

# Dominating the Superpower: A Bounded Rationality Approach to Nuclear Proliferation and Inhibition in the U.S. / North Korea Dyad

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# Dominating the Superpower: A Bounded Rationality Approach to Nuclear Proliferation and Inhibition in the U.S. / North Korea Dyad

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## ABSTRACT

Why was the United States, despite its overwhelming superiority in power, unable to prevent North Korea from developing nuclear weapons? Why did North Korea persist in its nuclear pursuit in the face of U.S. opposition? In this article, we represent nuclear proliferation and counter-proliferation as situations of subjective strategic interaction between states. We measure preferences over strategies and outcomes using operational codes of the leaders of each country, derived via linguistic analysis. Our results indicate that neither the U.S. nor North Korea accurately understood the other side's preference ordering, and that their operational codes interacted in such a way as to produce an outcome favorable to North Korea – the weaker party - and unfavorable to the U.S. – the stronger. The wider contribution is to show that (mis)perceptions of the goals and resolve of the opponent play a crucial role in the success or failure of strong states to compel weak states and vice versa.

**Keywords:** perceptions, political beliefs, nuclear proliferation, foreign policy analysis, leaders

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## Introduction

Why was the United States (U.S.), the world's most powerful state, unable to prevent North Korea (or the Democratic People's Republic of Korea - DPRK) from developing nuclear weapons? In seeking an answer, we investigate the U.S./North Korea dyad as an iterative strategic encounter. We recover the operational codes of the leaders of each country via linguistic analysis, thereby constructing a dyadic model of subjective strategic rationality.<sup>1</sup>

<sup>1</sup> Nathan Leites, *The Operational Code of the Politburo*, New York, McGraw-Hill, 1951; Ole. R. Holsti, *The Operational Code as an Approach to the Analysis of Belief Systems*, Durham, Duke University Press, 1977; Stephen G. Walker, "The Evolution of Operational Code Analysis", *Political Psychology*, Vol. 11, No 2, 1990, p. 403-418; Kelly P. O'Reilly, "Leaders Perceptions and Nuclear Proliferation: A Political Psychology Approach to Proliferation", *Political Psychology*, Vol. 33, No 6, 2012, p. 767-789.

We find that the U.S. and North Korea were operating in different perceptual realities; in essence, they were playing different strategic games. Each behaved rationally based upon their perception of the strategic situation, but neither accurately understood the other side's preference ordering.

Our operational code analysis shows that U.S. leaders from Bill Clinton to Barack Obama believed that a negotiated settlement was the best outcome for both sides, and that a rational DPRK would eventually move to this outcome. North Korean leaders from Kim Il-sung to Kim Jong-un, by contrast, saw no negotiated outcome as possible and therefore preferred the relentless pursuit of nuclear weapons. The interaction of these different perceptual realities meant the U.S. was amenable to North Korean deception strategies – pretending to have paused or abandoned their nuclear program – which allowed the DPRK to proceed toward their ideal outcome of achieving their nuclear goals.

We first develop an approach to the puzzles of nuclear pursuit and inhibition as dyadic strategic interactions ultimately determined by the decision unit – an individual leader or a group at the apex of the foreign policy decision-making processes of each state.<sup>2</sup> In the ensuing section, we introduce the rules of dynamic games of strategic interaction, and the procedures of the operational code analysis used to ascertain the specific games played by the U.S. and North Korea. Next, we account for the logic of the U.S. subjective game – a game commonly called *assurance*, and show how the structure of this game matches with U.S. behavior toward North Korea. We then explain the DPRK's subjective game of *prisoner's dilemma* and match this game structure to North Korean behavior. U.S. leaders from Bill Clinton to Barack Obama believed that a negotiated settlement was the best outcome for both sides, and that a rational DPRK would eventually move to this outcome. North Korean leaders had a dominant escalatory strategy – they preferred a relentless pursuit of nuclear weapons – and so were playing a different game. We conclude with an assessment of the study's implications for the theory and practice of nuclear proliferation and counter-proliferation.

## A Bounded Rationality Approach to Nuclear Pursuit and Inhibition

While operational codes are our key tool in understanding the *preference ordering* of each side of the U.S./North Korea dyad, we approach the representation of *strategic interactions* – in this case nuclear pursuit and nuclear counter-proliferation - through the logic of 2 x 2 games.<sup>3</sup> 2 x 2 games offer a clear and intuitive way to represent the interaction of different preferences over outcomes in dyadic encounters. We posit an ongoing interaction between a nuclear aspirant and a nuclear inhibitor, each of which possesses an escalatory and a de-escalatory strategy as they pursue their goals of acquiring or preventing the acquisition of nuclear weapons. This 2 x 2 interaction generates four possible outcomes, ranked by each actor from best to worst.<sup>4</sup>

2 Margaret G. Hermann, "How Decision Units Shape Foreign Policy: A Theoretical Framework", *International Studies Review*, Vol. 3, No 2, p. 47–81; Mustafa Aydın, *Turkish Foreign Policy: Framework and Analysis*, Ankara, Center for Strategic Research, 2004.

3 Glenn H. Snyder and Paul Diesing, *Conflict among Nations*, New Jersey, Princeton University Press, 1977.

4 Steven J. Brams, *Superpower Games: Applying Game Theory to Superpower Conflict*, New Haven, Yale University Press, 1985; Steven J. Brams, *Theory of Moves*, Cambridge, Cambridge University Press, 1994; Frank C. Zagare, *The Dynamics of Deterrence*, Chicago, University of Chicago Press, 1987.

The actors are goal-oriented, and know that the achievement of their goals depends upon both their choices and the choices of the other player - this is to say the actors are strategic. Each actor calculates their choices based upon their beliefs about the preferences of the other and their own beliefs about what is desirable and possible – this is to say they act based upon their subjective perceptions.<sup>5</sup>

This mode of analysis – combining operational codes with 2 x 2 games – was pioneered by Stephen G. Walker. In Walker’s research program, the model of strategic interaction is provided by a particular variant of 2 x 2 models known as the Theory of Moves,<sup>6</sup> and the model of subjective perceptions comes from the operational code construct. Walker combined the two in order that the results of linguistic analyses of perceptions could be systematically linked to foreign policy behaviors. This approach has been successfully applied in dozens of studies over several decades.<sup>7</sup>

The combined model is a representation of the effect of bounded rationality in a dyadic interaction. It posits that decision makers’ beliefs about the world exert a *steering* effect in relation to their strategic environment rather than simply *mirroring* its features and incentives.<sup>8</sup> The approach links these subjective perceptions to a strategic context - the inferred choice propensities of an interlocutor - and posits that outcomes depend not on the choice of one actor, but on the interaction of the choices of both actors.<sup>9</sup> In elaborating this

5 Robert Jervis, *Perception and Misperception in International Politics* (Reprint edition), Princeton, Princeton University Press, 2017; Yaacov I. Vertzberger, *The World in Their Minds: Information Processing, Cognition, and Perception in Foreign Policy Decision-making*, California, Stanford University Press, 1990.

