

**A STUDY OF THE INTERNAL AND EXTERNAL VARIABLES  
INVOLVED IN THE DECISION OF INDUSTRIALIZING  
STATES TO DEVELOP STRATEGIC BALLISTIC MISSILES**

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**DECEMBER 2, 1999  
SENIOR THESIS (IR 494)  
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## Chapter One: Ballistic Missiles and Why States Seek Them

"It remains, nevertheless, an ingenious and diabolical robot conception translated into fact. It belongs to a world of hideous phenomena. It comes without sound, without warning and without discrimination. Its inaccuracies are so vast that it becomes a weapon of monstrous chance, neither aeronautic nor military in its value and power."

-- H.E. Bates<sup>1</sup>

Although strategic ballistic missile proliferation is a serious threat to global stability, international relations theory has chosen to ignore the field, instead focusing solely on the spread of weapons of mass destruction (WMDs) and their horrific effects. Studying the spread of delivery devices for these WMDs is just as important to understanding the threat to world peace. This paper will take a qualitative approach to exploring the internal and external motivations behind the decision made by the Republic of Korea to abandon its strategic ballistic missile program once it was initiated and compare the decision to that made by India, which has developed, tested, and deployed strategic ballistic missile forces. The four independent variables of military morale, cultural proclivity to aggressive actions, the pursuit of international prestige, and the level of external threat are the most important methods for explaining why states choose to seek strategic ballistic

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<sup>1</sup> Bates uses these words to describe the effect that the German V-2, the world's first strategic ballistic missile, had on England during the closing days of the Second World War.

missiles or not to as will be explained by the case studies of Indian and South Korean missile programs. This paper will seek to measure the importance and strength of these independent variables in South Korea's and India's decision to respectively terminate and complete their missile programs and explain counterintuitive puzzles that may arise.

Specifically, each of the independent variables is expected to have an effect that encourages or discourages a state to develop or not to develop strategic ballistic missiles. Low military morale results in a state being more likely to develop ballistic missiles as the government does not have confidence in the military's capabilities and develops strategic weapons as an alternative tool of statecraft, as well as an effort to purchase the military's quiescence. If a state has a high tendency toward the use of force to achieve policy goals, it will likely develop ballistic missiles because their inherent offensive nature would fit the strategic culture. As ballistic missiles are technologically complex and the developed world will pay more attention to those that possess them, states that are interested in gaining international recognition and prestige are likely to develop ballistic missiles. Lastly, if there is a high degree of external threat that undermines the viability of the state, that nation is more likely to develop strategic ballistic missiles as a means to defend itself by having a strong offensive capability.

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## **General Overview**

The paper's first chapter will provide a general overview of ballistic missile proliferation and establish the validity of South Korea and India as representative case studies. The second chapter will provide an overview of and critique seminal works in the area of ballistic missile proliferation and examine how this paper will contribute to the extant literature. The second chapter will also set forth the methodological approach to the study and delineate the independent and dependent variables. Two internal variables, the morale of the military and the strategic culture of the specific state, and two external variables, the level of potential threat from other states and the international prestige or recognition to be derived from possessing strategic ballistic missiles, will be examined and compared. Both South Korea and India will each then be examined in individual case study chapters that examine the four aforementioned independent variables and how each affected South Korea's and India's individual decisions regarding strategic missiles. A chapter comparing the differences between the two states and what motivated them to make the decisions to develop or not to develop strategic ballistic missiles will follow the case studies. The paper will then conclude with a brief summary and suggestions for how these studies and the variables can be applied to explain the actions of other potential or actual ballistic missile proliferators and current nonproliferation efforts.

## **The Relationship Between Strategic Ballistic Missiles and WMDs**

The most credible tools of coercive force that a state can possess are weapons of mass destruction (WMDs): nuclear, chemical, and biological weapons designed to inflict the maximum amount of damage and casualties upon potential adversaries. Conventional high-explosive warheads can also wreak significant damage, as Baghdad and Tehran learned in the Iran-Iraq War and London experienced during the deluge of Hitler's V-weapons at the close of World War II. Such weapons are by their very nature strategic tools designed to destroy infrastructure and population, leaving the targeted state economically disrupted, politically crippled, and psychologically crushed. They are offensive weapons designed to destroy an adversary's means and will to fight, but they also have defensive value as by possessing such weapons a state can deter a potential aggressor from attacking it.<sup>2</sup>

But such weapons require a means of delivery to the target country in order to be a credible deterrent. Although they can probably be smuggled into target states, that does not represent a deterrent threat as it requires stealthy deployment of the WMD, the exact opposite of a deterrent threat, which requires that the state to be deterred fully understands the retaliatory power that will be used against it if an aggressive action is made. As the changing nature of global conflict has resulted in adversarial relationships between countries separated from each other by thousands of

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<sup>2</sup> Strategic ballistic missiles gain their value as a defensive deterrent force only through their offensive capabilities and hence should be considered offensive weapons in all regards.

kilometers, states have been obliged to develop other methods by which to deliver their weapons across long distances. States have explored the use of aircraft and submarines to deliver such weapons, but the preeminent delivery system to be developed during the last fifty years is the strategic ballistic missile - a weapons system capable of delivering WMDs or large conventional warheads to an adversary's industrial heartland and population centers hundreds or thousands of kilometers away. Besides the value of being able to attack distant adversaries, ballistic missiles are much more survivable than aircraft when used in a strategic role.<sup>3</sup> Aaron Karp confirms, "[M]issiles remain the delivery system of choice especially when they have longer range and because of their suddenness and extreme difficulty to intercept."<sup>4</sup> However, the development of ballistic missile technology is risky and extremely costly in terms of the monetary and human resources that must be expended.

### **The Emerging Ballistic Missile Threat**

The threat of ballistic missile proliferation emerged from the chaos at the end of the Cold War, a new obstacle to peace just as the likelihood of superpower confrontation began to decline. Karp

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<sup>3</sup> During the 1991 Persian Gulf War, Iraq's expensive air force was a total failure, being crippled at the start of the conflict. Contrastingly, Iraq's modified Scud missiles were far more effective at diverting allied air assets and created a sense of apprehension in Saudi Arabia and Israel, the very purpose of strategic ballistic missiles.

<sup>4</sup> Karp, Aaron. "The Maturation of Ballistic Missile Proliferation," in *The International Missile Bazaar: The New Suppliers' Network*, Boulder: Westview, 1994, p.7. Karp is a former missile proliferation specialist for the US Arms Control and Disarmament Agency.

writes, "The discovery that dozens of regional actors possessed or were experimenting with large rockets was uniquely chilling. Potentially armed with anything from conventional to thermonuclear warheads, these new weapons threaten to recreate the balance of terror from which the world just escaped."<sup>5</sup> Yet, although there was a great deal of media hype painting a lurid picture about the threats ballistic missile proliferation poised in the late 1980s and early 1990s. The reality was that many, if not all, of the developing rocket programs "had started years or decades ago, and few showed signs of rapid progress" until the late 1980s and early 1990s.<sup>6</sup>

Ballistic missile proliferation in the developing world is an emerging threat closely related to the spread of WMDs. The proliferation of ballistic missiles in the developing world is of particular importance as modernizing states are the actors that are more likely to use ballistic missiles in combat for strategic purposes, as proven by the use of strategic missiles in the Iran-Iraq War. The threat such missiles pose in the hands of developing countries is growing more significant as time passes. It has been established that approximately ten to twelve developing countries have or have had ballistic missile programs, although most of them have not progressed beyond the most rudimentary stages. Keith Krause adds that "five states in the developing world may acquire

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<sup>5</sup> Ibid., p.1.

<sup>6</sup> Ibid., p.5.

the capability to produce missiles by the year 2000. Although most of these missiles are relatively primitive and not capable of delivering large warheads with a great deal of accuracy, their presence changes the complexion of conflicts by their possible effect on crisis stability, deterrence, and escalation.”<sup>7</sup>

Although missile proliferation is a recent development, there is a considerable body of evidence and a sound intellectual foundation for understanding the threat. Furthermore, the very nature of missile technology “dictates a narrow path of development with few options for its acquisition.”<sup>8</sup> Most, if not all, countries attempting develop ballistic missile technology must make specific technical advances and adhere to a unique course of development. There is simply no other known way to develop such technologies, making it much easier to gauge the progress of a state’s program since it must pass a series of very specific and identifiable benchmarks for development.

Strategic ballistic missiles are rockets launched vertically in a parabolic flight path that use a guidance system to bring the missile’s warhead accurately to the target. But the most important distinction to consider is the difference between strategic and tactical ballistic missiles. By definition strategic missiles are those that are deployed with the intention of destroying or

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<sup>7</sup> Krause, Keith. *Arms and the State: Patterns of Military Production and Trade*. Cambridge: Cambridge UP, 1992, p.190. Krause is professor of international relations at York University in Toronto.

<sup>8</sup> Karp, Aaron. “The Maturation of Ballistic Missile Proliferation,” in *The International Missile Bazaar: The New Suppliers’ Network*, Boulder: Westview, 1994, p.4.

threatening an adversary's population and industrial base, whereas tactical missiles are those that are designed for use against enemy military targets and troop formations. Tactical missiles are used almost exclusively for military purposes such as attacking military headquarters or destroying bridges or supply depots, whereas strategic missiles are designed for destroying cities, factories, and oil refineries and causing general mayhem by terrorizing the adversary's population through indiscriminate killing. Although strategic missiles are usually aimed at specific targets, a significant side effect is the disruption of people's daily lives and thus production in all parts of the economy because there is virtually no way to prevent ballistic missile attacks. The inherent inaccuracy of most of the strategic ballistic missiles Second and Third World states are developing only amplifies the indiscriminate terror caused through missile attacks.

#### **Tactical vs. Strategic Ballistic Missiles**

For the sake of this paper, ballistic missiles with a range of 300km or greater will be considered strategic weapons and those with a range less than 300km as tactical weapons as most military theaters of operations fall within a range of 300km. Missiles with a range greater than 300km are designed to attack strategic targets and also, as a missiles range increases its accuracy decreases, diminishing its tactical value. The 300km range limitation is also the one the Missile Technology Control Regime (MTCR) uses to

differentiate between strategic and tactical missiles.<sup>9</sup> But it must be kept in mind that differentiating between strategic and tactical ballistic missiles based on the 300km range is somewhat arbitrary. If two potential adversaries such as the Republic of Korea and the Democratic People's Republic of Korea are more proximate, then missiles with ranges less than 300km can be considered strategic weapons, especially if there are significant industrial and population centers located in the border region, although they would still technically be considered tactical weapons according to the provisions of the MTCR.

Ballistic missiles should be differentiated from cruise missiles, which are normally launched from aircraft or submarines with tactical objectives but have the potential to become strategic weapons. Cruise missile proliferation is another emerging threat with several developing states beginning to develop the relevant technologies, but cruise missiles will not be discussed in this paper as no developing countries have yet tested cruise missiles.

#### **The Relationship Between Space Programs and Ballistic Missiles**

It must further be noted that an issue closely tied to ballistic missile proliferation is the development of national space programs. The technologies used to build booster rockets for launching satellites in orbit are almost identical to those used to build ballistic missiles, particularly in terms of staging technology and warhead design. The dual-use capabilities of rocket

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<sup>9</sup> Statement by the Assistant to the President for Press Relations, 16 April 1987.

technology for civilian and military usage represent a huge potential threat for the weaponization of civilian rocket programs as nations seek to grab a share of the increasingly lucrative satellite market. Some states such as India may have used their civilian rocket program as a cover for their military programs.

### **Research Question and Hypotheses for Independent Variables**

But the fundamental question posed in this thesis is what motivates and encourages certain states to seek to build strategic ballistic missiles? What causes certain states to expend valuable resources on the lengthy process of missile development? Why do some countries start developing missiles and then make a decision to end development?

This paper will examine the role that each of the independent variables will have upon the likelihood that a state will develop and deploy strategic ballistic missiles. These hypotheses will be tested through the comparative case studies of South Korea and India; the findings are presented in the following analytical chapter.

The previous literature on the issue of ballistic missile proliferation, as examined in Chapter Two, is flawed as it focuses primarily on economic motivations and external threats as its causes. However, by examining other closely related issue areas such as nuclear weapons, there are other alternate variables such as military morale, strategic culture, and the pursuit of international prestige that are significant in explaining the decisions why a state would build strategic ballistic missiles.

The first variable to be examined measures if and to what extent a state has an ingrained strategic culture wherein offensive force is considered and has regularly been used as an acceptable means to achieve diplomatic goals. A state with a high tendency toward aggressive action is more likely to develop and deploy strategic ballistic missiles.

Second, the higher a state's military morale, the less likely it will be to develop and deploy strategic ballistic missiles. This is because the military will be confident that it can defeat an adversary on the battlefield without having to rely upon strategic weapons and will not make the development of such weapons a priority.

