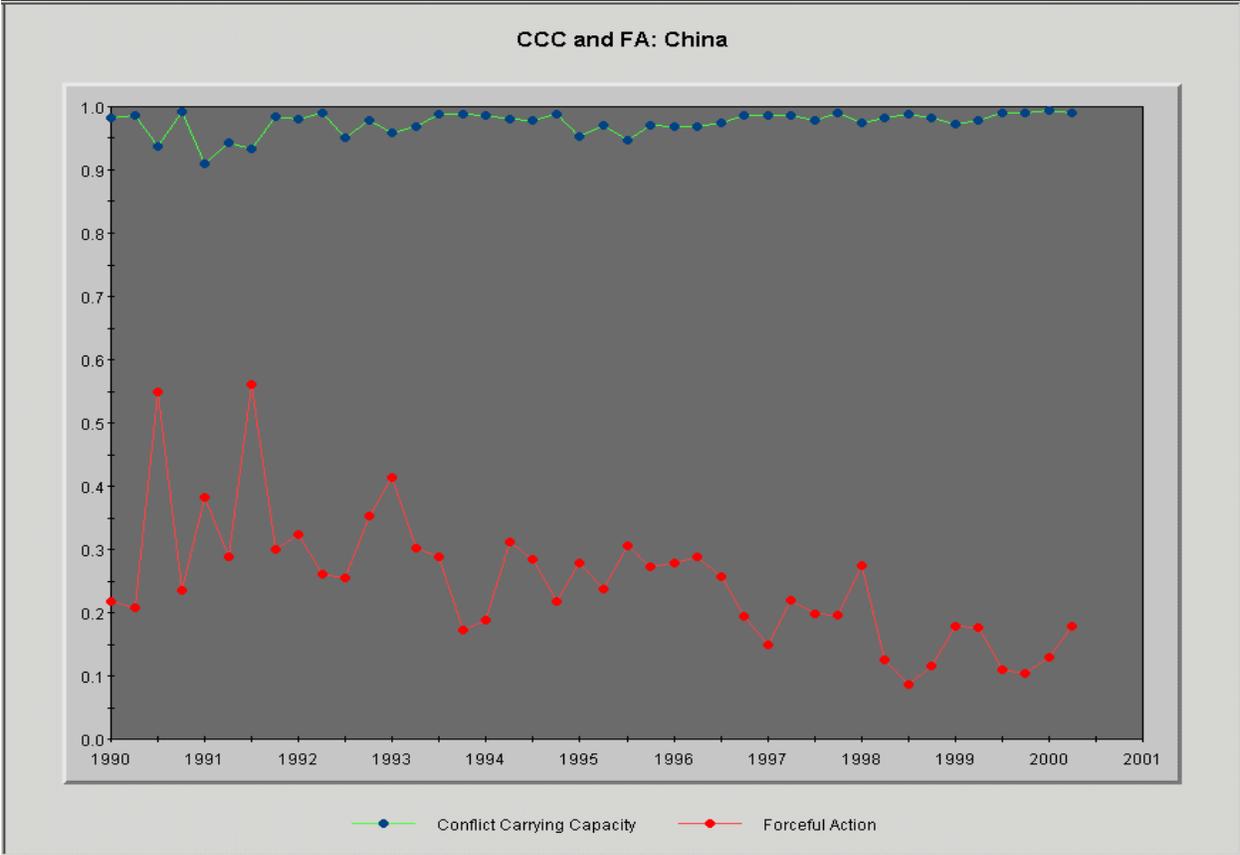
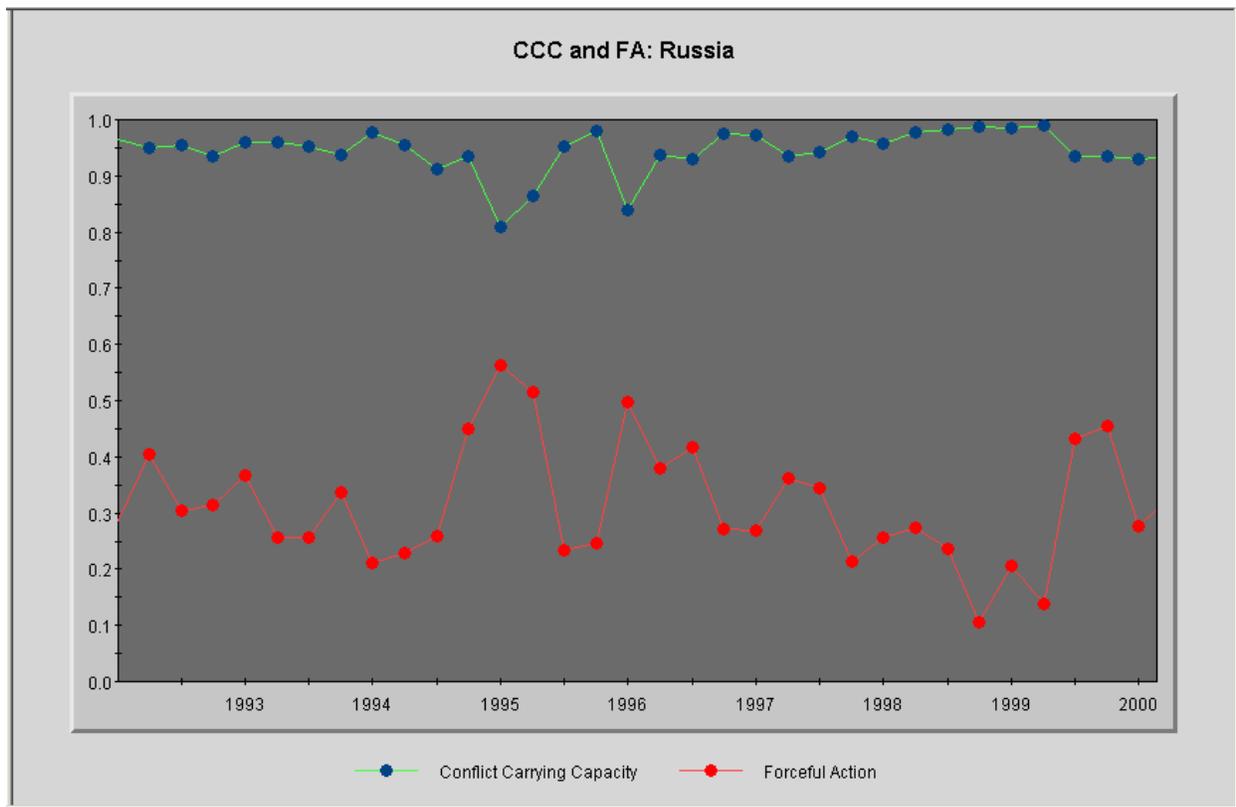