6 Brams, *Theory of Moves*.

7 Some earlier works in this research vein include the following: Gregory B. Marfleet and Stephen G. Walker, “A World of Beliefs: Modeling Interactions Among Agents with Different Operational Codes”, Mark Schafer and Stephen G. Walker (eds.), *Beliefs and Leadership in World Politics Methods and Applications of Operational Code Analysis*, New York, Palgrave Macmillan, 2006, p. 53-73; Stephen G. Walker, *Role Theory and the Cognitive Architecture of British Appeasement Decisions: Symbolic and Strategic Interaction in World Politics*, London, Routledge, 2014; Akan Malici and Stephen G. Walker, *Role Theory and Role Conflict in U.S.-Iran Relations: Enemies of Our Own Making*, New York, Routledge, 2017; Akan Malici, *When Leaders Learn and When They Don’t: Mikhail Gorbachev and Kim Il Sung at the End of the Cold War*, Albany, State University of New York Press, 2008; Akan Malici and Allison L. Buckner, “Empathizing with Rogue Leaders: Mahmoud Ahmadinejad and Bashar al-Asad”, *Journal of Peace Research*, Vol. 45, No 6, 2008, p. 783-800; Kelly P. O’Reilly, *Nuclear Proliferation and the Psychology of Political Leadership: Beliefs, Motivations, and Perceptions*, London, Routledge, 2016; Özgür Özdamar and Sercan Canbolat, “Understanding New Middle Eastern Leadership: An Operational Code Approach”, *Political Research Quarterly*, Vol. 71, No 1, 2018, p. 19–31; Sercan Canbolat, “Deciphering Deadly Minds in Their Native Language: The Operational Codes and Formation Patterns of Militant Organizations in the Middle East and North Africa”, Mark Schafer and Stephen G. Walker (eds.), *Operational Code Analysis and Foreign Policy Roles*, London, Routledge, 2021, p. 69-92; Sercan Canbolat, *Leadership Types and Organizational Formation of Violent Non-State Actors in the Middle East and North Africa: An Arabic Operational Code Approach*, Unpublished PhD dissertation, University of Connecticut, 2023; Özgür Özdamar, B. Toygar Halistoprak, and Michael Young “Do Campaign Speeches Predict Foreign Policy? An Operational Code and Leadership Trait Analysis of Donald Trump’s MENA Policies”, *Uluslararası İlişkiler*, Advanced Online Publication, 24 May 2023, pp. 1-19; Özgür Özdamar and Sercan Canbolat, *Leaders in the Middle East and North Africa: How Ideology Shapes Foreign Policy*, New York, Cambridge University Press, 2023.

8 Mark Schafer and Stephen G. Walker, “Beliefs as Causal Mechanisms”, Mark Schafer and Stephen G. Walker (eds.), *Beliefs and Leadership in World Politics Methods and Applications of Operational Code Analysis*, New York, Palgrave Macmillan, 2006, p. 3-4.

9 Robert Jervis, *Why Intelligence Fails: Lessons from the Iranian Revolution and the Iraq War*. Ithaca, Cornell University Press, 2011, p. 175.

approach below, we first explain the strategic component (theory of moves), and then the subjective component (operational codes).

### *The Strategic Setting: Theory of Moves*

Theory of Moves (ToM) captures the dynamic and interactive nature of international interactions, positing that games in strategic form represent states of the world that players move through before reaching a final state, at which payoffs accrue.<sup>10</sup> Play begins in an initial state, defined by the prior strategy choices of the players or empirical circumstances (call this “the history of play.”) Players make moves and countermoves, and have the capacity to think ahead about how each of their moves will be responded to by the other player. The two sides move through states of the game, defined by the intersection of each player’s strategy. Moving in turn, each side has the opportunity to switch strategy and change the game into a new state, from which the other side must decide to move or stay. Payoffs – endgame states ranked from 4 (most desirable) to 1 (least desirable) do not accrue until play ends in a final state, which is reached when the player whose turn it is to move declines to do so. Payoffs are strictly ordinal, negating the possibility of mixed strategies and reducing the role played by calculations of probability. Ordered preferences are not posited to be equally spaced – i.e., a player may prefer outcome 4 over outcome 3 a great deal, but have only a marginal preference for 3 over 2.<sup>11</sup> Preference orderings are complete and non-transitive.<sup>12</sup>

Brams supplemented these core rules of play with additional features designed to adapt ToM to the real-world circumstances of foreign policy. Most importantly, he incorporated misperceptions, where one or both players misread the preference ordering of the other.<sup>13</sup> Players make moves based upon their perception of their opponent’s goals, yet if these goals are misperceived, the opponent may be playing another game entirely.<sup>14</sup> Thus, both players can behave rationally according to their subjective reading of the game yet receive worse outcomes than were objectively available.<sup>15</sup>

The likelihood of misperceptions is amplified if one or both sides pursue a *deception* strategy. Deception is defined as “a false announcement of preferences to induce the other player to choose a strategy favorable to the deceiver”.<sup>16</sup> To be successful, the other player

10 Brams, *Theory of Moves*, p. 8-10, Steven J. Brams, “Game Theory: Pitfalls and Opportunities in Applying It to International Relations”, *International Studies Perspectives*, Vol. 1, No 3, 2000, p. 222-224.

11 In his *Theory of Moves*, Brams specified these conditions in furtherance of his goal of capturing the logic and direction of strategy, rather than imposing a mathematical operation on the calculations of the players that he believed to be unrealistic. He further averred that ordinal payoffs were significantly easier to accurately attribute to real-world players than cardinal utilities. For a detailed discussion on ordinal payoffs and cardinal utilities, see Steven J. Brams and Donald Wittman, “Nonmyopic Equilibria in 2x 2 Games”, *Conflict Management and Peace Science*, Vol. 6, No 1, 1981, p. 39-62.

12 For the five basic rules of the modeled strategic interaction games under ToM, see Brams, *Theory of Moves*, p. 23-26.

13 Brams, *Theory of Moves*, p. 157-162.

14 For an extended demonstration of the importance of misperceptions in 2 x 2 games, see Frank C. Zagare, “Nonmyopic Equilibria and the Middle East Crisis of 1967”, *Conflict Management and Peace Science*, Vol. 5, No 2, 1981, p. 139-162.

15 Brams, “Game Theory”.

16 Steven J. Brams, *Superpower Games: Applying Game Theory to Superpower Conflict*, New Haven, Yale University Press, 1985, p. 55-56.

must not know the true preference ordering of the deceiver.<sup>17</sup> While traditional game theorists had misgivings about the incorporation of deception into game structures, the incorporation of misperceptions and deceptions makes ToM a useful analytical framework to scholars of foreign policy analysis (FPA),<sup>18</sup> who place significant weight on matters of perception and contingency.<sup>19</sup>

### **Measuring Preferences: Operational Codes of Decision-makers**

Operational code research offers a method for systematically measuring the preferences of players of sequential games.<sup>20</sup> The operational code construct posits that decision makers hold priors (“beliefs”) as a result of the interaction between the material circumstances they face and their subjective perceptions of these circumstances; the latter being shaped by their experience, ideology, cultural context, personality, motivated reasoning, and the other constellation of influences that shape cognition.<sup>21</sup> Operational code analysis is a theory of strategic choice in that it combines an accounting of the self’s diagnosis of the situation with an assessment of how the other is likely to behave, in order to model the self’s perceived best approach to the realization of goals.<sup>22</sup> Therefore, much as ToM is a variant upon classical game theory, so operational code research is essentially a variant of rational choice theory.<sup>23</sup>

When used as a method for measuring preferences over strategies and outcomes in 2 X 2 games, researchers have focused on three (out of ten) core questions of the operational code construct,<sup>24</sup> and have generated quantitative measures of these beliefs through content analysis of political speech.<sup>25</sup> The first *philosophical* belief (P-1) concerns the fundamental