Third, if a state's foreign policy is focused on proving that it is a regional power by seeking international recognition and prestige, it will be more likely to develop strategic ballistic missiles. Such weapons, as mentioned above, are very difficult to develop, and if a state is able to build them domestically, other countries will treat it with more deference and respect.

The final variable measures the level of external threat - if a state is faced with a potentially belligerent adversary that threatens its very existence, a state is likely to build a strategic ballistic missile force to deter any attack upon it. Each of these independent variables and how they will be measured will be discussed in the second chapter. The fundamental hypotheses behind this thesis have been described above - to show whether the four

independent variables influence the dependent variables of developing or not developing strategic ballistic missiles.

### **General Findings**

Comparing the missile programs of South Korea and India leads the author to conclude that there is a correlation between proposed hypotheses regarding strategic culture and tendencies of a state to use force to achieve foreign policy goals, the level of military morale, and the nation's pursuit of international prestige and the likelihood of a state developing strategic ballistic missiles. The last hypothesis - the role of external threat to the viability of the state - is less clear in its relationship to the state developing and deploying strategic missiles. The findings of this paper from the comparative case studies indicate that each individual independent variable can predict whether a specific state is likely to develop strategic ballistic missiles. However, by using all the variables - both external and internal - together to paint a broader picture of each state, one can come to a much more accurate prediction as to whether a state is likely to develop strategic missiles than by using just one variable. There is a counterintuitive situation that runs contrary to what would be predicted from the hypotheses by the fact that South Korea has a high degree of external threat but did not develop strategic missiles. This issue will be addressed in Chapter Five, which compares Indian and South Korean motivations for their decisions regarding missile development. It will examine the importance of the intervening variable of the United States' security guarantees to

South Korea on the independent variable of external threat and the South Korean decision to discontinue its strategic missile program.

#### **Falsifiability of Expected Results**

There is the possibility that there is no correlation between the independent variables and the dependent variable of missile development. It is possible that the independent variables actually have the opposite effect from what is proposed in the hypotheses. For instance, if it could be proven that states that have high military morale are more likely to develop strategic ballistic missiles because the state feels more confident that it can bring the massive undertaking of a missile program to fruition, the military morale variable would be proven to be flawed. Similarly, if states with a high *parabellum* tendency reject strategic missile development because they perceive missiles as solely deterrent weapons with no offensive capabilities then the relationship between states' proclivities to aggressive action and an increased likelihood of building ballistic missiles would be disproven. Alternatively, there may be no relationship between a state's *parabellum* tendency and the likelihood that it will develop strategic ballistic missiles - two states may have radically different *parabellum* tendencies on the ordinal scale, but still have the same likelihood of developing strategic missiles despite the difference. Both of these possibilities - that there is no relationship or there is an inverse one from the one expected between the independent and dependent variables - the relationships

set forth in the hypotheses would be flawed. If that is the case, the hypotheses are invalidated and can be proven falsifiable.

### **Case Selection**

But why look at developing states and the likelihood that they will develop strategic ballistic missiles? Karp argues that "the challenge of missile proliferation varies significantly from country to country" and that "[m]issile proliferators can be divided into three categories, depending on their technical capabilities: those with substantial indigenous technical resources capable of creating their own strategic missile forces, those with sufficient resources to conduct rocketry development but with limited foreign help, and those dependent on foreign suppliers for entire missile systems."<sup>10</sup> In order to achieve valid results, only states that fall into the second category will be examined for several reasons. First, states that have the indigenous technological capabilities to build and deploy complete missile systems is limited to a very exclusive number of First World nations, which have possessed such missile systems for decades. It is empirically proven that they are unlikely to use them (although some states in the former category, such as China, may export strategic missiles and associated technologies). Second, the number of states in the second category Karp delineates is limited to those states that have a substantial indigenous defense industry that requires only minor technological input from outside sources in order to develop ballistic missiles, thus

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<sup>10</sup> Karp, Aaron. "The Maturation of Ballistic Missile Proliferation," in *The International Missile Bazaar: The New Suppliers' Network*, Boulder: Westview, 1994, p.5.

creating a similar yet varied pool of states to be studied. Third, one of the underlying foundations of this study is why certain states have carried their ballistic missile programs through to fruition and why others have not. Countries from the third category do not have indigenous missile programs and thus must be excluded from the study. Furthermore, all the states that fall into the first category and have the indigenous capability to develop ballistic missiles have done so.<sup>11</sup> This study must, therefore, be limited to the states in the second category as they represent the greatest potential ballistic missile proliferators in the present world. They are the states most likely to deploy new, large strategic missile forces and have the capability to do so. South Korea and India both fall into this category of technologically capable but still developing nations.

For the sake of this study and examining the importance of the different independent variables leading to the decision to develop missiles or suspend the program, India and South Korea - two countries known to have contemplated or started strategic ballistic missile programs - will be examined in the following chapters. But why select them for examination rather than states like Egypt, Iraq, North Korea, or Argentina - all of which fall into Karp's second

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<sup>11</sup> An interesting argument worthy of note and not discussed in this paper is the role that the MTCR may have in contributing to the emergence of more states that may fall into the first category Karp delineates. The MTCR has retarded the development of ballistic missiles in some countries, but may have the paradoxical effect of creating states that can develop completely indigenous missile systems and do not adhere to the MTCR possibly creating a greater missile proliferation threat.

category of states with significant defense industries but that need some foreign technological assistance to build strategic ballistic missiles? Because of the sensitive nature of states' ballistic missile programs, the study focuses on the states that have the greatest quantity and quality of literature on their respective missile programs. For instance, North Korea would be an ideal case study for this thesis, but there is little information about its program. What little data exists is of questionable quality, particularly in regards to the internal politics of the Kim regimes and military morale. Furthermore, the cases have been picked so there is variation in the size, population, and proximity of each state, so as to give the results of the study greater validity. It is also important that a pair of countries that form a strategic dyad not be selected, as that would likely skew the study. Furthermore, the regional variation is key to establishing the validity of the study, since India and South Korea have different socio-political and cultural underpinnings that give the study a broader, more varied range.<sup>12</sup> South Korea and India do share one important aspect crucial for this study - similar military industrial complexes and capabilities in terms of producing complex weapons systems with moderately advanced electronics and subcomponents.<sup>13</sup>

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<sup>12</sup> One of the significant reasons for deciding not to use Egypt or Argentina as case studies stems from their cooperation on the Condor missile project, potentially corrupting study data as both the Egyptian and Argentine missile industries were partially integrated with each other.

<sup>13</sup> Mussington, David. *Arms Unbound: The Globalization of Defense Production*. Center for Science and International Affairs Studies in

## **Chapter Two: Building a Methodological Framework for Explaining Why States Develop Strategic Ballistic Missiles**

By examining the relevant literature in the field of ballistic missile proliferation and related fields, the areas that previous scholarship has not covered can be identified. Furthermore, by examining previous work in the issue area, one can come to conclusions and ideas about what sorts of independent variables may have an impact on the dependent variable of indigenous ballistic missile development and what sort of contribution it will be to the extant body of literature. This chapter examines the pertinent articles and texts on strategic missile development and then sets forth the methodological framework for the rest of the paper.

### **Literature Review**

As the field of ballistic missile proliferation is relatively new, emerging only in the past decade, there is not a considerable field of literature upon which to draw. The amount of literature shrinks even further when one disregards the alarmist articles filled with hyperbole that merely report suspicions about the missile programs of various states rather than the motivations behind them. Even the remaining small amount of literature is decreased when one considers that this paper focuses on strategic ballistic missiles, eliminating a considerable amount of information that pertains to the proliferation of tactical missiles.

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International Security No. 4. Washington: Brassey's, 1994, p. 81. Mussington is an analyst for the Center for Strategic Studies and formerly was an analyst for Canada's Department of National Defense.

Furthermore, many articles merely present information about the spread of ballistic missiles across the world and mention specifics about individual state programs, but they fail to provide much of an analytical framework to determine what motivated each individual state to seek strategic ballistic missiles or compare them.

Publications such as *Jane's Missiles and Rockets* and *Defense News* merely provide the relevant statistical information about missile programs, but for the most part, they do not provide extensive analysis of the phenomena of missile proliferation. Most literature on missile proliferation focuses on raw technical data and fails to discuss the motives to obtain strategic ballistic missiles. For the most part, they allow the reader to make his or her own conclusions about the proliferation of missiles; if there is any analysis at all, it focuses on arms races and the security dilemma. Scant attention is paid to the other three variables examined in this study - the internal domestic variables of strategic culture and military morale or the external international prestige variable. Specifically, information on the motivations of the Indian missile program is limited to a few journal articles; data regarding the South Korean missile program and its motivations are practically nonexistent.

Janne E. Nolan's *Trappings of Power: Ballistic Missiles in the Third World* and W. Seth Carus' *Cruise Missile Proliferation in the 1990s* and *Ballistic Missiles in the Third World* all suffer from the same problem - a lack of analysis about what has motivated the

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proliferation of strategic ballistic missiles in the developing world.<sup>14</sup> This trio of books is from the early 1990s, when the threat of ballistic missile proliferation first appeared on the scene, and are hence filled with largely apocalyptic visions of the future and how the proliferation of strategic missiles would erode the United States' hegemony. They all contain a plethora of technical information about Third World ballistic missile programs and now-outdated threat assessments that have proven to be optimistically naïve about the progress of missile programs in most developing states. Each book contains policy recommendations for how to deal with the proliferation of ballistic missiles, but in retrospect it is doubtful that the recommendations would have been helpful. *The International Missile Bazaar: The New Suppliers Network*, edited by William Potter and Harlan Jencks, provides a tidy summary of every state that possesses or is developing missiles of any type.<sup>15</sup> Although the introductory and concluding chapters provide a theoretical background for missile proliferation, there is little analysis of what motivates specific states to develop strategic ballistic missiles.

Because of these limitations on the available literature on the spread of strategic ballistic missiles, literature from other

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<sup>14</sup> Carus, W. Seth. *Cruise Missile Proliferation in the 1990s*. Chicago: Praeger, 1992; Carus, W. Seth. *Ballistic Missiles in the Third World*. Chicago: Praeger, 1990; Nolan, Janne E. *Trappings of Power: Ballistic Missiles in the Third World*. 1991. Seth Carus is an Olin Fellow at the US Naval War College.

<sup>15</sup> Potter, William C. and Harlan W. Jencks, eds. *The International Missile Bazaar: The New Suppliers' Network*. Boulder: Westview, 1994.

related issue areas should be considered for similarities in the motivations for developing strategic missiles.<sup>16</sup> Considering that strategic ballistic missiles are closely related to nuclear weapons, since they are often considered the delivery vehicle of choice, the vast literature surrounding nuclear weapons and the motivations of certain states to develop them can be explored. In fact, Aaron Karp notes that "the rapid maturation of missile proliferation is due largely to the pioneering work in nuclear deterrence and nuclear proliferation. This provided much of the intellectual foundation for the new issue."<sup>17</sup> The most significant alternative system other than ballistic missiles for delivering strategic weapons such as WMDs to their targets are bomber and fighter aircraft. Considering that building or acquiring bombers is prohibitively costly and difficult for developing countries, the literature surrounding the proliferation of advanced fighter aircraft can also be reviewed and studied to provide insight into the motivations that states might have for developing strategic ballistic missiles. The logical comparison of fighter aircraft and nuclear weapons to strategic ballistic missiles is fundamentally based on their similarity and purpose as offensive weapons. Other possible areas that are

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<sup>16</sup> King, Gary, Robert O. Keohane and Sidney Verba. *Designing Social Inquiry*. Princeton: Princeton UP, 1994. p.217-9. This concept of examining closely related fields in order to determine the similarities between them and explore whether any of the explanatory theories can be cross-applied to the area being studied is a variation of a research design proposed in *Designing Social Inquiry*.

<sup>17</sup> Karp, Aaron. "The Maturation of Ballistic Missile Proliferation," in *The International Missile Bazaar: The New Suppliers' Network*. Boulder: Westview, 1994, p.4.

closely related to strategic ballistic missiles because of their similarity as an inherently offensive weapons are the development of a "blue water" navy able to project power, the development of aerial refueling technology to extend the operational range of fighter aircraft, and the design of missile submarines. However, this literature review will focus primarily on those works regarding the proliferation of fighter aircraft and nuclear weapons.