Figure 7. CCC and Forceful Action: United States



The relative volatility of China's conflict carrying capacity in the early 1990s reflects the aftermath of the Tiananmen Square incident of June 4, 1989 and the subsequent collapse of the Soviet and Eastern European communist regimes (see Figure 6.). The slight drop in Russia's 1993 3rd quarter's conflict carrying can be attributed to the October coup attempt.¹⁷ Significant drops in Russia's conflict carrying capacity accompanied by sharp increases in the use of physical force can be attributed to the beginning of the war in Chechnya (December 9, 1994 through December 13, 1994).

¹⁷ *Reuters Business Briefing*, 10/3/1993.

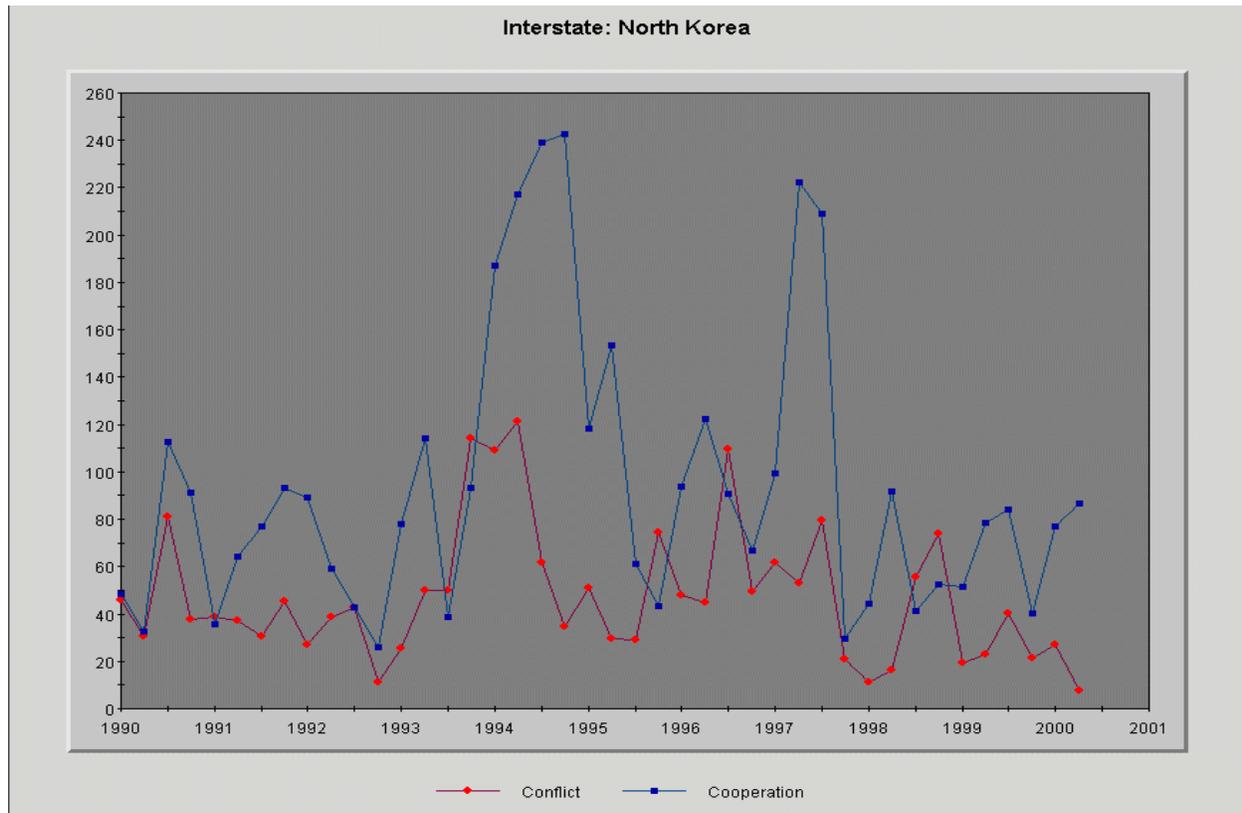
Between late 1995 through mid-1996, the war between Russia and Chechnya entered its most violent stretch. At least 41 bombings alone were recorded in Reuters.¹⁸ Between August 1996 and June 1997 media fatigue set in, the war geared down, and a fragile peace agreement was put in place. Hostilities resumed in September 1999 and continue through the present. The conflict carrying capacity profiles of South Korea, North Korea, Japan, the United States, China and Russia are a product of circumstances unique to each country.

Figure 8 illustrates levels of conflict and cooperation along the interstate dimension for North Korea. The conflict/cooperation trends were generated with Goldstein's 1992 conflict-cooperation scale, a scale that was designed for use with the WEIS framework¹⁹ Data points above 0 indicate varying magnitudes of cooperation while points falling below zero suggest conflict. Goldstein's 1992 conflict-cooperation scale ranges between +8.3 [highly cooperation] and -10 [highly conflict]. Conflictive and cooperative events can be verbal or behavioral. For example, a "military raid" is weighted as highly conflictive while "criticism" is weighted as slightly conflictive. Similarly, "military aid" is weighted as highly cooperative while "discussions" are weighted as less cooperative.

¹⁸ Note, this figure is limited to bombings only. It does not include stories that report military clashes, raids, physical assaults, etc.