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- 17 In his book, *Theory of Moves*, Brams recognized that introducing misperception and deceptions strategies into his rules of play was controversial. He argued that it was important to accurately model and interpret the real-world (as opposed to purely hypothetical) situations of international politics, rife with misperception, deception, and power differentials.
- 18 For a poignant discussion on various applications of game theory in the International Relations discipline, see Özgür Özdamar, “Contributions of Game Theory to International Relations Literature”, *Uluslararası İlişkiler*, Vol. 4, No 15, 2007, p. 33–66. For graphic expositions of operational code analysis and FPA via systemist approach, see Sercan Canbolat, Sarah Gansen and Patrick James, “Systemism and Foreign Policy: An Exercise in Systematic Synthesis”, *Canadian Foreign Policy Journal*, Vol. 27, No 3, 2021, p. 404-434; Sercan Canbolat, Sarah Gansen, and Patrick James, “Systemism and International Relations: How a Graphic Method Can Enhance Communication”, *International Studies Review*, Vol. 25, No 2, 2023, p. viad013.
- 19 Vertzberger, *The World in Their Minds*; Jervis, *Perception and Misperception in International Politics*; Malici and Walker, *Role Theory and Role Conflict in U.S.-Iran Relations*.
- 20 For a well-rounded exposition of this particular method, see Walker, *Role Theory and the Cognitive Architecture of British Appeasement Decisions*.
- 21 Vertzberger, *The World in Their Minds*.
- 22 Schafer and Walker, “Beliefs as Causal Mechanisms”.
- 23 Walker, “The Evolution of Operational Code Analysis”, p. 407.
- 24 Operational code studies are presented as answers to a suite of ten questions about the nature of international politics (philosophical beliefs) and the use of power within it (instrumental beliefs). The entire list of operational code questions can be retrieved from Alexander L. George, “The “Operational Code”: A Neglected Approach to the Study of Political Leaders and Decision-Making”, *International Studies Quarterly*, Vol. 13, No 2, 1969, p. 201-202.
- 25 See the appendix for Tables 1 and 2 depicting, respectively, the steps in coding text for operational code analysis and indices for calculating operational code beliefs. To access the appendix and individual operational code scores of the U.S. and North Korean leaders along with their average raw and relative scores as well as to replicate our analysis, please see Sercan Canbolat and Stephen B. Dyson “Replication Data for: Dominating the Superpower: A Bounded Rationality Approach to Nuclear Proliferation and Inhibition in the U.S. / North Korea Dyad” at <https://doi.org/10.7910/DVN/EIZOFF>.

nature of the political universe: dangerous and conflict-ridden or benign and cooperative? The greater the extent to which the political actor talks about others in their political universe using hostile language, the lower their score on this index. The second key belief (I-1) is the mirror of the first: what is the best strategy for oneself, a hostile (lower score) or cooperative (higher score) approach. The more the political actor talks about actions they have taken or will take using conflict-based language, the lower their score on this index. The third key belief (P-4) is the centrality of the question of control to the political actor. What do they see as their role in moving or shaping political events? The greater the extent to which the actors talk about themselves as being in control, the higher their score on this index.

Operational codes are extracted from the text of speeches given by political leaders and other responsible officials.<sup>26</sup> The unit of analysis is the transitive verb in the context of a social relationship wherein an actor is speaking about a subject.<sup>27</sup> Verbs are coded for direction (positive / negative) and intensity (deeds > words) and summed into an index representing key beliefs about the nature of the political universe and the actors within it (philosophical beliefs) and the best strategy of self in relation to others (instrumental beliefs).<sup>28</sup> While there are of course risks in deriving policy positions from political speech,<sup>29</sup> a corpus of studies has established that the direction of strategy evident in speeches is often a reliable guide to the direction of strategy later manifest in actions.<sup>30</sup> Political leaders tend not to make consistently

26 Some previous works in this research stream are as follows: Malici, *When Leaders Learn and When They Don't*; Sercan Canbolat, *Understanding the New Middle Eastern Leaders: An Operational Code Approach*, Unpublished MA thesis, Bilkent University, 2014; Malici and Walker, *Role Theory and Role Conflict in U.S.-Iran Relations*; Sercan Canbolat, "Understanding Political Islamists' Foreign Policy Rhetoric in Their Native Language: A Turkish Operational Code Analysis Approach", *APSA MENA Politics Newsletter*, Vol. 3, No 1, 2020a, p. 13-16; Özgür Özdamar, Sercan Canbolat, and Michael D. Young, "Profiling Leaders in Turkish in Forum: Coding in Tongues: Developing Non-English Coding Schemes for Leadership Profiling", *International Studies Review*, Vol. 22, No 4, 2020, p. 1045-1049; Sercan Canbolat "Profiling leaders in Arabic in Forum: Coding in Tongues: Developing Non-English Coding Schemes for Leadership Profiling", *International Studies Review*, Vol. 22, No 4, 2020b, p. 1049-1052.

27 Malici, *When Leaders Learn and When They Don't*, p. 32.

28 For more detailed discussion on philosophical and instrumental beliefs, see Stephen G. Walker, Mark Schafer, and Michael D. Young, "Systematic Procedures for Operational Code Analysis: Measuring and Modeling Jimmy Carter's Operational Code", *International Studies Quarterly*, Vol. 42, No 1, 1998, p. 175-189.

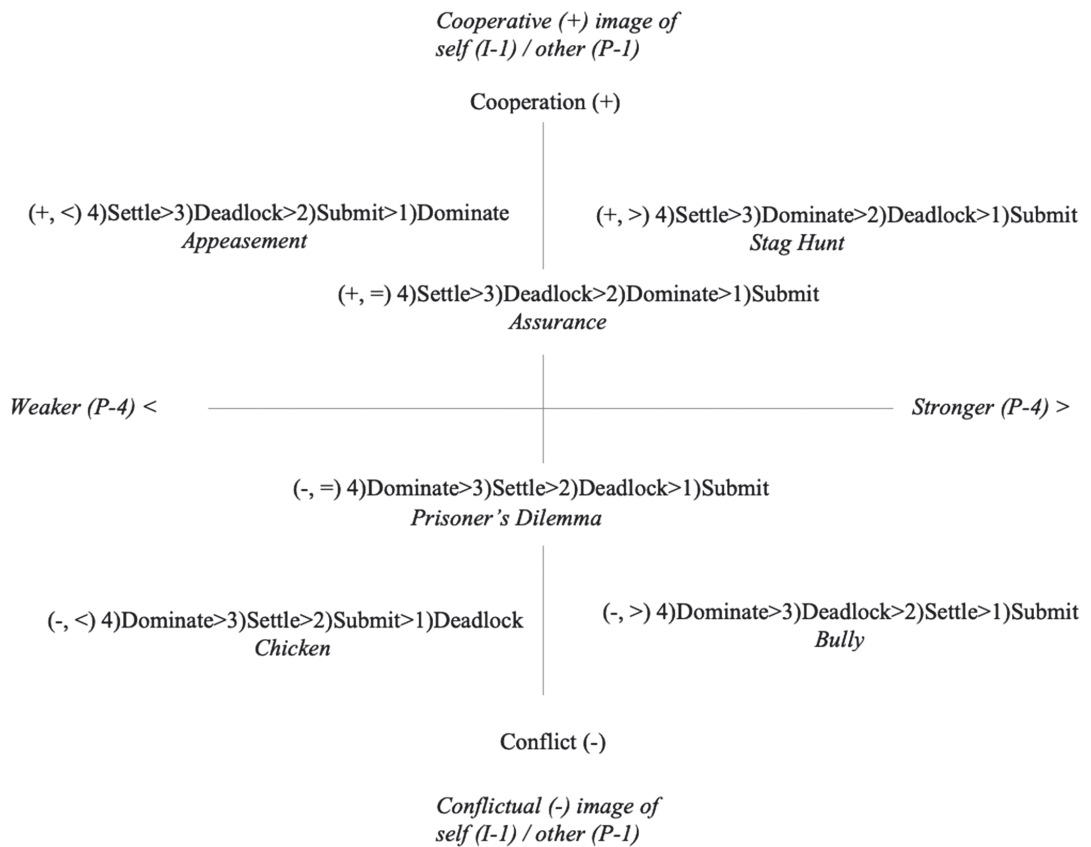
29 Inferring preferences from speech as a research strategy, while not perfect, must be considered in light of the alternatives: assuming uniform responses to similar circumstances (which in the area of nuclear pursuit and proliferation does not match the empirical record), inferring preferences from actions after the fact (which risks tautology) or inferring preferences from the contextual knowledge and intuitive judgment of the researcher via a qualitative research strategy (which risks subjectivity). For further discussion, see this important study: Rachel E. Whitlark, "Nuclear Beliefs: A Leader-Focused Theory of Counter-Proliferation", *Security Studies*, Vol. 26, No 4, 2017, p. 545-574.