There are a number of books that analyze the global arms trade and discuss the proliferation of ballistic missiles and related technologies, including David Mussington's *Arms Unbound: The Globalization of Defense Production, The Politics and Economics of Defense Industries* edited by Efraim Inbar and Benzion Zilberfarb, and Keith Krause's *Arms and the State: Patterns of Military Production and Trade*.<sup>18</sup> Mussington examines nonproliferation strategies, but he tempers the discussion with an in-depth analysis of the domestic military production capabilities of South Korea, Brazil, South Africa, Egypt, and India as the countries that are most likely to develop complex weapons systems such as ballistic missiles. Inbar and Zilberfarb devote most of their chapters to explaining how the military-industrial complexes have changed in the post-Cold War era in both First and Third World states and what influence they have on governmental decisions to develop high tech

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<sup>18</sup> Mussington, David. *Arms Unbound: The Globalization of Defense Production*. Center for Science and International Affairs Study in International Security No.4. Washington: Brassey's, 1994; Inbar, Efraim and Benzion Zilberfarb, eds. *The Politics and Economics of Defense Industries*. London: Cass, 1998; Krause, Keith. *Arms and the State: Patterns of Military Production and Trade*. Cambridge: Cambridge UP, 1992.

weapons systems. *The Globalization of Defense Production* is useful background information, particularly regarding the relationship between industry and government, but otherwise it does not directly pertain to this paper. Krause's *Arms and the State* contrasts the decision of states to develop ballistic missiles and fighter aircraft as delivery systems for WMDs, referring to fighter planes as a "poor man's ballistic missile." Krause also briefly discusses the utility of external variables, including external threats and the importance of international prestige in building ballistic missiles. However, these arguments are never developed or explained, as they are tangential to his arguments about the economic motivations to build complex weapons systems such as ballistic missiles and fighter aircraft. A common trend through each of these three books is a concentration on economic factors and external threats that drive the proliferation of weapons such as ballistic missiles, not internal domestic factors including military morale or strategic culture.

George Perkovich's *India's Nuclear Bomb* and Gaurav Kampani's "Structural Constraints on an Overt Indian Nuclear Weapons Program," one of the long line of reports the Natural Resources Defense Council has issued on nuclear weapons, both provide an in-depth analysis of India's nuclear program and have peripheral parts that indirectly deal with India's missile program. Perkovich's book is based mostly on interviews and declassified documents that explore India's schizophrenic attitude toward nuclear weapons, and he discusses Indian culture and history as having sparked India's

desire to build and test nuclear weapons.<sup>19</sup> He explores the contradiction of India seeking to become a superpower and gain international prestige balanced with the cultural legacy of pacifism Gandhi left. He further discusses how this internal contradiction has affected the Indian psyche, but that the quest for status eventual won out and the nuclear bombs were detonated. Perkovich extensively researches the internal cultural dynamics leading to India's decision to test nuclear weapons, but he is largely blind to the external threat factor of Pakistan. Kampani's report explores the more technical aspects of India's nuclear program and spends a fair number of pages examining the Indian strategic missile program. It analyzes civil-military relations in India and touches on the idea that Indian military morale might be important to the motivations behind the Indian nuclear program.<sup>20</sup> However, Kampani concludes his report by indicating that the Indian nuclear and missile programs will be constrained by the changing realities of the post-Cold War world - something belied in May 1998 by India's actions in the last eighteen months, exploding nuclear warheads and deploying the Agni strategic missile.

John Wilson Lewis and Xue Litai explore China's decision to acquire nuclear weapons in *China Builds the Bomb* and do an effective job of examining the external and internal factors that led to

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<sup>19</sup> Perkovich, George. *India's Nuclear Bomb*. Berkeley: University of California - Berkeley Press, 1999.

<sup>20</sup> Kampani, Gaurav. "Implications for the Comprehensive Test Ban and Beyond." New York: National Resources Defense Council, 1998.

China's decision.<sup>21</sup> Lewis and Xue explore the relationship between the Soviet Union and the People's Republic of China and the degree of external threat, as well as China's desire to be considered a great power and attract international prestige following the Communist Revolution, resulting in a crash nuclear program. *China Builds the Bomb* proposes some excellent variables about what motivated the PRC to develop nuclear weapons. Some can be used to discuss modern ballistic missile proliferation, but others are unique to nuclear weapons development and the situation in China in post-1949 era.

#### **Analysis of Relevant Literature**

The proliferation of strategic ballistic missiles throughout the developing world is a vital issue that is becoming increasingly important as more and more states are developing the technologies to obtain such missiles, thus "[t]here can be no doubt that missile proliferation poses a grave threat to international peace and stability."<sup>22</sup> Understanding the motivations behind why states choose to obtain such weapons is crucial to developing future nonproliferation strategies. Considering, from the literature review above, that scholars have done little to understand the motivations behind the acquisition of strategic ballistic missiles by developing states, this paper makes a unique and original

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<sup>21</sup> Lewis, John Wilson and Xue Litai. *China Builds the Bomb*. Palo Alto: Stanford UP, 1991.

<sup>22</sup> Karp, Aaron. "The Maturation of Ballistic Missile Proliferation," in *The International Missile Bazaar: The New Suppliers' Network*. Boulder: Westview, 1994, p.5.

contribution to the security studies field of international relations, exploring a previously unexamined niche.

The books and articles examined generally take three approaches to exploring the issue area of missile proliferation. The first is merely descriptive, laying forth what is known about the missile programs in various countries but making no effort to explain the internal and external motivations for the programs' existences. The second approach is one that uses the raw data compiled from those articles that provide it. However, they focus on the threats to the United States and the globe missile proliferation presents and propose ways to stop or control it. They do some analysis on the motivations behind states' decisions to build missiles, but pay more attention to the external threat variable - a legitimate and plausible explanation, but not the sole explanation for missile proliferation. The third approach tries to explain missile proliferation through an economic framework in terms of internal motivations of the military industrial complexes in these states and as a part of an export-driven strategy.<sup>23</sup> Conversely, all of the aforementioned approaches focus on why missile proliferation occurs and do not even consider what constraining factors may cause nations not to build and deploy strategic ballistic missiles, an important part of this study. This paper focuses primarily on the independent domestic variables of military morale and *parabellum* tendency, as

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<sup>23</sup> This paper strongly questions whether internal or external economic motivations are causal factors in the development of strategic missiles. At most, the economic variable is secondary.

well as the role of seeking international prestige with the control variable of external threat considered as well.

### **Research Design**

In terms of laying out the methodological framework for this study, there will be a short introduction of why a small *n* case study is a legitimate way to arrive at conclusions and then a more detailed explanation defining the four independent variables.

The use of a small number of comparative case studies (small *n*) is a valid methodological approach to proving or disproving the importance of the independent variables on the dependent variable of missile development. This qualitative approach is a way to make the comparisons since attempts to use quantitative approaches would be subject to second-guessing as to the data sets used to measure the different independent variables. Taking a quantitative approach to studying ballistic missile proliferation is difficult because of the issue area's sensitive nature and a general dearth of available data sets. A qualitative approach allows the study much more flexibility in terms of such intangibles as historical proclivities to certain action; however, there must be some analytical structure to keep the study relevant. Using a small number of cases is a valid and justifiable research method, as long as there are several variables being precisely measured and numerous observations that prove or disprove the variables.<sup>24</sup> For this paper, examining both states through comparative case studies in terms of the four independent

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<sup>24</sup> King, Gary, Robert O. Keohane and Sidney Verba. *Designing Social Inquiry*. Princeton: Princeton UP, 1994, p.52.

variables will result in conclusions about the importance of the variables, though the conclusions will not have been comprehensively tested. By providing historical summarization through the case studies of South Korea and India and then ascertaining the systemic differences and similarities between the cases, analysis can be made as to the relationships between the independent variables and the dependent variable.<sup>25</sup>

### **Ordinal Scales, Independent, and Dependent Variables**

In order to explain the motivations behind the decisions of the selected countries to develop and deploy ballistic missiles or not, both internal and external factors must be examined. The dependent variable for this study is simply the decision of the state in question to develop strategic ballistic missiles; hence, there are two subvariable options - the selected state goes ahead and builds the missiles or it does not. For this study, four independent variables - two external and two internal - will be tested. The internal variables to be analyzed include the military morale within the state and the empirical tendency of a state to rely upon offensive military force to achieve foreign policy goals. The external factors are the level of military threat to the state's viability other states pose to that country and the level of international prestige and respect that would be earned through the development of strategic ballistic missiles. The specific details of the independent variables will be explained forthwith.

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<sup>25</sup> Ibid., p.53-6.

It is obviously impossible to assign numerical values to each independent variable, as there are no specified sets of statistics that can capture the full breadth of each one. Hence, to measure each of the independent variables, ordinal levels will be used to establish points of comparison between the two culturally and geographically diverse states studied. The countries examined in the case studies are so diverse that there must be a points of common comparison or else the study will collapse into a morass of unintelligible qualitative observations and comparisons, which is why ordinal scales are the best option. In order to keep continuity throughout this study all the ordinal scales used will have four categories to ease and simplify the comparison between the countries studied.

### **Military Morale**

Each of the independent variables and the methodology for how each of the ordinal scales and categories will be defined represent the final portion of this introductory chapter. The first independent variable that influences the decision to develop strategic ballistic missiles is the morale of the military of the states being analyzed. There is an inverse relationship between the level of military morale and the likelihood of developing strategic missiles. The lower the morale of a state's military, the more likely it is that the state will develop ballistic missiles. For this paper, military morale is defined as the military's use of force to suppress internal dissent (increased usage of the military to suppress its populace results in lower morale), success or lack

thereof in recent conflicts (success results in higher morale), and the military's level of training, discipline, and equipment (better trained and equipped troops tend to have higher morale). Again, these aspects of military morale cannot be quantified numerically, so each of the three factors that make up military morale will be considered equally and classified accordingly. The states studied will be placed in one of four categories of military morale - elite, high, medium, and poor. These categories will provide a measure of comparison between different states, but not so many categories as to make it difficult to classify military morale. Elite military morale should indicate that a military force is in top fighting form, is well equipped, has not been used to put down insurrections, and has met with unqualified success when it has fought against opponents. High military morale, although similar to elite, is indicative of a military force that is well trained and disciplined, although some units may be equipped with slightly obsolescent equipment, but the military has not been used to put down popular dissent and is generally popular domestically. It has met mostly with success when engaging adversaries, although it may have suffered an occasional draw or defeat. Medium military morale indicates a military that is further degraded with units that may be using obviously obsolete equipment, it may have been used to suppress some internal dissent, and it may have been bested by a regional adversary in a recent war, but it put up a good fight. States with medium military morale still have a well-trained officer corps, although the troops may be ill disciplined and badly trained.

The domestic populace will be distrustful of the military. States with poor military morale have been defeated by adversaries, and are completely under-equipped, and what equipment there is will be antiquated and obsolete. The officer corps will be badly trained and disorganized; the troops will be armed but training is poor.<sup>26</sup>

### **Strategic Culture (*Parabellum* Tendency)**

As strategic ballistic missiles are inherently offensive weapons used to attack foreign adversaries, there should be a direct relationship between the likelihood of a state to develop such weapons and its use of force as a foreign policy tool. In order to ascertain the empirical willingness of a state to use force to achieve its foreign policy goals (a *parabellum* tendency), the state's recent relations with its neighboring states must be examined (since the mid-1940s for both India and South Korea - their birth as sovereign nation states) as well as its historical proclivities toward violence during the past several hundred years in order to ascertain that state's strategic culture. Alastair Iain Johnston defines strategic culture as "an integrated system of symbols which acts to establish pervasive and long-standing strategic preferences by formulating concepts of the role and efficacy of military force in interstate political affairs."<sup>27</sup>

Johnston argues that relating strategic culture to the behavioral

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<sup>26</sup> Scott Ritter explains in *Endgame: Solving the Iraq Problem Once and For All* how during the Iran-Iraq War, Iraq developed its ballistic missile force as a response to the collapsing military morale of its armed forces.

<sup>27</sup> Johnston, Alastair Iain. "Thinking About Strategic Culture." *International Security*. Spring 1995, p.46.

choices of states is not based on rational choice thinking, but the unique historical experiences of the state, so no two nations have the same strategic culture. However, it must be noted that analyzing a state's strategic culture and *parabellum* tendencies is subjective at best and can only be categorized according to general trends. Isolating and examining individual foreign policy decisions is risky, so the entirety of a state's actions over a period of time must be examined to ascribe certain attributes to its strategic culture.

The ordinal scale for a *parabellum* tendency in a state's strategic culture should be organized according to the following categories - high, moderate, low, and insignificant. A country that is regularly aggressive in dealing with foreign states and uses military power to achieve its foreign policy goals without exploring other options would be classified as having a high *parabellum* tendency. These nations have historically relied on surprise attacks and consider diplomacy to be a weak means for achieving their goals. A moderate *parabellum* tendency is characterized by a state that is willing to use force to achieve its goals and won't hesitate to do so, even if all other means of achieving the goals and averting violence have not been exhausted. Nations that resort to force only when all other means of attempting to reach their goals should be considered to have a low *parabellum* tendency in their strategic cultures. States that never or almost never use military might to reach their foreign policy goals and will change the goals if they are not attainable through peaceful means are

considered to have insignificant tendencies in their strategic cultures toward the use of force.