¹⁹ Because of IDEA's backwards compatibility with WEIS, we can utilize the Goldstein conflict-cooperation scale.

Figure 8. Interstate Conflict and Cooperation: North Korea



The conflict spike in 1993-1994 can be attributed to the “nuclear crisis” that engulfed the peninsula. This crisis was followed in 1995-1996 with the heightened tensions between the North and the South culminating in the North Korean submarine incursion into Southern waters. A third conflictive spike in 1998 can be attributed to North Korean missile testing. On August 31, for example, North Korea launched a three stage Taepo-dong 1 missile across Japan and into the Pacific Ocean²⁰. It is noteworthy that the North appears to implement a mixed crisis strategy of conflict and cooperation. Specifically North Korean conflict and cooperation appears to co-vary.

Figures 9-18 contain quarterly traces of conflict-cooperation for the North Korean dyadic relations.

²⁰Downs (1999:279).

Figure 9. Directed Dyad: North Korea > PRC

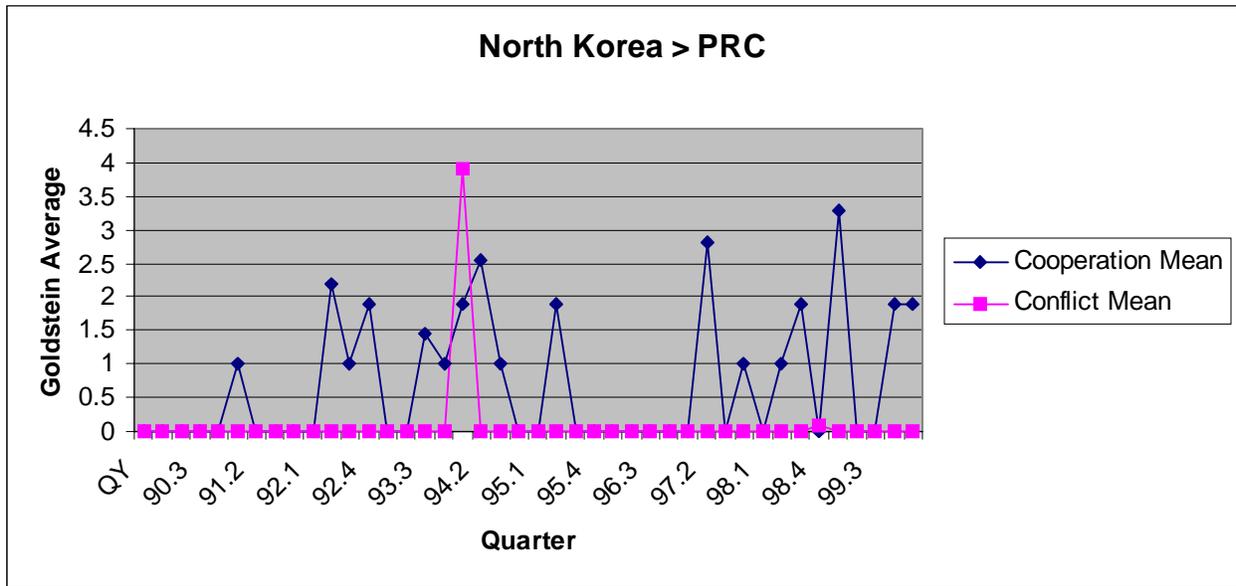


Figure 10. Directed Dyad: North Korea > Japan

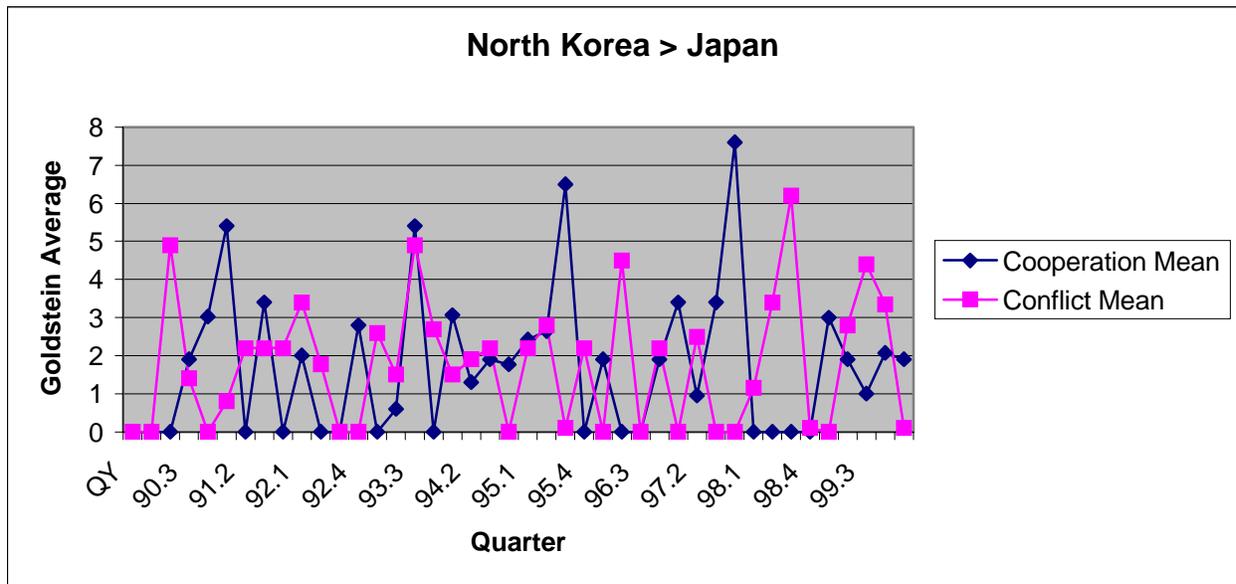


Figure 11. Directed Dyad: North Korea > South Korea

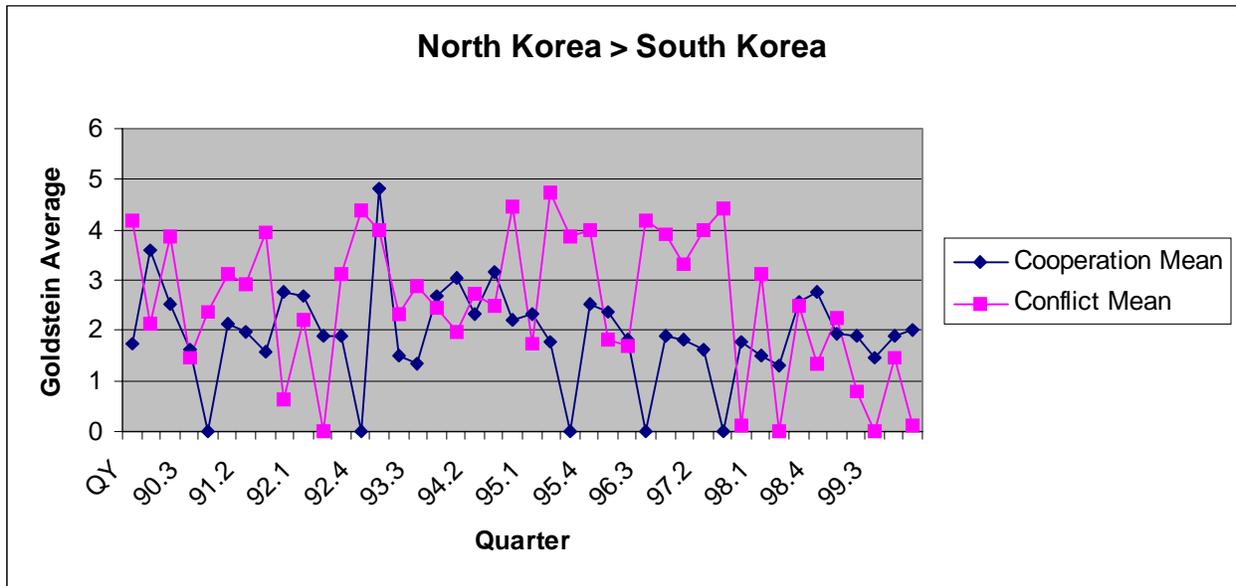


Figure 12. Directed Dyad: North Korea > Russia

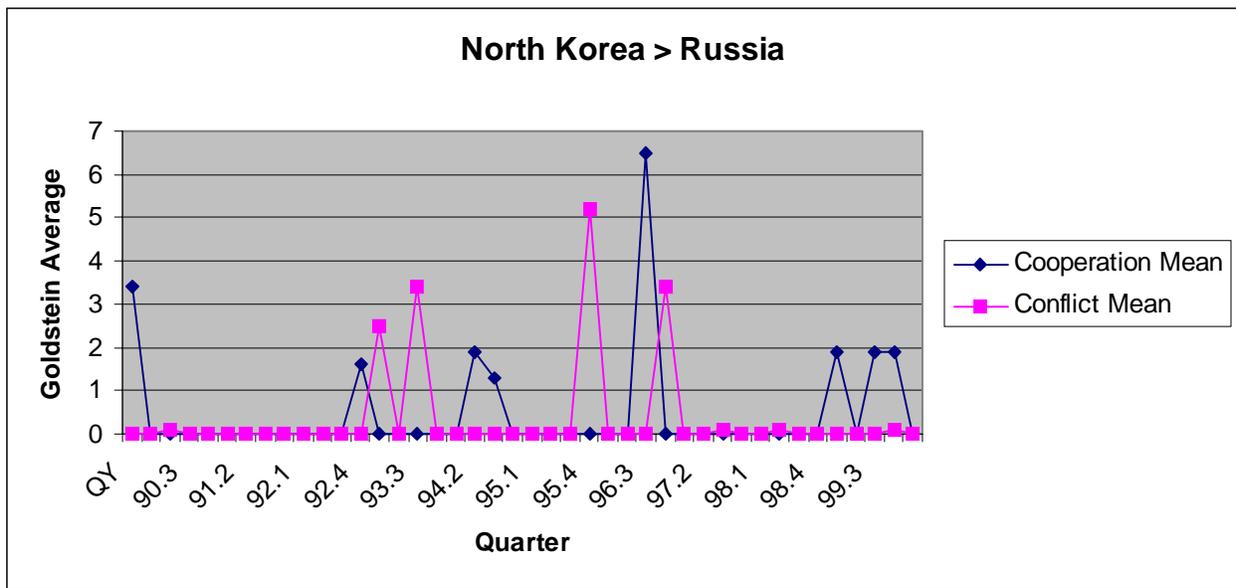


Figure 13. Directed Dyad: North Korea > United States