30 Whether preferences recovered from speech are a guide to subsequent strategic behavior is of course an empirical question – one we address later in the paper by matching the preferences derived from the operational code framework to the behaviors of the United States and North Korea. While space limitations preclude an extensive treatment of these important issues of quantitative content analysis, we note the evidence and discussion in the following studies: Mark Schafer, "Issues in Assessing Psychological Characteristics at a Distance: An Introduction to the Symposium", *Political Psychology*, Vol. 21, No 3, 2000, p. 511-527; Jonathan Renshon, "When Public Statements Reveal Private Beliefs: Assessing Operational Codes at a Distance", *Political Psychology*, Vol. 30, No 4, 2009, p. 649-661; Stephen Benedict Dyson and Alexandra L. Raleigh, "Public and Private Beliefs of Political Leaders: Saddam Hussein in Front of a Crowd and Behind Closed Doors", *Research & Politics*, Vol. 1, No 1, 2014, p. 1-7; Klaus Brummer, Michael D. Young, Özgür Özdamar, Sercan Canbolat, Consuelo Thiers, Christian Rabini, Katharina Dimmroth, Mischa Hansel, and Ameneh Mehvar, "Coding in Tongues: Developing Non-English Coding Schemes for Leadership Profiling", *International Studies Review*, Vol. 22, No 4, 2020, p.1039-1067; Walker, Schafer and Young, "Systematic Procedures for Operational Code Analysis".

hostile speeches or use Twitter to share negative tweets about countries toward which they intend to pursue a cooperative strategy, and vice versa.<sup>31</sup>

Operational code studies use data extracted from political text to place the subject of study on a typology of belief system types (Figure 1). The score for a given individual is compared to a large database of comparable political leaders. The “master beliefs” of P-1; P-4, and I-1 are used to determine placement on the typology. The typology is associated with a preference ordering over outcomes of domination, submission, settlement, and deadlock, corresponding to game states in 2 x 2 games.<sup>32</sup>

**Figure 1.** Belief System Types and Order of Preferences from Walker’s Theory of Inferences about Preferences (TIP)



31 For example, see this excellent study focusing on the impact of Twitter diplomacy on the U.S.-Turkey relations by analyzing top decision-makers’ tweets (e.g., the former U.S. President Donald J. Trump), which finds that not only leaders’ speeches but also their tweets are indicative of their foreign policy propensities towards other countries: Ali Şevket Ovalı, “Twitter Diplomacy in Turkey-US Relations”, *Uluslararası İlişkiler*, Vol. 17, No 65, 2020, p. 23-45.

32 This association is deductive by way of Stephen Walker’s “Theory of Inference about Preferences (TIP)”, and has been tested in repeated empirical studies. For some applications of TIP, see Malici, *When Leaders Learn and When They Don’t*; Marfleet and Walker, “A World of Beliefs”; Walker, *Role Theory and the Cognitive Architecture of British Appeasement Decisions*; Malici and Walker, *Role Theory and Role Conflict in U.S.-Iran Relations*.



## Operational Code Data and Results

To generate the operational code scores for U.S. presidents and North Korean leaders, we collected public statements from Kim Il-sung, Kim Jong-il, and Kim Jong-un, and from Bill Clinton, George W. Bush, and Barack Obama, and isolated those sentences where one side was speaking about the other. The resulting text was coded by the automated content analysis software Profiler Plus. Automation eliminates the possibility of human error or bias in the application of the coding rules. Speech by U.S. leaders was collected from the public papers of the United States project hosted by the University of California Santa Barbara. Speech by North Korean leaders came primarily from the Lexis Nexis and the Foreign Broadcast and Information System (FBIS).<sup>33</sup> This text corpus was analyzed using the content analysis system described above.<sup>34</sup> The resulting scores are reported as relational to the means in a 255-leader reference group.<sup>35</sup> We stopped collecting data at the end of the Obama administration. At this point, we argue that North Korea had achieved its nuclear goals – it had a significant nuclear arsenal and the capacity to strike not only U.S. troops and bases in region but U.S. territory as well.<sup>36</sup> In other words, the interaction between the U.S. and North Korea had effectively switched from a proliferation game into a deterrence game between two nuclear powers.<sup>37</sup>

**Figure 2.** Operational Codes of United States Leaders

	Clinton	Bush	Obama
P-1 <i>Image of Other</i>	+0.26	+0.07	+0.24
P-4a <i>Perceived control (self)</i>	+0.07	+0.06	.00
P-4b <i>Perceived control (other)</i>	-0.07	-0.06	.00
I-1 <i>Image of self</i>	+0.19	+0.25	+0.27

33 Data collection was comparatively easier for the U.S. presidents than the North Korean leaders, for whom far fewer statements are available. Because of this, we could not disaggregate their operational codes by time period, as is desirable in more data rich circumstances. Kim Jong-il, in particular, spoke notoriously little in public, especially as he grew older. Malici and Malici sought to circumvent this problem by constructing an operational code covering the years 1995-2003 of ‘the North Korean ruling elite’ – both Kim and his fellow national leaders. Source: Akan Malici and Johnna Malici, “When Will They Ever Learn? An Examination of Fidel Castro and Kim Jong-Il’s Operational Code Beliefs”, *Psicología Política*, Vol. 31, 2005, p. 19 (endnote n. 3). While we relied solely on direct statements by Kim, we note that Malici and Malici’s ‘ruling North Korean elite operational code’ does not significantly vary from our findings (Malici and Malici reported scores of P-1 = -.09, P-4a = -.06, P-4b = +.06; I-1 = -.32).

34 We used Profiler Plus version 5.8.4. Available at <https://profilerplus.org/> (Accessed 22 September 2022). Profiler Plus is an automated content analysis software program, developed specifically for use with constructs such as the Operational Code.

35 The world leaders reference group is drawn from the following book: Malici and Walker, *Role Theory and Role Conflict in U.S.-Iran Relations*.

36 Scott D. Sagan, “The Korean Missile Crisis: Why Deterrence Is Still the Best Option”, *Foreign Affairs*, November 2017, <https://www.foreignaffairs.com/articles/north-korea/2017-09-10/korean-missile-crisis>. (Accessed 14 October 2022).

37 Ibid.

**Figure 3.** Operational Codes of North Korean Leaders

	Kim Il-sung	Kim Jong-il	Kim Jong-un
P-1 <i>Image of Other</i>	-0.50	-0.39	-0.45
P-4a <i>Perceived control (self)</i>	-0.15	-0.11	-0.11
P-4b <i>Perceived control (other)</i>	+0.15	+0.11	+0.11
I-1 <i>Image of Self</i>	-0.55	-0.38	-0.25

**Predicted Strategic Interactions**

These data are translated into predicted preferences over outcomes in 2 x 2 game play (and hence over strategies in pursuit of those outcomes) via the *theory of inferences about preferences* in figure 1.<sup>38</sup> The assumption is that the preferences of one player and their perceived power intersect with perceptions about the preferences and perceived power of the other player to produce a subjective ranking of preferences over four game outcomes (“states of the world”) of Settlement (mutual compromise), Deadlock (mutual conflict), Domination (self wins) and Submission (other wins). These insights are then used to structure analytical narratives about the observed history of interaction between the two sides. These are, of course, highly stylized renditions of the direction of the strategic relationship – they are not designed to capture the nuance and detail of day-to-day diplomacy, the impact of domestic politics, or a plethora of other factors that would be of interest to a more detailed (and much longer) account.