### **Level of External Threat**

The first external factor, the level of threat to a state from external forces, is a well-discussed variable that has been studied in detail; however, to ensure the validity of this study, it will be included as a control variable. The survivability and viability of the state if potentially engaged in conflict becomes important as the very existence of the state is threatened in this direct relationship. The greater the chance that the state would be destroyed, the greater the level of external threat. Again, the ordinal scale will be based on four categories describing the level of external threat - high, medium, low, and negligible. States that have a high level of external threat are engaged in a serious arms race with rival states, and their very existence might be at risk if they do not engage in developing or acquiring advanced weapons - there may be limited armed clashes between the involved states. The medium level of external threat can be used to describe states that are engaged in an antagonistic arms race characterized by the acquisition of new weapons systems. However, the level of threat is not the same intensity as for the previous one, and it is not likely that the state's viability is threatened although there may be occasional diplomatic or military incidents between the states. A low level of external threat is one where a state makes a conscious effort to keep military parity with its adversaries, but the state's rivals do not threaten the existence of the state in any way,

although there may be limited diplomatic conflicts between them wherein international perceptions become important. If there is negligible external threat, the state is not threatened in any way whatsoever and has no need to acquire advanced weapons systems.

### **Pursuit of International Prestige**

The final external variable is a state's pursuit of international recognition, prestige, and attention as a motivation for developing strategic ballistic missiles. Certain states actively seek to be recognized as regional or global powers and hence view strategic ballistic missiles as a trapping of such status. "Even small numbers of conventionally armed missiles can be highly significant politically. Symbolic attacks in war can be of great importance."<sup>28</sup> Again, the ordinal scales will be divided into four different categories regarding the level and intensity of the state's pursuit for international prestige and attention - high, medium, low, and negligible. A high level of seeking international prestige is characterized by a state, usually a peripheral or second-rate power that makes gaining international attention the fundamental goal of all its foreign policy activities.<sup>29</sup> A state

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<sup>28</sup> Karp, Aaron. "The Maturation of Ballistic Missile Proliferation," in *The International Missile Bazaar: The New Suppliers' Network*, Boulder: Westview, 1994, p.9.

<sup>29</sup> A contemporaneous example of the sort of prestige brought to a state by possessing strategic ballistic missiles is the recent attention that the United States has given North Korea once it became clear that North Korea may have the capability to launch a missile attack against the continental United States. Previously, the United States had been loathe to deal with North Korea, but upon testing a strategic missile in August 1998, the United States became concerned and began treating North Korea with more respect and opened bilateral discussions (meanwhile antagonizing South Korea, which does not possess strategic missiles which was excluded from the US-DPRK missile negotiations).

that seeks some international acclaim, though it is not the sole determinant guiding its foreign policy, would be characterized as a state in the medium category. A low level of seeking international acclaim is characterized by a state that is concerned about its global image, but does not go out of its way or expend resources to gain recognition or prestige from other countries. The negligible level of seeking international prestige is self-explanatory - the state makes little or no effort to attain respect or prestige from other countries.

#### **Examination of Possible Variable Correlation Problems**

There is the risk in this study, by the very fact that India and South Korea both did begin the development of strategic ballistic missiles, that the very selection of the independent and dependent variables are too closely related. The independent variables of *parabellum* tendency, military morale, pursuit of international prestige, and the level of external threat could be so closely correlated with the dependent variable decision to develop ballistic missiles that the relationship could be tautological. However, because a state must continually make choices whether to continue its missile programs over the course of development, the very uniqueness of each state's circumstances results in the state continually reevaluating its decision to develop strategic missiles from multiple, varied points in the process. There is a significant likelihood that the state will abandon building the missiles because they do not fit into the state's foreign policy goals, strategic

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culture, or level of military morale. The very action of starting a strategic ballistic missile program does not automatically indicate that a state will have high ordinal scores for the independent variables.

There is also the possibility that the independent variables are closely correlated with each other and that one independent may have a greater affect on the dependent variable and overshadow the other independent variables even though they all may have ordinal measurements that suggest that missile development is likely. It is impossible in a qualitative case study like this paper to absolutely assure that the variables have an equal effect upon the decision of a certain state to develop or not develop strategic missiles, but the logic and evidence presented indicate that the four variables have a substantial effect and generally equal effect on a state's decision to develop and deploy ballistic missiles. A quantitative research design could assign values to the independent variables, but any values assigned would be questionably arbitrary. Considering the possibility that the independent variables could be correlated with each other, each has been selected and defined as to be as distinct and separate as possible keeping in mind that the "goal is to obtain more information relevant to evaluation of the theory without introducing so much bias as to jeopardize the quality of the inferences."<sup>30</sup>

### **Chapter Three: South Korea Develops the 'Polar Bear' and 'Turtle God' But Their Legs Are Short**

The Republic of Korea is, in essence, an artificial creation, a nation that exists because of the political expedience after World War II of partitioning Japan's remaining imperial territories between the United States and the Soviet Union spheres of influence. No one believed that the partition of the Korean peninsula into northern and southern states at the 38<sup>th</sup> parallel would be protracted, but that is exactly what has occurred.

After the Korean War, which wrecked much of its industry and infrastructure, South Korea became one of the world's quickest growing economies from the 1970s through the mid-1990s until the Asian economic crisis. During this period of rapid growth and development, South Korea was under the threat of imminent invasion by the North. South Korea has maintained a high degree of military preparedness over the years, yet it neither completed the development of nor deployed strategic ballistic missiles.

#### **South Korean Strategic Culture**

South Korea has encouraged mediation and diplomacy as an alternative to the use of force and generally does not exhibit a high level of *parabellum* tendency, despite repeated provocations by North Korea, threats of invasion, and the vulnerable location of its capital, Seoul.<sup>31</sup> Historically, Korean culture has been obligated to

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<sup>30</sup> King, Gary, Robert O. Keohane and Sidney Verba. *Designing Social Inquiry*. Princeton: Princeton UP, 1994, p.149.

defend itself from Chinese domination and it developed a mainly defensive strategic culture, but there were times when the Koreans did attack China. Korean strategic culture can be empirically proven to be for the most part defensive, but not without the possibility of aggressive action. The strategic culture in South Korea remained at a low level of *parabellum* tendency as the South Korean military has been deployed in a defensive posture, even when antagonized by North Korea. North Korea's dramatic quantitative advantage in troops, artillery, and tanks deployed along the demilitarized zone (DMZ) has partially dictated this defensive posture. Furthermore, South Korea has been obliged to deal with and tolerate serious North Korean provocations but has declined to take military action in response. Instead, South Korea has used diplomatic condemnations to show its displeasure. For instance when most of the South Korean cabinet was assassinated in Burma in a North Korean plot, South Korea did not undertake retaliatory action. South Korea has gone to great lengths to avoid antagonizing North Korea and rarely, if ever, undertaken offensive military operations against the Kim Il-Sung or Kim Jong-il regimes, even though North Korea has dug tunnels under the DMZ and sent myriad spies to South Korea. The South Korean government and military have used force when dealing with North Korean territorial transgressions such as pursuing and sinking North Korean submarines that landed saboteurs

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<sup>31</sup> Peter Hayes, "The Two Koreas and the International Missile Trade," in *The International Missile Bazaar*, William C. Potter and Harlan W. Jencks, eds., Westview: Boulder, 1994, p.141. Hayes is a senior research at the Nautilus Institute at the University of California - Berkeley.

in South Korea. Yet, these actions have been defensive in nature and do not indicate a *parabellum* tendency. Thus, the South Korean strategic culture's tendency toward the use of force can be classified as low.

### **South Korean Military Morale**

Constant exercises and pledges of US military support and assistance kept the morale of the South Korean military high despite the military and political hierarchies of South Korea being closely intertwined and the occasional use of the South Korean military to maintain order. South Korea remained heavily dependent on military aid and equipment from the United States, but as a consequence, South Korean troops had high levels of training and discipline.<sup>32</sup> Furthermore, South Korean military forces were largely successful when engaging North Korean troops in frequent border clashes.<sup>33</sup> The high level of military alert and the imminence of invasion kept South Korean troops well-trained and disciplined, leading to the eventual withdrawal of the majority of United States troops from South Korea and the gradual transfer of the responsibility of defending the DMZ to South Korean rather than American troops beginning in the early 1970s.<sup>34</sup> However, the South Korean military

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<sup>32</sup> US House of Representatives, Committee on Armed Services, *Review of the Policy Decision to Withdraw United States Ground Forces from Korea*, US Government Printing Office: Washington, 1978, p.38.

<sup>33</sup> Kim, Tae-woo. "In My View: South-North Missile Gap." *The Korea Herald* (Seoul), 22 April 1999.

<sup>34</sup> Author's conversation with Lieutenant Colonel Kelly Hicks, US Army, on 12 November 1999 at the United States Military Academy. Hicks is an instructor at West Point and was formerly the commander of US special operations forces in Asia.

was used to suppress internal political dissent through the 1970s and 1980s. This, coupled with the dependence of South Korea on foreign suppliers for high tech military equipment, prevents the military from attaining an elite level of military morale.

Accordingly, the South Korean military's morale can be classified at the high ordinal level.

### **South Korea and International Prestige**

South Korean foreign policy was largely subordinated to that of the United States' on most issues and is still quite understated, seeking little international attention or prestige as it usually supports the United States and stands in its diplomatic shadow. The relationship between the United States and South Korea is the key to understanding why South Korea has not developed or deployed strategic missiles. The United States has maintained close - though at times tenuous - relations with South Korea, providing it with military equipment, troops, and pledges of military assistance if attacked.<sup>35</sup> Yet, the United States has refused to supply it with certain technologies that might have been useful for missile or rocket development. South Korea has made some major efforts to seek international acclaim or prestige including making a major effort to host the Summer Olympics in 1988, and has quietly focused on developing its economy and has worked to join international organizations and establish diplomatic ties with states such as

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<sup>35</sup> Mussington, David. *Arms Unbound: The Globalization of the Defense Production*. Center for Science and International Affairs Studies in International Security No.4. Washington: Brassey's. 1994, p.55. See Ch.1 for credentials.

Russia and China. South Korea has distanced itself from getting involved in other regional conflicts and has not taken many major foreign policy initiatives that do not directly pertain to the Korean peninsula. South Korea is heavily dependent upon the United States for trade and military equipment, justifying South Korea to adopt a low-key foreign policy that closely follows that of the United States, but is not completely subservient as Kim Dae-jung's "sunshine policy" of engaging North Korea indicates. South Korea should be categorized as being in the moderate level for seeking international prestige because of its tendency to focus primarily on issues regarding the Korean peninsula and largely follow the United States' lead on security issues. However, South Korea has made significant attempts to participate in international fora and garner international prestige and attention through other avenues.

#### **External Threats to South Korea**

From 1950 to the present day, North Korea has threatened the viability of the South Korean state, despite US pledges to protect South Korea. North Korea's military is and has been more than twice the size of the South Korea's, and much of it has been massed along the DMZ for the last forty years, representing a continual threat to South Korea. Furthermore, much of South Korea's heavy industry and factories exist around its capital, Seoul, less than 50 km from the DMZ and well within the range of North Korean artillery and missiles. In addition, Seoul's position is difficult to defend, and United States and South Korean military officers have conceded that

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defending Seoul and its environs from a North Korean attack would be virtually impossible and that the city would likely be overrun in a matter of hours. Furthermore, all of South Korea is within the range of North Korean Scud-B, -C, and Nodong-1 ballistic missiles that can deliver heavy conventional, biological, or chemical warheads anywhere on the southern portion of the peninsula.<sup>36</sup> Because of these considerations, the level of external threat to South Korea must hence be categorized as high.

### **South Korea Begins Missile Development**

South Korea initiated a secret missile development program in 1974 under the orders of President Park Chung-hee, following the development and successful testing of an unguided rocket system by the South Korean Agency for Defense Development (ADD). Park charged the ADD with developing a strategic missile with range comparable to the US Pershing missile (approximately 1500 km), enough range to strike all of North Korea and significant portions of both China and Japan. South Korea was quantitatively outclassed by the North Korean military and sought to develop a deterrent force that could be used to dissuade North Korea from launching an attack.