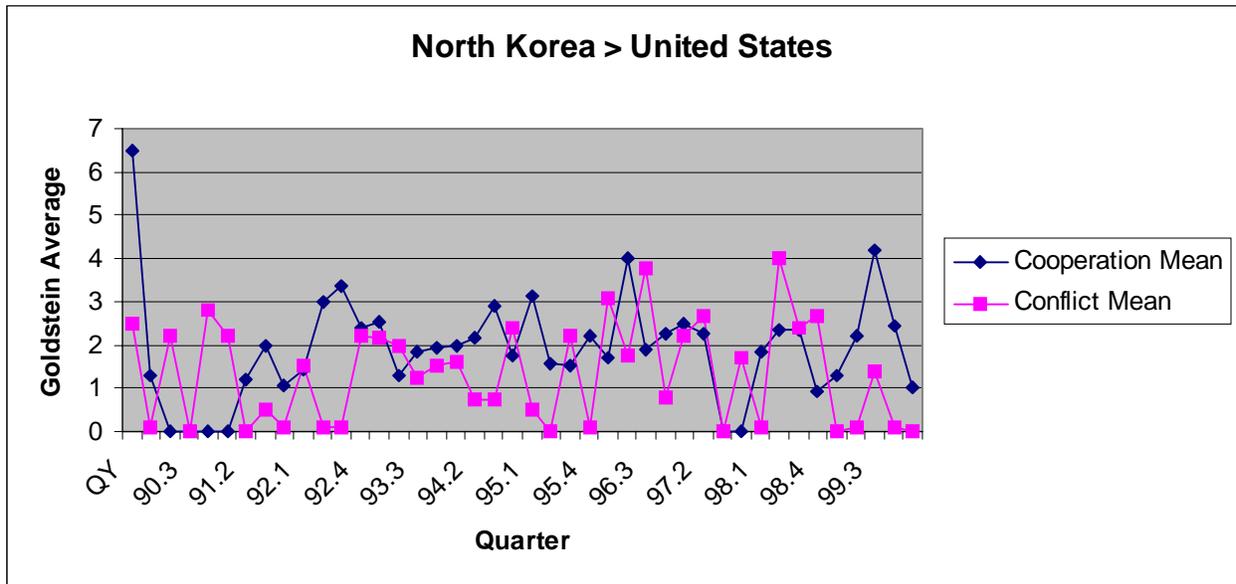


Figure 14. Directed Dyad: PRC > North Korea

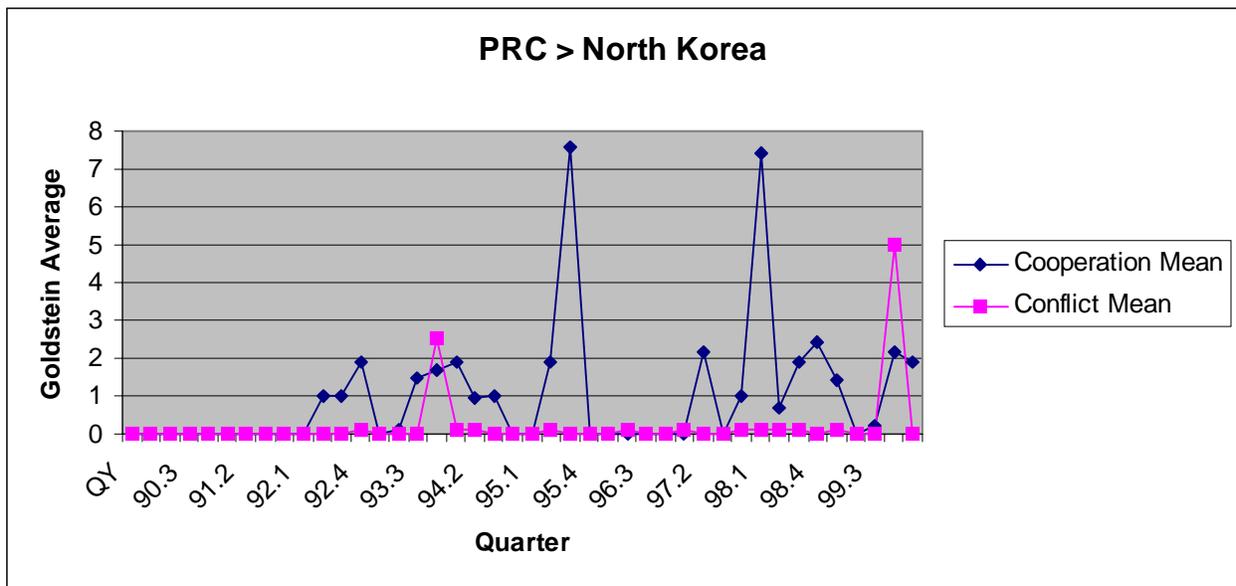


Figure 15. Directed Dyad: Japan > North Korea

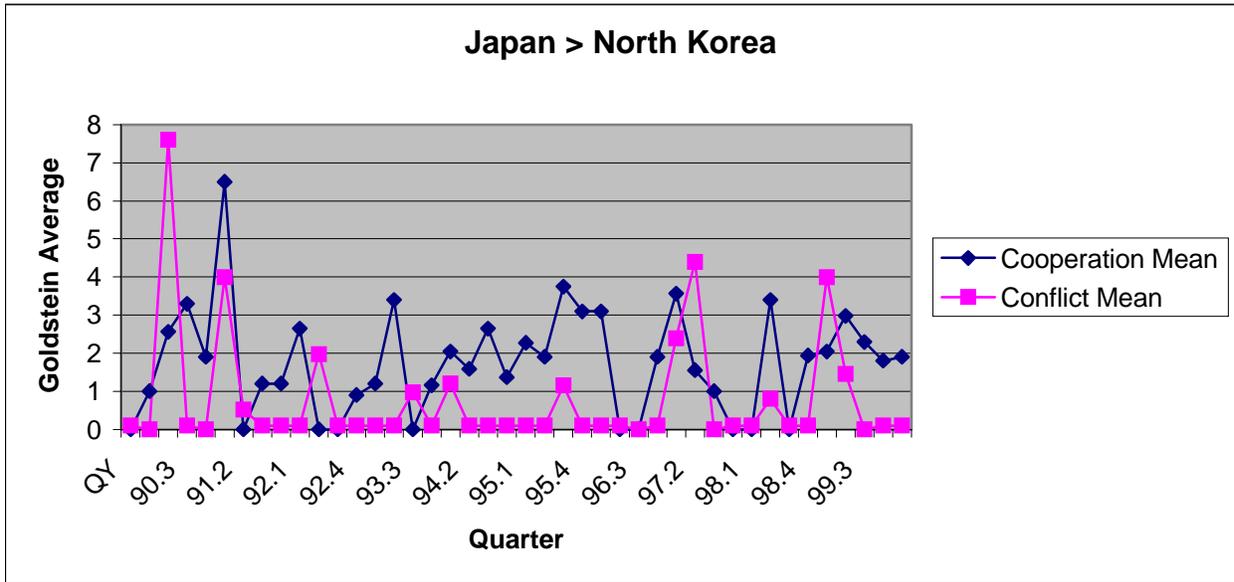


Figure 16. Directed Dyad: South Korea > North Korea

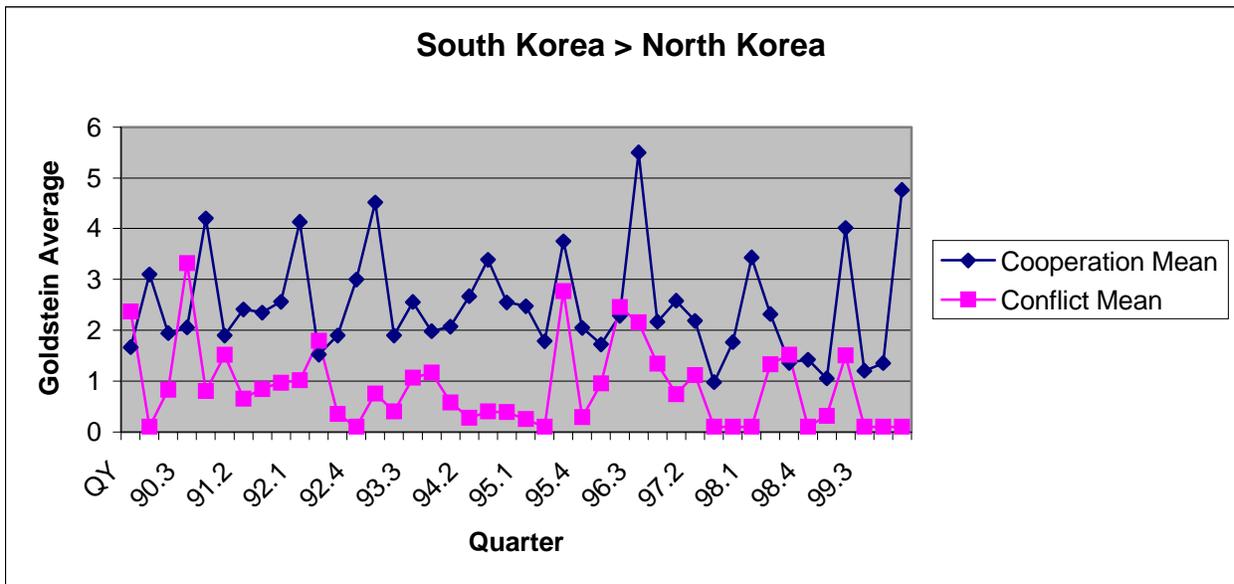


Figure 17. Directed Dyad: Russia > North Korea

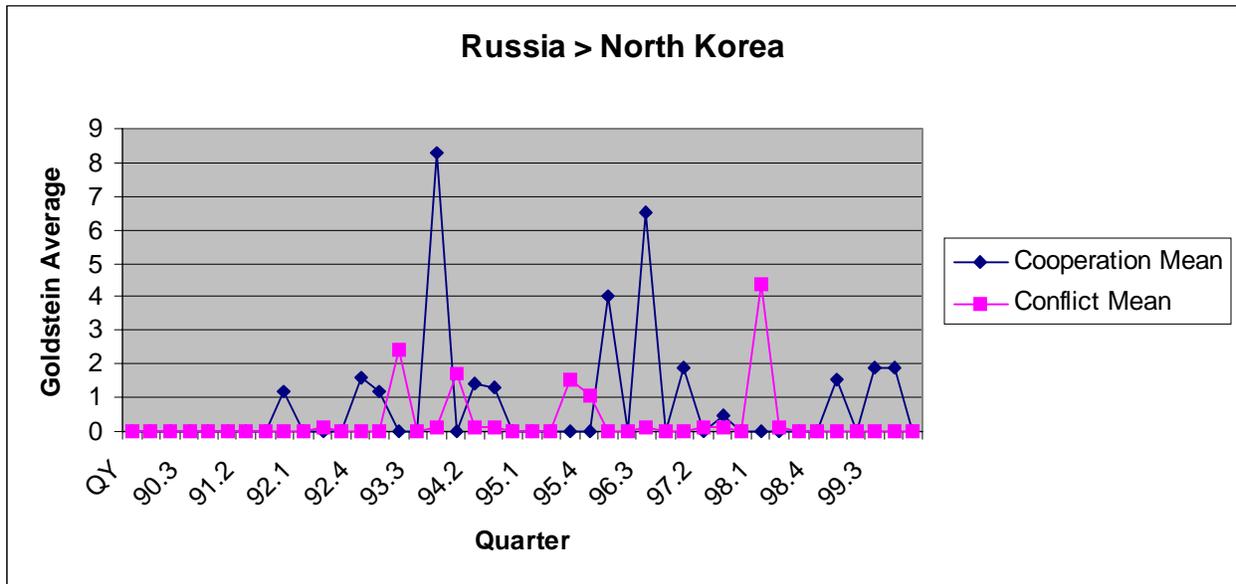
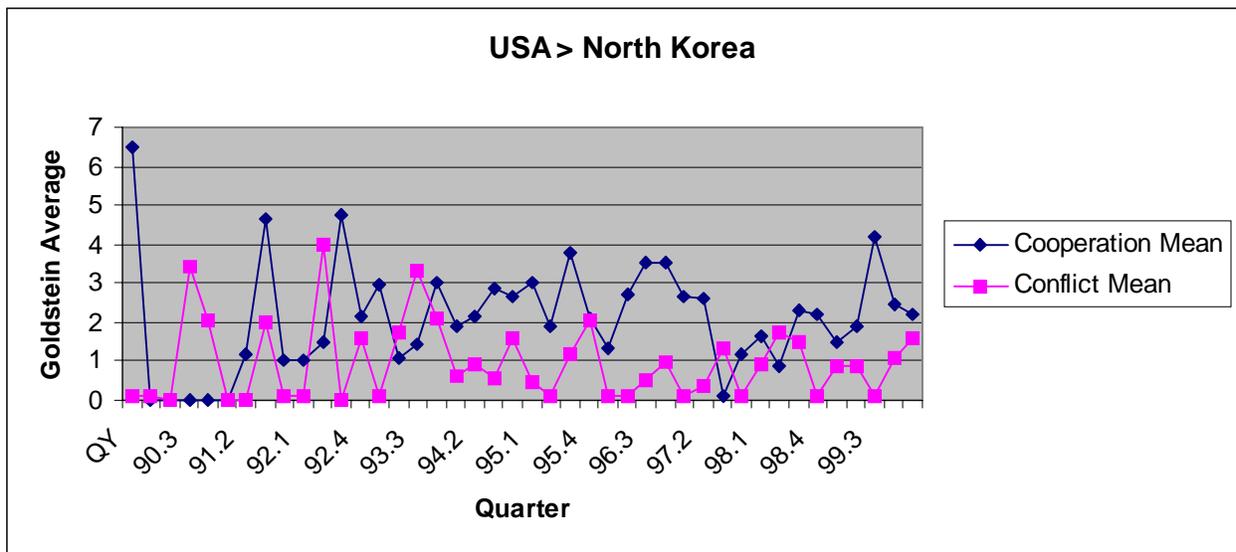