In the game at issue here, North Korea and the U.S. are acting, respectively, as a nuclear pursuer and a nuclear inhibitor.<sup>39</sup> The goal of the pursuer is to acquire nuclear weapons, the inhibitor wants to stop them. Consistent with the logic of 2 x 2 games, each side has two strategies.<sup>40</sup> The pursuer can escalate the situation, defined here as continuing to develop their weapons program, or de-escalate to pause or abandon their program.<sup>41</sup> The inhibitor can escalate, defined here as threatening or using coercive strategies such as preventive or punitive military strikes, legal and economic sanctions, normative opprobrium, and sabotage. The inhibitor can de-escalate by offering security assurances, diplomatic and economic benefits, normative praise and international (re-)integration, and / or transfer of goods and technologies.<sup>42</sup> The strategic choices of the two sides combine into four possible game states,

38 Malici, *When Leaders Learn and When They Don't*, p. 30-31; Malici and Buckner, “Empathizing with Rogue Leaders”, p. 790; Schafer and Walker, “Beliefs as Causal Mechanisms”.

39 The term “nuclear pursuer” is from Vipin Narang, “Strategies of Nuclear Proliferation: How States Pursue the Bomb”, *International Security*, Vol. 41, No 3, 2017, p. 110-150. The term “nuclear inhibitor”, and the strategies available to the inhibitor, is taken from Francis J. Gavin, “Strategies of Inhibition: U.S. Grand Strategy, the Nuclear Revolution, and Nonproliferation”, *International Security*, Vol. 40, No 1, 2015, p. 9–46.

40 Brams, *Theory of Moves*; Zagare, *The Dynamics of Deterrence*; Snyder and Diesing, *Conflict among Nations*.

41 On the ways in which a nuclear aspirant can calibrate their pursuit in terms of speed and openness, see Narang, “Strategies of Nuclear Proliferation”.

42 Gavin, “Strategies of Inhibition”, p. 25-34.

where the U.S. strategy is stated first and the North Korean strategy is stated second, followed by a brief sketch of how this game state would translate into observable real-world behavior:<sup>43</sup>

De-escalate + De-escalate = Settlement: North Korea agrees to pause or abandon its nuclear program in return for security assurances, allowing for expanded political and economic relationships with the United States and the international community.

De-escalate + Escalate = DPRK Dominates: North Korea moves toward completing its nuclear program, while the U.S. continues to offer assurances, inducements, and other diplomatic nonproliferation tactics. The North moves toward, and eventually achieves, a nuclear arsenal that threatens its neighbors and major U.S. cities.

Escalate + Escalate = Deadlock: The U.S. threatens or uses military force and / or other coercive measures to attempt to retard or eliminate the North's nuclear program. The North nonetheless persists in its attempts to complete the program.

Escalate + De-escalate = U.S. Dominates: The U.S. threatens or uses military force and / or other coercive measures to attempt to retard or eliminate the North's nuclear program. The North agrees to pause or abandon its attempts to complete the program.

In the sections below, we elaborate expected game play (in terms of initial states and subsequent moves) given the U.S. and North Korean preference orderings derived from their operational codes. We then attempt to match the game predictions to the empirical record of foreign policy behavior by the two sides, beginning with the U.S. Again, the goal is not to provide elaborate histories of the U.S. – North Korea relationship, indeed in the space available we can offer only heavily stylized accounts. Rather, the analytical aim is to determine whether the predicted strategies of the two sides, given their operational codes as they translate into the 2 x 2 game format, are broadly in line with the direction of observed behavior. More importantly, the goal is to use insights generated in this way to advance our understanding of the overarching puzzle – why the weaker side was able to achieve more of its goals than the stronger.

## U.S. Subjective Game

For the U.S. presidents Clinton, Bush, and Obama, the operational code scores in figure 2 translate into a common preference ordering (P-1 >, I-1 >, P-4 =).<sup>44</sup> This indicates their subjective game is *Assurance*, with the preference ordering for the United States of Settle

43 Consistent with the game theory literature on 2 x 2 games, these are stylized strategies rather than fully specified policy options. Each strategy could be broken out into x number of gradations and variants, but the goal here is to capture the direction of a strategic move rather than the specifics of the full, messy reality. On the virtues of modeling strategic interaction in this way, see Snyder and Diesing, *Conflict among Nations*, p. 152-163.

44 In words: the first philosophical belief is cooperative (the score is higher = P-1 >) when measured against the 255-leaders reference group, the first instrumental belief is also cooperative (I-1 >), and the perception of power between the two sides on this particular issue is roughly equal (P-4 =). The U.S. preference ordering is the combination of the first philosophical belief and the perceived balance of power (P-1 and P-4 beliefs) and the U.S. perception of North Korea's preference ordering is the combination of the first instrumental belief and the perceived balance of power (I-1 and P-4 beliefs).

> Deadlock > Dominate > Submit (P-1> and P-4=) and a mirrored perceived preference attributed to North Korea (I-1> and P-4=).<sup>45</sup>

**Figure 4.** Subjective Game of Clinton, Bush and Obama

		North Korea	
		De-escalate	Escalate
United States <sup>46</sup>	De-escalate	<u><b>4,4</b></u>	“1,2”
	Escalate	2,1	<u>3,3</u>

The initial state of the U.S. subjective game, then, is de-escalate (U.S.), escalate (NK): North Korea has chosen to pursue nuclear weapons and the United States has the next move.<sup>47</sup> This initial state of 1,2 is unstable, as both sides have unilateral and immediate incentives to depart from it. If the United States moves first, it can escalate, inducing deadlock at 3,3. Neither side would then have an immediate incentive to depart from mutual deadlock at 3,3, which is a Nash equilibrium. Under ToM play, though, they would have an incentive to continue moving, as deadlock is not a non-myopic equilibrium. Both sides have an incentive to move again through the escalate, de-escalate state of 2, 1 into the pareto-optimal mutual settlement end-state of 4,4. North Korea, knowing that the U.S. prefers 4 to 2, can safely (and temporarily) move to its worst state knowing that the U.S. will immediately move the game to the mutual best state of 4,4. The prediction of the game, if the U.S. moves first, is for an end state of 4,4 after a period of mutual confrontation at 3,3 and temporary DPRK submission at 2,1.

If it were possible, the U.S. would prefer that North Korea moves first, inducing what the U.S. sees as both sides’ best outcome of de-escalate, de-escalate (4,4) without going through the escalatory states first. Mutual cooperation is the pareto-optimal outcome of the game as perceived by the U.S. However, the U.S. does not have this option – North Korea has begun the game by escalating its nuclear program, and so the U.S. has the next move, which as noted leads the game from the 1,2 initial state into 3,3, then to 2,1 before finally terminating at 4,4.

In *Assurance*, the expectation is that rational players will eventually solve the game by moving to their mutual best option of 4,4 regardless of the state in which play begins. Therefore, the United States expects North Korea to eventually move to give up its weapons program in return for the benefits of cooperation. Once this state is established, the U.S. believes that it will persist in perpetuity. We remind the reader that these are subjective perceptions held by the U.S. and so may be incorrect, as we in fact argue was the case here.

45 This is game 2 in Marfleet and Walker’s index of possible subjective games produced by the operational code / ToM synthesis. Source: Marfleet and Walker, “A World of Beliefs”, p. 60.

46 Initial game state in quotation marks; Nash equilibria underlined; non-myopic equilibria in bold. By convention row player’s payoff (here, the U.S.) is listed first, column player’s (here, North Korea) second.

47 Consider this as representing a start of play date of March 1993 – North Korea has announced its intention to withdraw from the nuclear non-proliferation treaty and the crisis of 1994 is imminent.

## *Narrative of U.S. Efforts to Convince North Korea to Settle*

How closely does this interpretation and prediction of U.S. moves match the empirical record? In this section we measure the game predictions against observed behavior – again with the caveat that our focus is the broad direction of overall strategy rather than the detail of each twist and turn.