As work on the South Korean missile program progressed, it became apparent that the ADD lacked the technological capability and infrastructure to develop a completely indigenous South Korean strategic surface-to-surface missile (SSM) without considerable

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<sup>36</sup> Lennox, Duncan. "Ballistic Missiles Hit New Heights." *Jane's Defence Weekly*. 3 April 1994, p.24.

assistance from an outside source.<sup>37</sup> Fearing an uncontrolled arms race in Northeast Asia among the two Koreas and China, the United States declined to transfer strategic missile technology to South Korea despite repeated requests from its government.<sup>38</sup> The United States was also secretly concerned that if South Korea was able to develop strategic missiles, it would provide an incentive for it to initiate or accelerate its weapons of mass destruction program and hence discourage other states from assisting South Korea's missile program.<sup>39</sup>

Denied missile technology directly from the US government, South Korea sought to procure the necessary technologies from other sources. In 1975, South Korea acquired Lockheed Corporation's solid-fuel manufacturing facility in the United States and disassembled it for export to South Korea, but the US Department of State blocked the export of the factory until 1978, when the South Korean government sold it to a dummy corporation that then promptly exported it through a third country to South Korea.<sup>40</sup> This purchase was key to South Korea's missile program - not just for the physical

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<sup>37</sup> Ku Sang-hoe, "The Tank Fragment That Nearly Hit President Pak," *Sindong-A* (Seoul), 27 January 1999; Ku Sang-hoe, "Failure After Failure...Fly Polar Bear, Please Fly," *Sindong-A* (Seoul), 1 March 1999.

<sup>38</sup> Ku Sang-hoe, "Failure After Failure...Fly Polar Bear, Please Fly," *Sindong-A* (Seoul), 1 March 1999.

<sup>39</sup> The existence or nonexistence of a South Korean WMD program was a closely guarded secret in the mid-1970s - in fact, South Korea did possess a fledgling nuclear program that the United States did not discover until the late 1970s.

<sup>40</sup> Peter Hayes, "The Two Koreas and the International Missile Trade," in *The International Missile Bazaar*, William C. Potter and Harlan W. Jencks, eds., Westview: Boulder, 1994, p.141.

equipment, including large mixers for combining fuel and oxidizer and various other pieces of equipment for testing missile components, but for the dozens of US military manuals and technical publications about missile and rocket development that were of inestimable value to South Korean missile scientists.<sup>41</sup> In 1979, South Korea also sought to acquire an obsolete US Atlas Centaur intermediate range ballistic missile along with nose cone materials, alloys, guidance systems, missile blueprints, engineering drawings, and assembly equipment. The sale was again blocked by the US Department of State and the missile seized. It is unclear whether South Korea was able to obtain any of the associated equipment and documents that might be helpful to its missile program.<sup>42</sup> South Korea also developed relations with missile manufacturers in France and other states, but due to US pressure on those countries, South Korea obtained very little usable technology in terms of missile development.<sup>43</sup>

The ADD then shifted its focus from acquiring or building strategic missiles to attempting to modify a missile already in its arsenal for use as a strategic weapon, as it became obvious that South Korea did not possess the industrial or technological base to build a strategic missile, and it was unlikely that South Korea

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<sup>41</sup> Ku Sang-hoe, "Failure After Failure...Fly Polar Bear, Please Fly," *Sindong-A* (Seoul), 1 March 1999.

<sup>42</sup> Peter Hayes, "The Two Koreas and the International Missile Trade," in *The International Missile Bazaar*, William C. Potter and Harlan W. Jencks, eds., Westview: Boulder, 1994, p.140.

<sup>43</sup> C. W. Lim, "South Korea Successfully Test-fires Short-range Missile," *Agence France Presse*, 27 October 1997.

would be able to acquire the necessary information and technology to build a strategic missile. The ADD focused on the surface-to-air (SAM) anti-aircraft missiles and decided that a long-range SAM like the US MIM-14 Nike-Hercules missile would be easiest to modify.<sup>44</sup> However, there were still considerable obstacles that the ADD had to overcome - such as the fact that all Nike-Hercules missiles were under US control and that it would be no small technological feat to convert the guidance systems and warheads of an anti-aircraft missile into a strategic missile.<sup>45</sup> Yet, the ADD was quite knowledgeable about the Nike-Hercules' capabilities since in order to cut costs, the United States had subcontracted the maintenance of the Nike-Hercules SAMs to the South Korean government and more than 150 South Korean military personnel were trained for combat duty on the Nike-Hercules missiles. Furthermore, the manufacturer of the Nike-Hercules, the Raytheon Corporation, provided the South Korean military with information about the missile's electronics, warheads, and guidance system.<sup>46</sup> With the reduction of US military forces on the Korean peninsula under President Jimmy Carter, the United States transferred six batteries of Nike-Hercules SAMs to South Korea in May 1977, as well as two further batteries in 1978.<sup>47</sup>

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<sup>44</sup> Ku Sang-hoe, "Failure After Failure...Fly Polar Bear, Please Fly," *Sindong-A* (Seoul), 1 March 1999.

<sup>45</sup> Ibid.

<sup>46</sup> Peter Hayes, "The Two Koreas and the International Missile Trade," in *The International Missile Bazaar*, William C. Potter and Harlan W. Jencks, eds., Westview: Boulder, 1994, p.143.

<sup>47</sup> Ibid., p.136-7.

With the missile transfers in 1977, the ADD worked to convert a number of the Nike-Hercules SAMs into SSMs. Considerable modifications were made, including replacing the first- and second-stage rocket motors with ones that use composite propellants to generate more thrust and greater range, replacing vacuum-tube circuitry with semi-conductors for greater reliability, replacing the warhead, and obtaining a completely new guidance system, reportedly from France, or developed with French assistance.<sup>48</sup> The new missile was designated the NHK-1 "Paekgom" (Polar Bear) and made its first public test flight on 26 September 1978. (There were eight previous test flights, only four of which were successful). Political considerations at the time led to South Korea declaring that it indigenously developed the NHK-1 without foreign assistance, although that claim was patently false.<sup>49</sup> The NHK-1 fell far short of expectations in terms of a strategic missile, as it can only fly 150km with a payload between 450 and 500kg. There is no doubt that the NHK-1 is not a strategic missile as by definition it does not have the range to reach either China, Japan, or a significant portion of North Korea. Most importantly, it does not have the range to reach Pyongyang or any part of North Korea's industrial heartland, thus relegating the NHK-1 to nothing more than a tactical missile that can be used to target North Korean military targets and not much else. Furthermore, its warhead is relatively small and

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<sup>48</sup> Ibid., p.138.

<sup>49</sup> Ku Sang-hoe, "Failure After Failure...Fly Polar Bear, Please Fly," *Sindong-A* (Seoul), 1 March 1999.

would not inflict significant damage on North Korean targets unless the missiles were launched in significant numbers. Possessing only limited numbers of NHK-1 missiles and still needing SAMs for air defense, South Korea chose not to convert many of the Nike Hercules SAMs into NHK-1 SSMS.<sup>50</sup>

### **The United States Reacts**

Though not surprised, the United States was understandably alarmed by South Korea's missile test, because despite South Korea's claims to the contrary, the NHK-1 missile was based on the Nike-Hercules SAM. The United States pressured South Korea to sign a memorandum of understanding (MoU) in 1979, limiting the range of South Korean missiles and their warhead capacity in exchange for a continued supply of spare parts for the NHK-1 missiles and some SAM technology.<sup>51</sup> The 1979 MoU which USFK commander John Wickham and South Korean defense minister No Chae-hyon signed also stipulated that South Korea refrain from attempting to acquire strategic missile technology from a third country. All South Korean missiles and rockets were limited to a range of 180km, shorter than the 240km range needed to strike Pyongyang or the 400 to 500km range needed to target the industrialized portions of North Korea near the Chinese border, thus rendering the South Korean missile program essentially tactical in nature. Although the details of the MoU have not been

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<sup>50</sup> Wyn Bowan, Tim McCarthy, and Holly Porteous, "The Ballistic Missile Shadow Lengthens," *Jane's International Defense Review Extra*, 1 January 1997, p.1

disclosed, both South Korea and the United States have revealed its more salient points.<sup>52</sup>

### **South Korea Aborts Its Program**

Records indicate that the South Korean strategic missile program did not end in 1979 with the signing of the MoU, but rather that two other significant events led to South Korea's abandonment of its strategic missile program. In October 1979 South Korean President Park Chung-hee, the champion of the South Korean strategic missile program, was assassinated and the government that succeeded him reallocated the funding reserved for the missile program, thus ending it. A further reason for the discontinuation of funding for the missile program was the United States' discovery and demands that South Korea disassemble its covert nuclear program. Thus, with no possible WMD warhead, South Korea's need for a means of delivery of such a weapon no longer existed and the strategic missile program became expendable. By mid-1980, the ADD laid off dozens of scientists and hundreds of technicians working on South Korea's missile program.<sup>53</sup> South Korea had sought to develop a nuclear weapon, the greatest symbol of international prestige, but was constrained by its relationship with the United States to reevaluate the program and adopt a foreign policy that fit with US interests for fear of alienating its protector. This confirms that South

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<sup>51</sup> Dinshaw J. Mistry, *International Cooperation in Arms Control: Building Security Regimes to Contain Missile Proliferation*, doctoral thesis University of Illinois Champaign-Urbana, 1999, p.176.

<sup>52</sup> Ibid, p.176.

<sup>53</sup> Ibid, p.113.

Korea's interests in seeking international prestige should be considered low, since its relationship with the United States constrained it. In addition, as an incentive for South Korea to end its nuclear program, the United States stationed MGM-52 "Lance" short-range ballistic missiles in South Korea. Reports indicate that these missiles may have been armed with nuclear warheads. The "Lance" missiles have since been withdrawn from South Korea.<sup>54</sup>

The South Korean government publicly justified the cancellation of the missile program through reasoning that the amount of deterrence that would be gained from having a strategic missile equipped solely with a conventional warhead was not worth the substantial costs and resources that would have to be dedicated to a strategic missile program.

Although the 1979 MoU forbid South Korea from developing new SSMs, the ADD began development of an improved version of the NHK-1 in 1984 and deployed it in late 1987, under the designation NHK-2 "Hyon-mu" (Turtle God of Defense).<sup>55</sup> The payload and range of the NHK-2 are the same as the NHK-1, according to South Korean sources. Although there was speculation that the NHK-2 might have a range greater than 150km, inspections by US military officials in 1991 indicate that the NHK-2 missiles do not have extended range.<sup>56</sup> It is

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<sup>54</sup> Hayes, Peter. *Pacific Powderkeg, American Nuclear Dilemmas in Korea*. Free Press: New York, 1990.

<sup>55</sup> Dinshaw J. Mistry, *International Cooperation in Arms Control: Building Security Regimes to Contain Missile Proliferation*, doctoral thesis University of Illinois Champaign-Urbana, 1999, p.113.

believed that South Korea developed the NHK-2 after North Korea developed extended range Scud-B and -C capable of striking any point in South Korea.<sup>57</sup> Neither of the NHK missile varieties can be considered strategic weapons because of their very limited range. In addition to the inspections, the United States and South Korea signed a second MoU in 1991 that reportedly reaffirmed the 1979 MoU. There have been some reports in the South Korean press that the document was a non-binding diplomatic note rather than an official MoU.<sup>58</sup> South Korea has threatened to abrogate the 1979 and 1991 MoUs, leading to negotiations with the United States discussing whether South Korea should be allowed to develop missiles that can be used for strategic purposes.<sup>59</sup>

### **Recent Developments**

Although the United States and South Korea have not publicly disclosed the results of these meetings, sources indicate that little or no progress has been made and that the United States is still committed to its belief that if South Korea arms itself with strategic missiles, it will result in instability and possible

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<sup>56</sup> Wyn Bowan, Tim McCarthy, and Holly Porteous, "The Ballistic Missile Shadow Lengthens," *Jane's International Defense Review Extra*, 1 January 1997, p.1.

<sup>57</sup> North Korea converted Scud tactical missiles originally obtained from the Soviet Union into strategic weapons by boosting their payloads and increasing their range.

<sup>58</sup> "ROK: 'Discord' with U.S. Over Missile Development Viewed," *Chosun Ilbo* (Seoul), 7 February 1996, p.A1; "S. Koreans Push U.S. for Entry to MTCR," *Defense News*, 4 December 1995.

<sup>59</sup> "Government May Abrogate Missile Pact with U.S.," *Tong-A Ilbo* (Seoul), 9 October 1995, p.1.

conflict with China and North Korea.<sup>60</sup> There are also concerns that if the United States accedes to South Korean demands, it will undermine the credibility of the Missile Technology Control Regime, even though South Korea has pledged to follow its provisions.<sup>61</sup> Also after a period of relative inactivity, it appears that the North Korean economy is beginning to recover. There have been recent provocations including clashes between North and South Korean patrol boats over fishing rights and new North Korean territorial claims.

The declining threat to the South Korean from North Korea and a foreign policy uninterested in seeking international prestige, combined with South Korea's already high military morale and nonaggressive strategic culture, explain the South Korean decision to end its missile program before it could develop and deploy strategic ballistic missiles.

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<sup>60</sup> Author's conversation with Robert Gallucci, the United States' former lead negotiator for North Korea and current dean of the Georgetown University School of Foreign Service on 16 September 1999 at the University of Southern California.