Figure 18. Directed Dyad: USA > North Korea



Those conflictive and cooperative event interactions between North Korea, the United States, South Korea, Japan, China and Japan that were found to be significant at $p < 0.05000$ are summarized in Table 1., below.²¹

Table 1: Correlation matrix of directed dyads

North Korea > South Korea Cooperation	North Korea > Japan Cooperation	-0.35
North Korea > United States Cooperation	North Korea > Japan Cooperation	-0.36
North Korea > Japan Cooperation	North Korea > South Korea Cooperation	-0.35
North Korea > United States Cooperation	North Korea > Russia Cooperation	0.35
Russia > North Korea Cooperation	North Korea > Russia Cooperation	0.49
United States > North Korea Cooperation	North Korea > Russia Cooperation	0.40
North Korea > Japan Cooperation	North Korea > United States Cooperation	-0.36
North Korea > Russia Cooperation	North Korea > United States Cooperation	0.35
United States > North Korea Cooperation	North Korea > United States Cooperation	0.79
Russia > North Korea Conflict	China > North Korea Conflict	0.64
Russia > North Korea Cooperation	China > North Korea Conflict	0.40
Japan > North Korea Conflict	Japan > North Korea Cooperation	0.33
Japan > North Korea Cooperation	Japan > North Korea Conflict	0.33
North Korea > Russia Cooperation	Russia > North Korea Cooperation	0.49
China > North Korea Conflict	Russia > North Korea Cooperation	0.40
China > North Korea Cooperation	Russia > North Korea Conflict	0.64
North Korea > Russia Cooperation	United States > North Korea Cooperation	0.40
North Korea > United States Cooperation	United States > North Korea Cooperation	0.79

²¹ Correlations greater than +/- 0.50 are in bold.

The strongest dyadic relationship is that between the United States and North Korea on cooperation. Cooperation on the part of either tends to prompt cooperation on the part of the other. The other notable dyadic relationships involve Russia, China and North Korea. Russian > North Korea conflict tends to prompt Chinese > North Korean conflict. Finally, Chinese > North Korean cooperation tends to ignite Russian > North Korean conflict. The latter relationship highlights North Korea's propensity of playing the two nations off on one another.

Conclusions

Debates over the merits of the machine coding of events, commonplace in the past decade, are no longer viable. Analysts today typically do not explicitly exploit the rich syntactic information embedded in the voluminous news (event) reports crossing their desks each day. Rather it is left to individual analysts to (implicitly) incorporate and monitor this information into their interpretation of each evolving situation. In an information scarce environment, this approach may be feasible. However, in the current information environment where information overload poses a significant obstacle to identifying and tracking event trends the visual trend assessment and display functionality of the VRATM *Reader* offers an intuitively satisfying and easy-to-use means of supporting analysts.

The VRATM *Reader* extracts latent information embedded in the syntax of news stories and integrates it into visual traces of evolving social, political and economic events. These events are presented in graphs, tables and maps, which in turn are linked to the underlying news stories from which they were derived. Starting from these visual news trend displays, users simply "point and click" to read the particular stories that contributed to the trends. More conventional search strategies are based upon filtering, either with literal terms or with indices of their related concepts. These searches can only identify information already known to be relevant and that can

be specified in advance. No filtering approach can address the challenge of identifying information that is only relevant as it relates to the larger context of which it is a part. In other words, the filtering techniques of conventional search approaches can readily find the proverbial "needle in the haystack," but only when that "needle" can be specified in advance, and also at the cost of knowing nothing about what lies next to the "needle." Only with a visual news trend or text parsing approach can one begin to "see" the overall contours of all the news or "haystack," including all potentially relevant news events or "needles." In short, auto parsing offers real-time capability, cost effective method of monitoring event trends and to discern their inflections in their early stages.

References

- Adelman, Howard (1998) "Difficulties in Early Warning: Networking and Conflict Management" In Klaas van Walraven (Ed.), *Early Warning and Conflict Prevention* (pp. 51-81). The Hague: Kluwer Law International.
- Azar, E. E. (1980) :The Conflict and Peace Data Bank (COPDAB) Project." *Journal of Conflict Resolution*, Vol. 24, pp. 143-152.
- Bond, D. (1994) "Nonviolent Direct Action and the Diffusion of Power." In P. Wehr, H. Burgess & G. Burgess (Eds.), *Justice Without Violence* (pp. 59-79). Boulder: Lynne Rienner Publishers.
- Bond, D. (1998) "Timely Conflict Risk Assessments and the PANDA Project" In John L. Davies and Ted Robert Gurr (Eds.), *Preventive Measures: Building Risk Assessment and Crisis Early Warning Systems* (pp.108-120). Boulder: Rowman & Littlefield Publishers, Inc.
- Bond, D., J. C. Jenkins, C. L. Taylor and K. Schock. Mapping Mass Political Conflict and Civil Society: Issues and Prospects for the Automated Development of Events Data. *Journal of Conflict Resolution* (August 1997). <http://hdc-www.harvard.edu/cfia/pnscs/DOCS/Papers/publications.htm>
- Bond, J. *The Operational Codes of Kim Il Sung and Kim Jong Il*. MA Thesis. Tempe, AZ: Arizona State University.
- Bond, J. and D. Bond. "The Protocol for the Assessment of Nonviolent Direct Action." The