We take the starting point for this game as the DPRK’s March 1993 announcement that they intended to withdraw from the nuclear non-proliferation treaty. This elevated the issue of the North’s nuclear weapons program to near the top of U.S. foreign policy concerns.<sup>48</sup> President Bill Clinton stated the U.S. position: “I was determined to stop North Korea from developing a nuclear arsenal, even at the risk of war...I believed that if North Korea really understood our position, as well as the economic benefits it could realize by abandoning its nuclear program in favor of cooperation with its neighbors and the United States, we could work it out.”<sup>49</sup>

Although the U.S. tried diplomacy first, offering security assurances and negotiations on U.S. – South Korean military exercises, North Korea was not immediately willing to negotiate. The U.S. reinforced its military posture in the region and Secretary of Defense William Perry said that a military strike was being considered.<sup>50</sup> This escalation moved the game to the state of mutual deadlock (3,3). The U.S. was following a coercive diplomacy approach that conveyed threats to North Korea of consequences, including the use of force, for the continued pursuit of a weapons program, while offering the carrots of economic and political benefits for reaching a negotiated settlement.

The U.S. believed that a rational North Korea would prefer a negotiated settlement, and that was also the United States’ preferred option (4,4). As the key U.S. negotiators Wit, Poneman, and Gallucci wrote, “A strong posture was essential, but diplomacy had to be open to an agreement that achieved American objectives while avoiding, in the words of one [military] officer, ‘going to war with a second-rate country that was falling apart anyway.’”<sup>51</sup>

Matters came to a head in June 1994. Stuck at mutual deadlock, the Clinton administration seriously considered the use of force to forcibly end the DPRK program. The U.S. preferred, though, that the DPRK switch strategies to negotiate, and so allowed former president Jimmy Carter to undertake a diplomatic mission to Pyongyang. Carter was able to get a verbal commitment to negotiate from Kim Il-sung, which the former president quickly made public.<sup>52</sup> North Korea thus appeared to switch strategies to de-escalate, temporarily moving the game to the 2,1 state. The U.S. quickly accepted these negotiations, moving the game to what the U.S. saw as the pareto-optimal 4,4 end state.

48 Van Jackson, *Rival Reputations: Coercion and Credibility in US-North Korea Relations* (Reprint ed.), Cambridge, Cambridge University Press, 2017, p. 141.

49 Bill Clinton, *My Life*, New York, Vintage Books, 2005, p. 591

50 Nicholas L. Miller and Vipin Narang, “North Korea Defied the Theoretical Odds: What Can We Learn from Its Successful Nuclearization?”, *Texas National Security Review*, Vol. 1, No 2, 2018, p. 62-63.

51 Joel S. Wit, Daniel Poneman, and Robert L. Gallucci, *Going Critical: The First North Korean Nuclear Crisis*, Washington D.C., Brookings Institution Press, 2005, p. 182.

52 Jackson, *Rival Reputations*, p. 154-155.

Following further negotiation, the United States and North Korea signed the ‘Agreed Framework,’ which exchanged a freeze in the North’s nuclear program for U.S. provision of energy aid and the promise of proliferation-resistant light-water nuclear reactors. A path to normalization of relations, while long, was established.

From the U.S. standpoint, there was little reason to expect the North to defect from this state, which represented both a Nash and a non-myopic equilibrium in its subjective game. Indeed, the benefits of cooperation to the North could increase over time, as trust in their following the nuclear rules could lead to increased aid, trade, and diplomatic contacts.

In terms of wider U.S. interests, the outcome of the Agreed Framework also appeared optimal. The nuclear non-proliferation regime seemed to be strengthened, and the North Korean episode could serve as a roadmap for dealing with other states pursuing a weapons program. The United States had worked multilaterally, through the International Atomic Energy Administration, and had avoided the use of force.<sup>53</sup> From the standpoint of the U.S., this was expected to be the end of the game.

However, as we now know, North Korea defected from (or never intended to adhere to) the Agreed Framework and began a clandestine program for producing highly enriched uranium. When this was discovered in 2002, the crisis erupted once more. The U.S. and North Korea were returned to the initial state of the game, with the North pursuing weapons against U.S. wishes. To understand why the North defected from what the U.S. saw as a stable equilibrium, we need to look at the situation as it was perceived by the North Korean leadership.

## North Korea’s Subjective Game

Facing the *assurance* game perceived by U.S. leaders, were the North Korean leaders Kim Il-sung, Kim Jong-il, and Kim Jong-un.<sup>54</sup> As with the U.S. leaders, they show remarkable similarities in their operational codes and resulting preference structures (see figure 3). Each leader exhibits P-1, P-4, and I-1 scores significantly below the mean of world leaders. Their P-4 scores are within one standard deviation of the reference group mean.

North Korean preferences (P-1 <, I-1 <, and P-4 =) translate into the *Prisoner’s Dilemma* subjective game with the preference ordering of Dominate > Settle > Deadlock > Submit and a mirrored preference ordering attributed to the United States.<sup>55</sup>

53 On the U.S. wish to situate the DPRK case within a general and multilateral non-proliferation framework, see Michael J. Mazarr, “Going Just a Little Nuclear: Nonproliferation Lessons from North Korea”, *International Security*, Vol. 20, 1995, p. 106-107; Gavin, “Strategies of Inhibition”.

54 For an earlier study of Kim Jong Il that finds similar results in his operational code and subjective game, see Akan Malici, “The United States and Rogue Leaders: Understanding the Conflicts”, Stephen G. Walker, Akan Malici, and Mark Schafer (eds.), *Rethinking Foreign Policy Analysis: States, Leaders, and the Microfoundations of Behavioral International Relations*, New York, Routledge, 2011, p. 83-96.

55 This is game 5 in Marfleet and Walker’s index of possible subjective. Source: Marfleet and Walker, “A World of Beliefs”, p. 60.

**Figure 5.** Subjective Game of Il-sung, Jong-il and Jong-un

		United States	
		De-escalate	Escalate
North Korea	De-escalate	<b>3,3</b>	1,4
	Escalate	“4,1”	<u>2,2</u>

Play begins, as in the U.S. subjective game, with North Korea escalating by pursuing its nuclear program (4,1). This time, the initial state offers what North Korea perceives to be its best payoff, so it has no immediate incentive to depart from this state. However, the U.S. has significant incentive to move, preferring 2,2 over 4,1, escalating to shift the game into the deadlock state of 2,2. The DPRK sees no immediate incentive at this point to stop its nuclear program, as this would produce its worst outcome of 1,4. Mutual deadlock is a Nash equilibrium, although it is pareto-suboptimal, representing the next worst option for both sides.

From its standpoint, the DPRK has little reason to believe that the U.S. negotiating posture is credible. If North Korea abandons its program, adopting a cooperative posture at 1,4, it has every reason to believe that the U.S., preferring 1,4 to 3,3, will decline to de-escalate and move the game to 3,3. Further, if the U.S., irrationally in the DPRK perception, continues to negotiate, the North has its own incentive to escalate, preferring 4,1 over 3,3 and 2,2 over 1,4. This is the crux of the problem as the DPRK’s prisoner’s dilemma game interacts with the U.S. assurance game: mutual cooperation is a stable equilibrium in the game the U.S. is playing, yet is an unstable state from which both sides have incentives to defect in the game the DPRK is playing.

This demonstrates once more the well-known result that prisoner’s dilemma is a game in which cooperation is hard to achieve. However, this is true only under classic rules of solving for Nash equilibria. We confront a lacuna under ToM’s non-myopic rules of play. Assuming non-myopia, the DPRK should see ahead to understand that the U.S. has a dominant strategy of escalation. Understanding this, the DPRK should switch the strategy to one of negotiation (de-escalate and move from 4,1 to 3,3), preferring the payoff of 3 it can induce by so doing to the payoff of 2 it must expect if it does not switch.