<sup>61</sup> South Korea is not a signatory of the MTCR as the United States has blocked its entry into the organization. As a member of the group, South Korea would be permitted by the organization's bylaws to acquire and develop missiles and related technologies that could be used to build ballistic missiles with a range up to 300km.

**Figure 3.1: South Korean NHK-2 Missile**



## **Chapter Four: India Climbs the Mountain and Finds 'Fire' and 'Earth'**

India has long had aspirations of taking a role in world affairs commensurate to its size and population, but it has been a long, hard road since India gained independence from Britain following the Second World War. A large, impoverished population, as well as its location surrounded by potential adversaries has handicapped India. Yet, it has sought to establish itself as a regional power and consequently developed strategic ballistic missiles to maintain its position in South Asia and perhaps to serve as a stepping stone to world power status in the next century. By examining the four independent variables that may have an effect on the dependent variable of Indian missile development, the importance of each variable in the decision to develop and deploy strategic ballistic missiles in India can be evaluated.

### **Indian Strategic Culture**

Indian strategic culture is quite complex, as there appear to be two contradictory trends that seek to dominate Indian strategic thinking. The first is a tendency toward seeking peaceful solutions to problems and fighting only when necessary. The other is a much more aggressive view based in India's history that the country has always been a weak power and must arm itself and act aggressively in order to ensure its own security. The latter mindset has become ascendant in Indian strategic thinking since the end of the Cold War and has been manifested in the rise of the ultranationalistic Hindu Bharatiya's Janta Party's (BJP) rise to power, but it has long been

the guiding principle behind Indian foreign policy. India has long maintained to the rest of the world that its foreign policy is based on finding peaceful solutions to problems; however, India's aggressive actions to increase its regional power have belied this rhetoric. Gaurav Kampani argues that "India [has] aspired to great power status. A belief in the unity of Indian civilization on the subcontinent provided the rationale for its hegemonic pretensions... Historical memories of a socially divided, organizationally weak, and technologically inferior India that had for centuries been the final destination of invading hordes, have fueled the 'never again' syndrome. India is now determined to acquire the organizational, economic, technical, and military trappings of a great power."<sup>62</sup> Indian strategic culture has not so much changed in the past several years as the underlying militaristic current has become more and more mainstream and India has not maintained its peace-oriented rhetoric. In terms of strategic psychology, India's aggressive behavior is rooted in a historical fear of its technological and military inferiority to outsiders, thus motivating India to act in a manner that will discourage foreign thoughts of exploiting Indian weakness.<sup>63</sup> Indian strategic culture's *parabellum* tendency will be

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<sup>62</sup> Kampani, Gaurav. *Structural Constraints on an Overt Indian Nuclear Weapons Program*. Washington: Natural Resources Defense Council, 1998, p.1. Kampani is a research associate at the Center for Nonproliferation Studies at the Monterey Institute for International Studies.

<sup>63</sup> Indian strategic culture has paradoxically become more aggressive as the Indian military's capabilities and morale have markedly declined since the late 1980s, indicating a correlation with the concept that by making threats and acting more antagonistically, India's military will appear more capable than it actually is. This point was proven by the Indian army's

considered high on the ordinal scale despite the dualistic underlying tendencies as India has acted aggressively since its independence. India has invaded Pakistan, encroached on Chinese territory, and intervened in Sri Lanka - all aggressive actions. The BJP's current nationalistic saber-rattling rhetoric more than confirms that the Indian high *parabellum* tendency is likely to continue into the foreseeable future as it does not appear that Indian strategic culture is becoming any less aggressive.

### **Indian Military Morale**

The second internal variable to be considered is the morale of the Indian military, which has been steadily declining since the mid-1970s. The beginning of this decline in military morale began during the regimes of Indira and Rajiv Gandhi, who politicized the military as a way to maintain their rule. The military has become less of a meritocracy and more of a place where the politically well-connected are promoted without considering prowess or ineptitude, greatly lowering morale in the military as junior officers are frustrated and often leave the service. The Indian military has also not been successful in recent conflicts, being badly embarrassed after a series of military disasters against China in the 1960s. Although India was largely successful against Pakistani forces in the 1970s, it suffered far heavier losses than it should have and failed to decisively defeat the Pakistani army - in general a lackluster showing against a force the Indian military

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inability to dislodge a few hundred guerillas from a few mountain ridges during the Kargil Crisis in the summer of 1999.

should have dominated. Furthermore, insurgencies in Punjab, Assam, Kashmir, Nagaland, and Mizoram have resulted in more than one-third of India's army being mired in internal security operations. For instance, in the period between 1982 and 1989, the number of times the Indian military was called upon to "aid in civilian authority duties" more than tripled the total number of times the army was called out since independence from Britain.<sup>64</sup> The army has protested against being used as an internal security force as it has reduced operational readiness, lowered morale, and its gradually delegitimization as a national institution; however, the army's pleas have been ignored as it remains the sole force that can keep order. Furthermore, India's budgetary problems have lowered India's military budget to about 2.75 percent of GDP in 1997, down from a high of more than 4 percent of GDP in the mid-1980s, resulting in reduced training and little or no new equipment.<sup>65</sup> Long forgotten are the ideas that India will be able to project power as its navy is shrinking, its air force is antiquated, and its troops are neither well equipped nor trained. That is why India's strategic ballistic missile capability has become increasingly important as the power and effectiveness of its conventional forces erode, as evidenced by the nation's difficulty in expelling Pakistani interlopers from Kargil in the summer of 1999. For the aforementioned reasons, India's military morale must be classified

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<sup>64</sup> Kampani, Gaurav. *Structural Constraints on an Overt Indian Nuclear Weapons Program*. Washington: Natural Resources Defense Council, 1998, p.3.

<sup>65</sup> *Ibid.*, p.4.

as low on the ordinal scale because of politicization of the command structure, its repeated and continued intervention into internal domestic affairs, and its budgetary constraints. It is likely that India will become more dependent on its nuclear forces, and as its air force may not be up to delivering the warheads, India's strategic missile force becomes of paramount importance.

### **India and International Prestige**

The first external variable to be examined is India's pursuit of a foreign recognition and prestige. During the Cold War, India presented itself as a model for Third World states that sought to maintain their neutrality and not get involved in the superpower rivalry, and it was a leader in the "non-aligned movement" during the Cold War's early years. India has claimed that it deserves international respect as one of the world's most populous democracies and has made efforts to complete expensive high-profile technological advances, even as large portions of India's internal infrastructure are disintegrating. India has spent hundreds of millions of dollars on its high profile space, missile, and submarine programs while, in the meantime, people are starving and India faces serious internal economic problems. The decision to conduct nuclear weapons tests in May 1998 can be attributed to the Bharatiya Janata Party's (BJP) nationalistic rhetoric, but also to attracting the international prestige of being a nuclear-armed state. The same can be said of India's missile program - it is a high-profile effort for India to be considered a world power and earn the respect and attention of the United States and Europe,

particularly if India possesses intercontinental ballistic missiles (ICBMs) - the self-described goal of the Indian strategic ballistic missile program. An Indian defense analyst notes that the Agni missile's "role as a weapon is the least of its roles. It is a confidence builder and a symbol of India's assertion of self-reliance not merely in defense but in the broader international political arena as well."<sup>66</sup> For these reasons, India's level of seeking international attention and prestige must be classified as high on the ordinal scale.

#### **External Threats to India**

Despite India's size it is surrounded by potential foes, most significantly Pakistan and China - nuclear-armed opponents with which India has fought several conflicts since the Second World War, and thus there is a significant level of external threat to India. However, due to the sheer size of India and its population it is unlikely that its viability as a state is threatened, although it could be badly damaged in a protracted war or nuclear exchange. India still has unresolved border disputes with both China and Pakistan, the most serious of which is the province of Kashmir, partitioned among the three parties. Pakistan has continued to supply insurgents in Kashmir with food and weapons. Throughout the 1990s there have been reports that Pakistani troops infiltrated into Kashmir and have engaged Indian troops; there are also regular artillery exchanges across the Line of Control between Indian and

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<sup>66</sup> Subrahmanyam, K. "The Meaning of the Agni," *Hindustan Times*. 2 June 1989.

Pakistani military forces. China has also sold Pakistan considerable amounts of military equipment including M-11 ballistic missiles with a range of 300km that can carry nuclear warheads. Pakistan has also developed the Ghauri strategic ballistic missiles with the help of North Korea.<sup>67</sup> India is involved in an arms race with Pakistan, with each state constantly upping the ante by announcing new weapon developments. India is also concerned about the strategic relationship between Pakistan and China, especially as China greatly assisted Pakistan's development of nuclear weapons.<sup>68</sup> Hence, because of India's strategic situation, its level of external threat must be considered to be moderate, as India's very existence is not threatened because of its sheer size and large population, but it is surrounded by past and potential adversaries armed with nuclear weapons.

#### **India Begins Missile Development**

The Indian ballistic missile program began in the early 1960s under the Defence Research and Development Organization (DRDO). India took a slow approach to developing its missile program, sending scientists to study abroad in the United States and the Soviet Unions, as well as building nominally civilian sounding rockets to develop missile-staging technology.<sup>69</sup> India's first

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<sup>67</sup> Pakistan's Ghauri ballistic missile is an almost identical copy of North Korea's Nodong-1 ballistic missile with a range of 1500km.

<sup>68</sup> Kampani, Gaurav. "From Existential to Minimum Deterrence: Explaining India's Decision to Test." *The Nonproliferation Review*. Fall 1998, p.13.

<sup>69</sup> McCarthy, Timothy V. "India: Emerging Missile Power," in *The International Missile Bazaar: The New Suppliers' Network*, edited by William C. Potter and Harlan W. Jencks. Boulder: Westview, 1994, p.202. McCarthy

attempts to build an operational military use surface-to-surface missile (SSM) began in 1972 with the "Devil Program," which like South Korea, tried to convert extant surface-to-air missiles (SAM) into SSMs. In this case, Soviet SA-2 SAMs were reconfigured with new liquid-fueled engines. However, unlike the South Korean SAM-conversion project, India's "Devil Program" was canceled in 1978 after four years of repeated prototype failures.<sup>70</sup>

In July 1983, India authorized \$133 million for the creation of the Integrated Guided Missile Development Program (IGMDP) within the DRDO; the IGMDP is a vast umbrella organization that brings all of India's missile programs under one roof in order to eliminate redundant research and pool scarce research and development resources. The formation of the IGMDP created "a vast missile design and production establishment within India that is more integrated with and responsive to the needs of the armed forces."<sup>71</sup> There were originally five guided missile programs under the IGMDP including SAMs and anti-tank missiles; however, only the Prithvi (Earth) short-range ballistic missile and the Agni (Fire) intermediate range ballistic missile (IRBM) are pertinent to this study.

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is a senior research associate at the Center for Nonproliferation Studies at the Monterey Institute of International Studies.

<sup>70</sup> *Hindustan Times* (Delhi), 27 February 1988, p.1. The "Devil Program" was one of the first politicized military programs in India. Reports suggest that the program failed largely because of the ineptitude of the officer in charge of the program, a political appointee.

<sup>71</sup> McCarthy, Timothy V. "India: Emerging Missile Power," in *The International Missile Bazaar: The New Suppliers' Network*, edited by William C. Potter and Harlan W. Jencks. Boulder: Westview, 1994, p.204.

## **The Prithvi Is Developed**

The program to build the Prithvi began in October 1984 after being delayed for a year because of technical problems. Originally designed as a short-range tactical battlefield support missile for use against military installations and heavy troop concentrations, DRDO engineers experimented with making tradeoffs between range and payload. The initial version of the Prithvi (Prithvi-1) was able to carry a 1,000kg warhead to targets up to 150km away. The second version of the Prithvi (Prithvi-2) is armed with a 500kg warhead and has a range of 250 to 300km, barely qualifying it to be a strategic ballistic missile according to this study.<sup>72</sup> The Prithvi-2 missiles have sufficient range to strike areas of high population and industry in Pakistan and can be considered strategic weapons for the sake of a conflict against Pakistan; the Prithvi-2 missiles do not have sufficient range to be strategic threats against China. There are reports that a third version of the Prithvi with longer range is being developed, but they remain unconfirmed at this time.<sup>73</sup> All versions of the Prithvi use a type of liquid fuel derived from the work done on the "Devil Program" and is the same as or is closely related to that used in the SA-2 SAMs.<sup>74</sup>

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<sup>72</sup> "India." *Milavnews*. April 1991. P.15-6.

<sup>73</sup> McCarthy, Timothy V. "India: Emerging Missile Power," in *The International Missile Bazaar: The New Suppliers' Network*, edited by William C. Potter and Harlan W. Jencks. Boulder: Westview, 1994, p.206.