- Program on Nonviolent Sanctions and Cultural Survival, The Weatherhead Center for International Affairs, Harvard University, 1995-1999: <http://hdc-www.harvard.edu/cfia/pnscs/panda.htm>.
- Bond, J., D. Bond, C. Oh and J. Silva (1999) *The VRATM Reader User Manual: Version 2.2*. Weston, MA: Virtual Research Associates, Inc.
- Cioffi-Revilla, C. (1990) *The Scientific Measurement of Conflict Handbook of Datasets on Crises and Wars 1498-1988 AD*. Boulder: Lynne Rienner Publishers.
- Gerner, Deborah J. *et al.* (1994) "The Analysis of Political Events using Machine Coded Data." *International Studies Quarterly*, Vol. 38 No. 1, pp. 91-119.
- Gurr, T. R. (1993) *Minorities at Risk*. Washington: United States Institute of Peace.
- Goldstein, Joshua S. (1992) "A Conflict-Cooperation Scale for WEIS Events Data," *Journal of Conflict Resolution*, 36/2 (June 1992): 369-385.
- Daniel M. Jones, Stuart A. Bremer and J. David Singer (1996) "Militarized Interstate Disputes, 1816-1992: Rationale, Coding Rules, and Empirical Patterns." *Conflict Management and Peace Science*, 15(2): 163:213.
- Davis, D. R. and W. H. Moore (1995) "International Political Interactions (IPI) Coding Rules." The Department of Political Science, Florida State University: <http://garnet.acns.fsu.edu/~whmoore/ipi/codebook.html>
- Downs, Chuck (1999) *Over the Line: North Korea's Negotiating Strategy*. Washington, D.C.: AEI Press.
- Hausser, Ronald (1999) *Foundations of Computational Linguistics: Man-Machine Communication in Natural Language*. Berlin, Springer.
- Howell, L. (1983) "A Comparative Study of the WEIS and COPDAB Datasets." *International Interactions*, 27: 149-159.
- Jagers, K. and T. R. Gurr (1995) "Tracking Democracy's Third Wave with the Polity III Data." *Journal of Peace Research*. 32(4):469-482
- King, G. (1989) "Event Count Models for International Relations: Generalizations and Applications." *International Studies Quarterly* 22(2): 123-148.
- Liddel, M. and J. L. Davies (1995) "An Expanded Set of Event Categories for the Derivations of COPDAB, WEIS, and Other Coding Schemes from GEDS Event Data." The Center for International Development and Conflict Management, University of Maryland.
- McClelland, C. A. and G. Hoggard (1969) "Conflict Patterns in the International Interactions

- Among Nations.” International Politics and Foreign Policy, (revised ed.) J. N. Rosenau (editor). New York, Free Press: 711-724.
- McClelland, Charles A. (1976) "World Event/Interaction Survey Codebook." (ICPSR 5211). Ann Arbor: Inter-University Consortium for Political and Social Research.
- McClelland, C. A. (1983) "Let the User Beware." *International Studies Quarterly*, 32: 155-173.
- Pevehouse, Jon C. and Joshua S. Goldstein (August 1999) Serbian Compliance of Defiance in Kosovo? Statistical Analysis and Real-Time Predictions.” *The Journal of Conflict Resolution*, Vol. 4 No. 3: 538-546.
- Putnam, Robert (1994) *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton, NJ: Princeton University Press.
- Uhrig, S. C. Noah, van Dyke, Nella, Olzak, Susan and Kyra Greene (1999), "Dynamics of Collective Protest in the U.S., 1960-1980: Manual for Microfilm Copying and Event Coding." Dept. of Sociology, Stanford University. Stanford California.
- Rummel, R.J. (1994) *Death by Government: Genocide and Mass Murder in the Twentieth Century*. New Jersey: Transaction Publishers.
- Rummel, R.J. (1972) *The Dimensions of Nations*. Beverly Hills: Sage Publications.
- Schrodt, Philip A. and Deborah J. Gerner (1998) "Cluster Analysis as an Early Warning Technique for the Middle East" In John L. Davies and Ted Robert Gurr (Eds.), *Preventive Measures: Building Risk Assessment and Crisis Early Warning Systems* (pp.108-120). Boulder: Rowman & Littlefield Publishers, Inc.
- Singer, J. D. and M. Small (1970) *The Wages of War 1816-1965: A Statistical Handbook*. NY: John Wiley & Sons.
- Sommer, Henrik and J. Scarritt (1999) "The Utility of Reuters for Events Analysis in Area Studies: The Case of Zambia-Zimbabwe Interactions, 1982-1993." *International Interactions*, Vol. 25, No. 1, pp. 29-59.
- Taylor, C. L., J. Bond, D. Bond, J. C. Jenkins, Z. B. Kuzucu. "Conflict-Cooperation for Interstate and Intrastate Interactions: An Expansion of the Goldstein Scale." A paper prepared for presentation at the annual meeting of the *International Studies Association*, Washington, D.C., February 16-21, 1999:
<http://data.fas.harvard.edu/cfia/pnsocs/DOCS/Papers/conflict.htm>
- Taylor, Charles Lewis and David A. Jodice (1983) *World Handbook of Political and Social Indicators: Third Edition*. New Haven: Yale University Press.
- Tomlinson, R. G. (1991). "Monitoring WEIS Events Data in Three Dimensions." A paper

prepared for presentation at the annual meeting of the International Studies Association, March 20-23, Vancouver, British Columbia.

Vincent, J. E. (1983) "WEIS vs COPDAB: Correspondence Problems." *International Interactions*, 27: 161-188.

Wallensteen (1998) "Acting Early: Detection, Receptivity, Prevention and Sustainability, Reflecting on the First Post-Cold War Period" In Klaas van Walraven (Ed.), *Early Warning and Conflict Prevention* (pp. 83-99). The Hague: Kluwer Law International.

Zhang, Ming (1997) "The New Mission of the Chinese Communist Party: A Revisit to Communist International Relations." *Journal of Communist Studies and Transition Politics*, Vol. 13, No. 4, December, pp. 79-98.