Has North Korea behaved, then, in a manner that is even subjectively rational? North Korea’s behavior is rational under ToM rules if we assume it is using a deception strategy. The DPRK can attempt to make the United States believe it has switched its strategy to de-escalate, while retaining a clandestine nuclear program. In this way, it can induce the United States to de-escalate (which the U.S. is even more minded to do than the North realizes, due to the U.S.’ mistaken belief that mutual settlement is the highest ranked outcome for both sides), as the U.S. prefers the payoff at 3,3 to 2,2 in prisoner’s dilemma. With successful deception, the DPRK believes it can achieve its best state of 4,1 or its fallback state of 2,2 while temporarily inducing the U.S. into believing it has moved to a 3,3 settlement state. As with the U.S. side of the interaction discussed above, we now move to match these predictions against the empirical record of North Korean foreign policy in the nuclear arena.

## *Narrative of North Korea's Pursuit of Nuclear Program*

As Wit, Poneman, and Gallucci observe of the failure of the 1994 settlement and the North's continued pursuit of nuclear weapons, "North Korea was actually playing a far different game" than the U.S.<sup>56</sup>

In the game as played by the North Koreans, the pursuit of a nuclear program is relentless, to the point that it became central to North Korea's strategic culture.<sup>57</sup> The tactics varied along the way, for example by temporarily pausing or appearing to abandon the program when put under significant pressure or offered excellent incentives, but the North's apparent cooperative moves were either deceptive or temporary.<sup>58</sup> In the reading offered by our subjective strategic interaction approach, the North was always pursuing nuclear weapons.<sup>59</sup>

Thus, to the DPRK, the agreed framework of 1994 did not represent a stable and pareto-optimal mutual equilibrium, as the U.S. thought. Instead, to the DPRK it was a useful fiction that served as cover for continued progress towards the North's nuclear goals. This is because, in the preference ordering revealed by the North's subjective game, the DPRK values pursuit of its nuclear program more than the U.S. thinks it does, and values the benefits of economic and political integration into the international community less than the U.S. believes.<sup>60</sup>

There is real-world evidence of the North Korean deception strategy predicted by the model. Kim Il-sung's oft-repeated disclaimers – that the North does not have "the capacity to build [nuclear weapons], the money to buy them, or the desire or need to have them,"<sup>61</sup> were, as a matter of the empirical record, proven to be disingenuous. More accurate were the private comments of Kim's chief nuclear negotiator that "the dogs bark, but the caravan moves on,"<sup>62</sup> an unguarded admission that whatever the U.S. said or did, North Korea was motivated to continue its pursuit of nuclear weapons.

When the deception was exposed, the DPRK preferred to incur the costs of mutual deadlock (2,2) rather than abandon its program (which it believed would produce the North's worst state of 1,4). The costs the U.S. could impose, in terms of sanctions and lost opportunities for international trade and integration, were regarded as bearable. As detailed by Byman

56 Joel S. Wit et al., *Going Critical*, p. 372.

57 Emine A. Alagöz, "North Korea's Nuclear Program through the Lens of Strategic Culture", *Uluslararası İlişkiler*, Vol. 16, No 61, 2019, p. 111-126.

58 Mustafa Kibaroglu, "North Korea's Nuclear Ambition: Causes and Consequences", *Uluslararası İlişkiler*, Vol. 1, No. 1, 2004, p. 154-172.

59 For a related argument that the DPRK has preferred a relentless, clandestine pursuit of nuclear weapons, see the following work: Kai He and Huiyun Feng, "Deceptive Bargaining and Nuclear Ambitions: Prospect Theory and North Korea's Decision to Go Nuclear", Stephen G. Walker, Akan Malici, and Mark Schafer (eds.), *Rethinking Foreign Policy Analysis: States, Leaders, and the Microfoundations of Behavioral International Relations*, New York, Routledge, 2011, p. 97-111.

60 This view is consistent with one of the "Nuclear Logics" developed by Etel Solingen, who argues that states that are disinterested in global engagement and internally focused are unlikely to respond to the inducements and coercions favored by the United States in support of the non-proliferation regime. See Etel Solingen, *Nuclear Logics: Contrasting Paths in East Asia and the Middle East*, New Jersey, Princeton University Press, 2007, pp. 45-46.

61 Joel S. Wit et al., *Going Critical*, p. 95.

62 *Ibid.*, p. 56.



and Lind, the closed and totalitarian North Korean regime could concentrate its resources on its nuclear program and inflict severe pain on its population without risking its internal control.<sup>63</sup> Experts judge that no later than 2000 the DPRK had defected from the 1994 Agreed Framework,<sup>64</sup> working through the AQ Khan proliferation network to acquire material for a new nuclear enrichment facility.<sup>65</sup>

Consistent with their subjective game, the North simply did not value or believe the security assurances the U.S. offered in return for verifiable disarmament. “If we disarm ourselves,” First Vice Minister of Foreign Affairs Kang Sok-ju said in October 2002, “then we will become like Yugoslavia or Afghanistan’s Taliban, to be beaten to death.”<sup>66</sup> The Kims took careful note of the precedent of Libya, where Muammar Ghaddafi negotiated away his weapons program and found himself thrown out of power a few years later. The DPRK, in the words of its foreign ministry, saw negotiations with the U.S. as “an invasion tactic to disarm the country.”<sup>67</sup>

## U.S. Remains in the Assurance Game

The operational code data reveals that the preference ordering of the United States was consistent from the Clinton to the Bush administration. Even after the collapse of the 1994 Agreed Framework and the revelation of North Korea’s continued nuclear pursuit, the United States continued to play the assurance game. Whilst this was objectively irrational, and led the U.S. toward a suboptimal outcome, it was subjectively rational given U.S. perceptions.

Although U.S. president George W. Bush named North Korea as a member of the “Axis of Evil” and proclaimed a doctrine of preemptive war, U.S. threats were quickly exposed as bluster. Victor Cha, the U.S. administration’s leading North Korea expert, reports that Bush’s threats were empty: “Peaceful diplomacy was always considered the only practical solution,” he later wrote.<sup>68</sup> “President Bush never had, nor asked for, a plan to collapse the North Korean regime that he despised so bitterly.”<sup>69</sup>

Under Bush, the U.S. response to the DPRK’s continued nuclear pursuit was to engage in more diplomacy. The U.S. endorsed a new negotiation process, the six-party talks, making

63 Daniel Byman and Jennifer Lind, “Pyongyang’s Survival Strategy: Tools of Authoritarian Control in North Korea”, *International Security*, Vol. 35, No 1, 2010, p. 44-74.

64 Don Oberdorfer and Robert Carlin, *The Two Koreas: A Contemporary History*, New York, Perseus Books, 2014, p. 366; Alexandre Debs and Nuno P. Monteiro, *Nuclear Politics: The Strategic Causes of Proliferation*, Cambridge, Cambridge University Press, 2016, p. 292.

65 There is debate, though, over why the DPRK defected from the agreement. Some aver that the U.S. was not meeting its obligations under the Agreed Framework. What is clear is that the DPRK did not believe that the U.S. had moved to a permanent cooperative posture, as is consistent with their belief that they were playing a Prisoner’s Dilemma game.

66 Charles L. Pritchard, *Failed Diplomacy: The Tragic Story of How North Korea Got the Bomb*, Washington D.C., Brookings Institution Press, 2007, p. 25.

67 Jong H. Pak, “The Education of Kim Jong-un”, *Brookings Report*, 15 February 2018, <https://www.brookings.edu/essay/the-education-of-kim-jong-un/> (Accessed 23 September 2022).

68 Victor D. Cha, “Winning Asia”, *Foreign Affairs*, 01 November 2002, <https://www.foreignaffairs.com/articles/asia/2002-11-01/winning-asia> (Accessed 25 September 2022), p. 1-2.