<sup>74</sup> Bhaduri, Shankar. "Weapons Overview-Prithvi SS-150." *India Defense Review*. October 1992. p.97.

The Prithvi was first tested on 25 February 1988, but due to further technical problems, the program progressed slowly with a number of failed tests and problems with developing effective warheads and guidance systems to be mounted on the missiles. The Prithvi has been armed with conventional high explosive warheads for use against troops and hardened targets. There are also reports that India is developing a fuel-air-explosive warhead for the Prithvi.<sup>75</sup> Furthermore, given the Prithvi's large throw-weight for its size, it "may also be nuclear capable."<sup>76</sup> Indian engineers redesigned the Prithvi's guidance system in 1996 to include Global Positioning System (GPS) technology in order to improve accuracy.<sup>77</sup>

The Prithvi was slated to enter military service in 1993, but it was delayed a number of times and did not enter into serial production until 1998, and the Indian military did not deploy it until early 1999 after extended trials.<sup>78</sup> All the Prithvi missiles that the Indian military has taken delivery of have been deployed to Kashmir for use in a possible conflict with Pakistan.<sup>79</sup> One possible

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<sup>75</sup> Radio report from the All India Radio Network (Delhi), 19 August 1992; compiled in *Proliferation Issues*, 27 August 1992, p.11. Fuel-air-explosives are advanced weapons that combine various gases that when combined become extremely explosive and can have explosive yields similar to those of small strategic nuclear weapons.

<sup>76</sup> McCarthy, Timothy V. "India: Emerging Missile Power," in *The International Missile Bazaar: The New Suppliers' Network*, edited by William C. Potter and Harlan W. Jencks. Boulder: Westview, 1994, p.207.

<sup>77</sup> Chengappa, Raj. "Boosting the Arsenal." *India Today*. 29 February 1996, p.98.

<sup>78</sup> Bedi, Rahul. "Making Ends Meet." *Jane's Defense Weekly*. 5 May 1999, p.26.

<sup>79</sup> Ibid. p.30.

explanation for this delay is that India had difficulty in obtaining the high technology components, such as microchip processors needed to begin large-scale production of Prithvi missiles because of the constraints of the Missile Technology Control Regime. India may have had to wait until indigenous industry was capable of producing such high technology items in sufficient numbers before beginning serial Prithvi production. The Indian military has thus far ordered at least ninety Prithvi missiles, which are being constructed at a rate of three to five per month.<sup>80</sup>

#### **The Agni: India's Missile Program Comes to Fruition**

Although it is debatable whether the Prithvi missile can be used as a strategic weapon, there is no doubt that India's Agni missile is designed for one purpose alone: to present a strategic threat to dissuade China and Pakistan from engaging in aggressive behavior. The Agni missile is a two-stage intermediate range ballistic missile (IRBM) with a range of 1,500km and a payload capability of 1,000kg. It was first tested on 22 June 1989, but there were serious technical problems plaguing the Agni's engines.<sup>81</sup> India concluded a \$250 million contract with Russia in 1992 for at least seven cryogenic rocket engines and related technology, ostensibly for the Indian space program, despite vehement objections by the United States. India tested the Agni for a second time in 1992, but the prototype failed again due to engine problems. India

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<sup>80</sup> Yadav, Laxmi Shankar. "Importance of Missile Program Stressed." *Dainik Jagran* (Delhi). 19 June 1994, p.6.

<sup>81</sup> Raghuvanshi, Vivek. "India Completes Agni Launch." *Defense News*, 28 February 1994, p.20.

finally conducted a successful Agni test in February 1994; however, following the test flight, the Indian government announced that it had no plans to put deploy the Agni militarily and classified the rocket as a "technology demonstrator."<sup>82</sup> Although the Indian military requested that the Agni program be continued due to "developments of military significance in the neighborhood," the Indian government elected to suspend funding for the Agni program in December 1996.<sup>83</sup> This decision came shortly after a visit by Chinese President Jiang Zemin to India, creating speculation that New Delhi suspended the Agni project in return for undisclosed Chinese concessions.<sup>84</sup>

However, in May 1998, with the rise of the BJP to power and paralleling the decision for India to weaponize its nuclear program and conduct nuclear tests, the DRDO was ordered to begin the development of the Agni-2 missile with a range of 2,500km with a 1,000kg warhead and improve the existing Agni designs by upgrading computer hardware and software, as well as integrating GPS technology to improve its accuracy. The Agni-2 is a two-stage missile that uses solid fuel, rather than the liquid fuel used in the Agni.<sup>85</sup> The use of solid fuel improves the reliability of the

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<sup>82</sup> "Agni Not to Be Inducted for Now," *The Hindu* (Delhi), 12 March 1994, p.12.

<sup>83</sup> "India: Parliamentary Committee Urge Agni Missile Production." *Times of India* (Bombay), 11 March 1996, p.1.

<sup>84</sup> Cooper, Kenneth J. "India Halts Development of Medium-Range Missile," *Washington Post*. 6 December 1996, p.48.

<sup>85</sup> "Gov't Okays Agni's Upgradation." *Indian Express*, 4 May 1998.

Agni-2 missiles and minimizes the amount of maintenance and time needed before launch.<sup>86</sup> On 11 April 1999, the DRDO successfully test-fired the Agni-2 missile over the Bay of Bengal. Indian Defence Minister George Fernandes stated that India has "reached a point where no one anywhere will dare to threaten us."<sup>87</sup> Other Indian defense officials were more explicit and verified that the Agni would be armed with nuclear warheads, "The Agni without a nuclear warhead has some strategic importance, but with a nuclear warhead it gives India a credible deterrent against China and Pakistan."<sup>88</sup>

#### **The Future of the Indian Ballistic Missile Program**

The DRDO currently has a number of strategic ballistic missile projects on the drawing boards, including the Agni-3 with a reported range of 3700km and the Agni-4 with a range of 5000km, both of which are reportedly derived from India's Polar Satellite Launch Vehicle.<sup>89</sup> There have also been reports in the press that the DRDO has been working on plans for building an ICBM under the moniker "Surya" (Sun). The Surya is expected to have a range of at least 12,000km and perhaps as great as 20,000km, far enough to reach Washington,

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<sup>86</sup> Sheppard, Ben. "Regional Rivalries are Replayed as India and Pakistan Renew Ballistic Missile Tests." *Jane's International Defense Review*. May 1999, p.57.

<sup>87</sup> Bearak, Barry. "India Tests Missile Able to Hit Deep Into Neighbor Lands." *New York Times*, 12 April 1999.

<sup>88</sup> "India Claims Ultimate Deterrent," *Inquisit*, 16 May 1998.

<sup>89</sup> Sheppard, Ben. "Regional Rivalries are Replayed as India and Pakistan Renew Ballistic Missile Tests." *Jane's International Defense Review*. May 1999, p.57.

D.C.<sup>90</sup> However, these reports have not been confirmed and the Surya project may have been shelved in favor of the Agni-3 and -4 programs.

There have also been suggestions that India modify the Agni and Prithvi missiles for use as sea-launched ballistic missiles (SLBMs) in order for India to develop an invulnerable nuclear strategic triad.<sup>91</sup> However, the development of these variants is unlikely, as the range of the Prithvi is too limited for use against states other than Pakistan and it remains to be seen whether either missile can be modified for underwater launch. Furthermore, India's missile submarine program has stalled because of serious technical difficulties.

#### **India's Space Program**

India's space program began in 1969 under the India Space Research Organization (ISRO), and it was originally speculated that ISRO was a cover for a secret ballistic missile program. There have also been reports that the Indian space and missile programs are closely linked, although it does not appear that there is any closer a relationship between the DRDO and ISRO than similar organizations in other states. The ISRO has developed two usable booster systems, the Augmented Satellite Launch Vehicle (ASLV) and the Polar Satellite Launch Vehicle (PSLV), both of which have been used to put

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<sup>90</sup> Radio report from Pakistan Radio Network, 31 May 1994; compiled in FBIS-NES-94-107, 3 June 1994.

<sup>91</sup> Kampani, Gaurav. *Structural Constraints on an Overt Indian Nuclear Weapons Program*. Washington: Natural Resources Defense Council, 1998, p.13.

satellites into orbit, despite technical problems similar to those the Indian missile program has experienced.<sup>92</sup> Reports indicate that much of the technology used to build the ASLV was derived from the Prithvi missile program.<sup>93</sup> The ISRO is also currently developing the three-stage Geostationary Satellite Launch Vehicle (GSLV), a gigantic booster rocket that could be used to develop ICBM technologies.<sup>94</sup>

Given the militaristic nature of India's ruling coalition, which the BJP leads, the recent aggressive stance India has taken in weaponizing its nuclear program and the recent military adventurism in Kashmir, which threatens to widen into a wider Indo-Pakistani conflict, it appears that India will continue to develop and deploy new strategic missile systems beyond the Prithvi and Agni. India will seek to maintain its own external security and attain the level of international prestige it believes "the world's largest democracy" should be accorded. However, continuing to pursue a strategic ballistic missile program may actually result in a decreased sense of security and international isolation in the longer term.

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<sup>92</sup> Bowen, Clayton, Tiffany Lawson and Shelby McNichols. "India Missile Profile." Center for Nonproliferation Studies, Monterey Institute of International Studies, 1999, p.1

<sup>93</sup> *Flight International*, 27 May 1992, p.6.

<sup>94</sup> All India Radio Network (Delhi), 7 March 1998; in FBIS-NES-98-066, 7 March 1998.

## Chapter Five: Comparison and Analysis of the Motivations Behind the South Korean and Indian Strategic Ballistic Missile Programs

### General Findings

The findings of the case studies indicate that there are definite relationships between the level of military morale, the pursuit of international prestige, the level of *parabellum* tendency and the decision to develop and deploy strategic ballistic missiles. By analyzing the ordinal categories of the different independent variables and comparing how India's and South Korea's different classifications are related to each other, one can come up with general conclusions and tendencies about their missile programs.<sup>95</sup> However, it is important to remember that each variable should not be examined in a vacuum and that one variable alone can not predict whether a state will develop strategic ballistic missiles. All the variables must be looked at as a whole in order to accurately predict whether a state might develop such weapons. As mentioned previously, it is also important to look at the independent variables in combination with each other as a whole, but also as pairs and triads in their effect on the proclivity of a state to develop ballistic missiles. Furthermore, it is also important to consider possible false readings, intervening variables, and puzzles not directly considered or dealt with in the study. Often these

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<sup>95</sup> See Table 5.1: Comparison of Ordinal Results for South Korean and Indian Case Studies.

**Table 5.1: Comparison of Ordinal Results for South Korean and Indian Case Studies**

<u>Independent Variable</u>	<u>South Korea</u>	<u>India</u>
Military Morale	High	Low
Parabellum Tendency (Strategic Culture)	Low	High
Level of External Threat	High*	Moderate
Efforts to Gain International Prestige	Moderate	High

\* This ranking of high for the level of external threat to South Korea is an objective viewpoint without taking into consideration the intervening variable of the United States' security guarantees to South Korea, which will be addressed in this chapter. If the intervening variable is considered, the level of external threat to South Korea would be reduced to moderate.

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factors have a significant effect upon how a state will be act and can skew study results, hence they must be considered.

### **Military Morale**

The first relationship to be considered is the one between the level of military morale and whether a state develops strategic missiles. The evidence from the case studies supports the proposed hypothesis that the lower a state's military morale, the more likely it is to develop strategic missiles as a crutch on which it can depend as its military capabilities deteriorate. The South Korea and India case studies indicate a fairly strong indirect relationship, as South Korea's military has high military morale and the morale of the Indian armed forces can be classified as low. The

relationship is strong since South Korean and Indian military morale are at almost opposite ends of the ordinal scale for military morale. Both states behave exactly as proposed in the hypothesis. As India's military morale has fallen dramatically since the mid-1980s, its missile program has been accelerated to compensate for the gap in Indian military capabilities. An opposite, but similar, reaction has occurred in South Korea as its missile program came to a halt and its military morale has increased through decreased involvement in South Korea's internal politics and better training.

#### **Strategic Culture (*Parabellum* Tendency)**

The second internal independent variable to be examined is that of strategic culture (*parabellum* tendency) and its relationship between whether or not a state develops strategic ballistic missiles. The India and South Korean case studies tend to support the hypothesis that there is a direct relationship between states with a tendency toward aggressive action and the likelihood of developing strategic ballistic missiles. However, it must be remembered that measuring the strategic culture of a state and its *parabellum* tendencies can be considered subjective at best. The relationship appears to be fairly strong as they are separated at different ends of the ordinal scale with India having a high *parabellum* tendency despite its peaceful rhetoric and South Korea being classified as having a low *parabellum* tendency. India is classified as having a greater tendency toward aggressive action than South Korea, and the fact that India developed strategic ballistic missiles and South Korea has done so supports the original

hypothesis. Because of the subjective nature of strategic culture and although India and South Korea were classified relatively far apart on the ordinal scale, it can be concluded that there is a relationship between *parabellum* proclivity and strategic missile development. However, it must also be conceded that the relationship may not be as strong as for some of the other independent variables examined in this study, because of the subjectivity of the strategic culture independent variable, even though South Korea and India are located relatively far apart on the ordinal scale for *parabellum* tendency.

#### **International Prestige**

The Indian and South Korean case studies also tend to support the proposed hypothesis that nations which actively seek greater diplomatic recognition and global prestige are more likely to develop strategic ballistic missiles. Both states are classified relatively close to each other at the center of the ordinal scale, with South Korean foreign policy being classified as moderate in terms of attracting international attention and prestige while India's efforts to garner it international acclaim and recognition can be considered to be high. The relationship is a straightforward and direct one: the more a state seeks international prestige and recognition, the more likely it is to develop missiles. South Korea did not develop strategic missiles, and its foreign policy is not based on attracting international prestige. Conversely, India's foreign policy is heavily oriented toward bringing India international attention, and India did indeed develop strategic

ballistic missiles. Because of the distance between the states on the ordinal scale and the differences in their foreign policies, one could argue correlation between seeking international prestige and developing strategic ballistic missiles is not as strong as that for the strategic culture variable. However, the relationship is likely stronger as South Korea has focused on attracting international attention and prestige through joining organizations and establishing diplomatic ties, rather than developing advanced technologies and flouting them for all the world to admire. The United States' military relationship with South Korea allows the South Korean government to focus its foreign policy more on economic and humanitarian prestige, rather than international respect based on its military and technological prowess. In terms of ordinal dynamics, there are definite similarities between the independent variables of military morale and the pursuit of international prestige, although South Korea and India are located much closer to each other on the ordinal scale.

#### **Level of External Threat**

The findings of the case studies do present a puzzle that contradicts the proposed hypothesis articulated in the first chapter with regards to the control variable of the level of external threat and its relationship with the independent variable of strategic missile development. South Korea has a higher level of external threat than India does, yet South Korea did not develop strategic missiles and India did do so. On the ordinal scale for the level of external threat, South Korea is classified as high, considering the

imminent threat the North Korean military poses, the vulnerability of its industrialized areas, and its small size. Conversely, although India is surrounded by enemies, the level of external threat to the nation is moderate as the very existence of the Indian state is not threatened. Is the level of external threat an important variable in the development of strategic ballistic missiles? It is a significant factor, especially since in the South Korean case there is the intervening variable of the United States' security guarantees to South Korea. The assurances that South Korea is under the United States' nuclear umbrella and that American troops would be sent to assist South Korean forces in the eventuality that North Korea launched an invasion have the end result of lowering the level of perceived external threat to the South Korean government.<sup>96</sup> Although the ordinal level of external threat to South Korea is high, the fears of the South Korean government are assuaged by the security guarantees and hence, the pressure to develop strategic ballistic missiles is not as intense. Thus, the security guarantees decrease the perception of external threat to the South Korean state to moderate on the ordinal scale and act as an intervening variable. However, the level of external threat to South Korea will still be classified as high for the sake of this study because although there are United States troops

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<sup>96</sup> Recent South Korean appeals to the United States to cancel the 1979 and 1991 MoUs so that it can develop its own strategic ballistic missiles are based on the gradual withdrawal of US troops from South Korea and the phasing out of the security guarantees as a part of the United States' efforts to engage North Korea. Hence, the intervening variable (US security guarantees) is being withdrawn and South Korea is beginning to behave according to the proposed hypothesis.

present, there are not enough of them to stop a North Korean invasion from capturing a significant portion of South Korea, including Seoul, if an invasion ever occurred. The fact that South Korea has a higher level of external threat (or the same if you consider the intervening variable of US security guarantees) than India on the ordinal scale and did not develop strategic missiles is particularly important as it raises the issue that the level of external threat might not be as significant a motivation for developing strategic ballistic missiles as articles and texts in the literature indicate. As argued above, there is an intervening variable at work, but the fact that the intervening variable can shift the perception of the government as occurred in the South Korean case undermines the contention that the level of external threat is the major motivation for developing weapons systems, a position military analysts often take, but rather it is one of several elements in determining the likelihood that a state will develop missiles.

### **Conclusions**

In order to make conclusions about whether a state is going to develop strategic ballistic missiles, each of the four independent variables can be an indicator as to whether a state will develop missiles, but the only way to come to a truly comprehensive understanding is to examine all of them in concert. Upon first examining the South Korean case study and recognizing the high level of external threat, it would make sense that South Korea would develop strategic ballistic missiles. However, upon further

observation of the three other independent variables, it seems plausible that South Korea would not develop or deploy strategic ballistic missiles. Each variable needs to be considered in relation to the others, not as a separate, isolated catalyst for or against the development of ballistic missiles. Only by understanding the relationship amongst the independent variables and how they influence the state can one make reasonably accurate predictions as to whether a state will or will not make the decision to develop and deploy strategic missiles. Furthermore, examining each variable singly can lead to false conclusions, since there may be an intervening variable as there is in the South Korea case study in this paper.

Overall, this study has confirmed that there is a relatively strong correlation between the level of a state's military morale and its efforts to seek international prestige and its decision to build strategic ballistic missiles. This study also supports the hypothesis that the more aggressive a nation's strategic culture, the more likely it is to develop missiles; however, the correlation is not as strong or as clear as for the military morale and international prestige variables. The level of external threat to the state, originally introduced as a control variable into this study, is not confirmed as having a direct relationship to missile development according to the evidence in the case studies. However, through an explanatory intervening variable, the level of external threat can still be considered a significant factor in the decision

to develop strategic ballistic missiles, yet it may not be as significant as some analysts believe.

## Chapter Six: Conclusions and How to Deal with Future Strategic Ballistic Missile Proliferation

Strategic ballistic missile proliferation is a serious challenge to global security and stability in the future, but it is a threat that can be managed. The case studies of the South Korean and Indian ballistic missile programs shed light on the domestic and external factors that contribute to the decision by policymakers in both states whether or not to develop and deploy ballistic missiles. It appears, according to the case studies, that there is a correlation between the independent variables of military morale, strategic culture, and seeking international prestige with very strong relationships between a state's military morale and its efforts to gain international recognition and the dependent variables of whether or not it develops strategic ballistic missiles. This paper concludes that there is a relationship between a state's military morale and its likelihood to build strategic missiles - the lower the morale of the military, the more likely the state is have an active missile program. A similar conclusion is made in regards to a state's tendency toward aggressive action - the greater the *parabellum* tendency, the more likely it is that the state will build strategic missiles. Also, the greater a nation's drive for international attention and prestige, the greater likelihood that the state will build long-range ballistic missiles. Although the case studies do not indicate a strong relationship between external threat and the decision to develop missiles, the

role of an external threat cannot be completely disregarded as a motivator for states to develop advanced missiles, although the relationship may not be as strong as many suspect. It must also be considered that each of the independent variables does not operate in a vacuum and that only in combination can a tendency toward a state's likelihood to develop strategic ballistic missiles be predicated.

### **The MTCR's Inadequacies**

The proliferation of ballistic missiles is a serious threat to states across the globe, especially in conjunction with the proliferation of weapons of mass destruction. The United States and the West recognized this threat and as a result, the Missile Technology Control Regime (MTCR) was formed to limit the spread of relevant rocket technologies to states with active missile programs. Although the MTCR has serious loopholes, such as allowing unlimited assistance by member states to non-member states on tactical missiles (those with a range less than 300km) and providing unlimited assistance to indigenous space programs, the MTCR has met with relative success, slowing or stopping missile programs in Iraq, Iran, India, Brazil, and Argentina.<sup>97</sup> The MTCR is not an answer to the proliferation of ballistic missiles, as it has only limited enforcement provisions and has been signed by relatively few states

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<sup>97</sup> Krause, Keith. *Arms and the State: Patterns of Military Production and Trade*. Cambridge: Cambridge UP, 1992, p.191.

Also, some states that have acceded to the MTCR flout its conventions.<sup>98</sup>

The MTCR is, in fact, a very short-sighted effort to stop ballistic missile proliferation. By creating what is essentially a suppliers' group, the MTCR alienates those states that are attempting to develop strategic ballistic missiles. Although the initial effect of the MTCR is to slow or stop missile programs in developing countries, it is not completely effective as can be seen from the Indian case study. States that are determined to build strategic ballistic missiles will be able to do so. Once these states have developed strategic ballistic missile technology, it is unlikely that they will accede to the MTCR, especially since it caused so many problems for bringing their missile programs to fruition in the first place. States such as India that developed strategic ballistic missile technology at great cost to themselves (made even more expensive by the provisions of the MTCR) will likely want a return on their investments, and selling actual missiles or the technology to build missiles are both attractive ways to pay for their missile programs. There is nothing that the MTCR can do to prevent this from happening. One possible recourse is implementing trade embargoes, but the situation in Iraq following the Persian Gulf War shows that such actions would likely lack widespread international support.

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<sup>98</sup> Although China has acceded to the MTCR, but it has continued to sell M-11

## **Possible Alternatives to the MTCR**

There must be other, more effective, solutions for preventing the proliferation of ballistic missile technology that take into account the level of external conflict, states' interest in gaining international prestige, the *parabellum* tendencies of a state's strategic culture, as well as the morale of the military. These issues must be taken into account in the formulation of any policies intended to prevent the proliferation of strategic ballistic missiles. Without addressing, or at least considering these variables, it will be difficult if not impossible to stop or slow the proliferation of strategic ballistic missiles. The countries that comprise the MTCR can use the independent variables in this study to identify which countries are likely to develop strategic ballistic missiles and then act to deter such programs or engage the states. The missile proliferation regime must become more proactive, rather than remain reactive as it is at the present time.

One possibility is a missile test ban treaty, where signatories pledge not to test their newly designed ballistic missiles.<sup>99</sup> There are various permutations of such a ban or partial ban. Missile flights could be limited to 300km or less, or missile tests in internationally recognized waters or airspace could be banned, thus limiting the range of missiles being tested. It is impossible to stop a state from developing strategic ballistic

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ballistic missiles to Pakistan.

<sup>99</sup>This proposal is reportedly similar to the one that may be hammered out between the United States and North Korea limiting the testing of North Korean missiles in exchange for diplomatic concessions.

missiles if it absolutely committed to obtaining them, as is India. In that case, several options remain for the global community, including engaging the state that has acquired the weapons and making efforts to monitor that the state stores its warheads and missiles separately. Another possible solution is the removal of the guidance systems from the missiles. Removing the warheads and guidance packets and storing them separately reduces a state's temptation of using strategic ballistic missiles as first strike weapons as it would take days to rearm and target the missiles, enough time for the other nations to recognize that the missiles are being readied for operational use and act accordingly.

Obviously, the United States would have to take a leading role if such a treaty is to be put into effect; however, that remains problematic considering the United States has neither ratified the Comprehensive Test Ban Treaty for nuclear weapons nor the Landmine Ban Treaty. Another issue that limits US action on the issue of ballistic missile proliferation is the national missile defense (NMD) initiative that, if it is technologically feasible, may lull the United States into a false sense of security that it does not need to worry about strategic ballistic missiles. A withdrawal of US interest in the area of missile proliferation would be a serious blow to nonproliferation efforts, to put it mildly.

### **Looking to the 21<sup>st</sup> Century**

Strategic ballistic missile proliferation is a serious challenge for all states in the 21<sup>st</sup> century, but by understanding its underlying motivations, as this study attempts to do, the spread

of such weapons can be understood and hopefully contained in the future. H. E. Bates, at the start of this paper, describes the terrifying effect of indiscriminate ballistic missile attacks on cities. With the proliferation of WMDs, all a state has to do is demonstrate the capability to launch ballistic missiles, and thus the state gains leverage by merely threatening to destroy a city. The spread of strategic ballistic missiles are a serious threat to states across the world, not because they will be used, but just because they might be. States will continue to seek strategic ballistic missiles if motivated by low military morale, a pursuit of international prestige, a strategic culture inclined toward the use of force to achieve foreign policy goals, and a significant level of external threat. Ignoring the problem of missile proliferation is the worst course of action as it will not go away and is likely to become only more serious as time passes.

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I would like to thank the following people for making this thesis possible:

Professor Dan Lynch, for being my advisor, second reader, and patient enough to listen to all my theoretical castles made of sand;

Professor John Odell for supervising IR494 and giving me a motivating shot across the bows;

Andrew Olds and Claire Luna for reading and correcting various different drafts;

Gaurav Kampani and the rest of the Crown & Anchor crowd at Center for Nonproliferation Studies in Monterey for ideas;

and of course, my parents for everything over the years.