69 Victor D. Cha, *The Impossible State: North Korea, Past and Future*, London, Vintage, 2013, p. 257.

the now familiar offer of economic benefits and diplomatic normalization in return for denuclearization. The DPRK responded with its own now familiar deception strategy, signing a statement that it agreed to give up its nuclear programs, a bad-faith promise that was quickly exposed as such.<sup>70</sup>

In 2006, the U.S. discovered the DPRK had shared the design of its Yongbyon reactor with Syria.<sup>71</sup> In July of that year, the DPRK conducted several missile tests in service of its long-term goal to develop an intercontinental ballistic missile capable of striking the continental United States. And on October 9<sup>th</sup>, 2006, it crossed “the biggest threshold of all,” conducting a massive nuclear test and immediately declaring itself a “full-fledged nuclear state.”<sup>72</sup>

In one sense, it would be reasonable to conclude that the dyadic game had changed in nature at this point, from nuclear pursuit and inhibition to nuclear deterrence. However, we continue the analysis into the Obama and Kim Jong-un years, as North Korea continued to make important progress in service of its strategic nuclear goals. In particular, North Korea conducted further nuclear tests, claimed to have developed a hydrogen bomb and, in 2017, tested a ballistic missile apparently capable of reaching the continental United States. By the time Obama left office, it was clear that the game had changed to deterrence. We consider that the pursuit / inhibition dynamic continued into his administration and so apply our analytical framework to the dyad during these years.

In his first campaign, Obama had said he would talk with regimes like North Korea without precondition, and in his inaugural address he said that whilst regimes like the DPRK should “know that you are on the wrong side of history,” nonetheless the U.S. “will extend a hand if you are willing to unclench your fist.”<sup>73</sup>

The DPRK instead revealed a fully operational uranium enrichment facility at Yongbyon in November 2010 and pursued further missile tests throughout Obama’s two-terms. In response, the U.S. adopted a policy of “strategic patience,” offering a resumption of talks only in return for complete and verifiable nuclear disarmament. Strategic patience, in terms of dynamic game theory, is the announcement of an unwillingness to unilaterally switch strategy to a more escalatory posture. From the DPRK standpoint, this amounted to the U.S. declaring it would accept the game remaining in the North’s own perceived best state of 4,1. In this circumstance, no DPRK regime holding the preference ordering we have identified would unilaterally switch strategies and give up their nuclear pursuit. The overall pattern of the Clinton and Bush years therefore continued into the Obama era.

Indeed, looking back over the Clinton, Bush, and Obama administrations, Victor Cha notes that: “Each [U.S.] policy had its own flavor, but the overall direction of engagement

<sup>70</sup> Jackson, *Rival Reputations*, p. 173; Cha, *The Impossible State*, p. 260.

<sup>71</sup> Gregory L. Schulte, “Stopping Proliferation Before It Starts”, *Foreign Affairs*, 01 July 2010, <https://www.foreignaffairs.com/articles/2010-07-01/stopping-proliferation-it-starts> (Accessed 25 September 2022).

<sup>72</sup> Michael J. Mazarr, “The Long Road to Pyongyang”, *Foreign Affairs*, 01 September 2007, <https://www.foreignaffairs.com/articles/asia/2007-09-01/long-road-pyongyang> (Accessed 25 September 2022).

<sup>73</sup> Barack Obama, “Inaugural Address”, 20 January 2009, <https://www.npr.org/2010/12/02/99590481/transcript-barack-obama-s-inaugural-address> (Accessed 26 September 2022).

has been far more carrot than stick.”<sup>74</sup> The U.S. response to each revelation of DPRK nuclear progress was essentially the same: “some sanctions (which the DPRK can tolerate), but then some diplomacy, which gives the North what they want to make them (temporarily, and only in public) stop.”<sup>75</sup>

## Conclusion

Our operational code analysis identifies that the U.S. was playing a more cooperative game than the insular North Koreans, and models the way in which these clashing subjective realities have interacted as the DPRK moved toward its nuclear goals. Interpreted through our framework, the pattern is of the U.S. consistently perceiving settlement as a more desirable option than North Korea, and believing that the North valued settlement significantly more than it, in fact, did.<sup>76</sup> The U.S. perception was that settlement was a strictly dominant strategy for both sides, and would produce a pareto-optimal outcome. We characterize U.S. presidents therefore, as “strategically puzzled” by their inability to convince the DPRK to move to and stay at the mutually cooperative end state, giving up its weapons program in return for the lifting of sanctions and the inducements of trade and aid. As the U.S. saw this as the best outcome the North could obtain, they perceived the task to be one of simply making this apparent to the DPRK, who would then behave in the desired manner - as it was in their rational interest to do so.

North Korea perceived the structure of the game very differently. The North believed that the U.S. preferred to prevail via escalation. It seems reasonable to assume that the North perceived that the U.S. had regime change, rather than disarmament, as its desired goal. North Korean deception strategies proved to be especially useful in this nuclear pursuit game. The pursuit of nuclear weapons is not an endless cycle – each period of successful deception by the DPRK brought it closer to its nuclear goals.<sup>77</sup> Thus, the game has a real-world end when the North successfully achieves its strategic nuclear goals, and deception strategies producing temporary breaks in the confrontation worked to the North’s advantage, as they bought time to move closer to the end goal. In short, then, both sides have behaved rationally within their subjective realities, and yet these realities have been at odds with one another. The result is that the world’s dominant power has been bested by a small and weak rogue state.

From the standpoint of objective rationality – and therefore perhaps of traditional game theoretic models – both sides’ play of the nuclear proliferation / inhibition game has been puzzling. However, from the perspective of the bounded rationality approach adopted here, both sides have acted logically based upon their definition of the situation and their understanding of the preferences of the other. This shows the power of the framework in translating general concepts

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74 Cha, *The Impossible State*, p. 297.

75 *Ibid.*, p. 238.

76 In discussions of this paper with some critics of U.S. foreign policy, we have found that these lines generate some debate. Some critics argue that the U.S. is a perfidious imperial power bullying a much smaller state, and read our description of U.S. actions as a normative endorsement. Of course, our aims are scientific rather than political; we do not seek to render a normative judgement on U.S. actions.

77 He and Feng, “Deceptive Bargaining and Nuclear Ambitions”.

of strategic behavior to the convoluted realities of international politics and foreign policy. The implications for theory are to support the use of this model of subjective strategic rationality. The actions of the U.S., in particular, are hard to reconcile with either classical rational choice or with the sequential game framework absent the operational code modeling of subjective games.

Future research can consider salient nuclear proliferation and inhibition case studies such as the protracted standoff in U.S. – Iranian relations in light of Iran’s nuclear program and the ramifications of this dispute in the broader Middle East and North Africa (MENA) region as well as its diffusion, or the lack thereof, to other fraught nuclear dyads. While the history and geopolitics of U.S. – DPRK relations differ from those between the U.S. and Iran, both Iran and North Korea are leader-oriented, weaker nuclear aspirants defying the world’s superpower against all odds.<sup>78</sup>

The implications for policy are to encourage statespersons to pay particular attention to the possibility that their strategic plan may be based on a fundamental misunderstanding of the situation. Confusion reigned in the U.S. / North Korean dyad, with both sides expecting the other to act differently. The DPRK was advantaged by its misperceptions. An end state where they achieved their nuclear goals without the U.S. decisively escalating was, for them, both unexpected and ideal. For the U.S., though, the mistaken belief that the North would move to an end state of mutual cooperation has had fateful results: The DPRK achieved its nuclear goals against the wishes of the world’s superpower.

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<sup>78</sup> Murat Bayar, “The Joint Comprehensive Plan of Action and the Future of Iran’s Nuclear Program”, *Uluslararası İlişkiler*, Vol. 13, No 51, 2016, p. 81-97.

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