STV 1212 Grading Guide: Fall 2022

This is a four-hour exam. Students are asked to answer three of four short-answer questions and two of the four long-answer questions. The two sections of the paper are weighted equally.

We have provided the students with the following guidance in advance of the exam.

- The first three questions should be answered relatively briefly.
- The longer questions should be answered more expansively and analytically.
- They do not need to use formal citations, suffice it to refer to authors on the course syllabus.

Short questions

1. **Explain the theory of the nuclear revolution and one criticism of it.**

This question asks students to identify the main characteristics of the nuclear revolution (Jervis 1989). Jervis deliberates how nuclear weapons have transformed both the military utility of force and then discusses how these changes in the military dynamics of warfare produce change in the political behavior of states in the international system. Nuclear weapons' capability to inflict enormous destruction at high speed fundamentally changes the relationship between military power, warfare, and international politics. Achievement of a survivable second-strike capability by two or more adversaries creates a situation in which military victory is no longer possible. Acquisition of greater destructive power will not change this basic situation. This situation should result in peace between the nuclear powers, preservation of the geopolitical status quo between them, few crises and those that do occur are competitions of resolve that have a tenuous relationship to the detailed military balance. States should therefore maintain a secure second-strike force, but any attempt to go beyond that would be senseless.

The course has covered a few criticisms of the nuclear revolution, including the fact that stability at the nuclear level could permit conflict at the conventional level given that both sides would understand that nuclear use was infeasible, (the stability-instability paradox, Glenn Snyder). Students have read Lieber and Press (2020 chap. 4), which argue that states finding there conventional deterrence as insufficient have an incentive to develop a Coercive nuclear strategy. Students have also read Green 2020, which argues that US policymakers never accepted MAD and continued to pursue augmentation of the United States' nuclear arsenal. Students may also note that many states have adopted nuclear postures that diverge from a simple secure second-strike capability predicted by the theory of nuclear revolution (Narang 2013).

A good answer will broadly outline Jervis's theory, covering most but not all the above points, and provide a general discussion of one criticism. A very good answer provide more detail regarding both the theory of the nuclear revolution and criticisms (including reference to authors). An excellent answer will provide significant detail that contrasts the nuclear revolution's predictions with the criticism.

2. **What is the difference between employing brute force and coercion, and how is this distinction relevant for the nuclear age?**

The students are here asked to discuss concretely the difference between brute force and coercion. The relevant reading from the syllabus here is the first chapter in Schelling's "Arms and Influence".

Schelling understand brute force as the actual employment of military force, and it succeeds when military force is used to take what you want with force. It is, for example, when you conquer an enemy's territory, or defeat his army. If we were only concerned with brute force we would only be interested in the enemy's military power and how we can defeat him on the battlefield, we would not be interested in his preferences per se. We would only try to defeat him in a military battle, not persuade him to yield without a fight. Thus, brute force succeeds only when it is used.

On the other hand, the power to hurt (coercion) is most successful when it is held in reserve. The central idea behind coercion is that it is the threat of damage, or more damage to come, that creates compliance from the enemy. Coercion focuses on future pain, and the violence that is withheld. It is about influencing the enemy's incentives in such a way that he behaves according to your demands or wishes. It is not employment of brute force, because you are not physically forcing the enemy to act in a certain way, you are only trying to influence his incentives, and in this way persuading him in a more indirect manner.

It is the coercion aspect of using military force that has been most relevant when we try to understand the influence of nuclear weapons in international relations. In the nuclear era it is not the actual use of nuclear weapons in combat, but the threat of using such weapons that has been most important. It is not the actual destruction inflicted, but the potential destruction that can be inflicted if the enemy behave in a certain manner that has been most influential. Not the pain and damage itself, but how the threat of such destruction influence somebody's behavior.

An excellent answer to this question should engage with Schelling's discussion of the concepts and describe how this distinction is relevant for nuclear weapons/ the nuclear age. Excellent answers might also distinguish between two types of coercion (compellence and coercion). A good answer will define the concepts correctly, but not engage with how nuclear weapons are relevant for the distinction in detail.

3. Explain two ways in which the acquisition of nuclear weapons can influence a state's foreign policy.

This question is designed to test students' knowledge of Mark Bell's article, "Beyond Emboldenment: How Acquiring Nuclear Weapons Can Change Foreign Policy," *International Security* (2015). Bell outlines six different behaviors that states can engage in after acquiring nuclear weapons: aggression, expansion, independence, bolstering, steadfastness, and compromise. Students need to name just three of these.

Aggression: A state may become more belligerent in pursuing its existing objectives. Example: Pakistan.

Expansion: In contrast to aggression, acquisition of nuclear weapons can allow states to broaden their interests beyond those they had before they did so. Example: United States.

Independence: States may act more independently of senior allies because they rely on them less for their security than they did before they acquired nuclear weapons. Examples: France, North Korea, UK.

Bolstering: nuclear weapons can help the possessor provide greater support to junior allies. Examples: China with Pakistan, UK with colonies and former colonies.

Steadfastness: A state may become less willing to back down in disputes with other states. Examples: Pakistan, UK.

Compromise: nuclear weapons may facilitate compromise by allowing states to take on greater risks (for example by conceding territory) than it would if did not have their protection. Examples: More difficult, but potentially the USSR at the end of the Cold War.

A good answer will list three ways that nuclear acquisition can change a state's foreign policy, but with limited detail. A very good answer will explain with greater detail. An excellent answer will explain with more detail, including historical examples of changes in state behavior after nuclear acquisition.

4. **Why are nuclear weapons effects hard to estimate and how could that have affected the development of US nuclear strategy?**

This question tests students' knowledge of the class on nuclear weapons effects (Lecture 7). Reasons for the difficulty of estimating nuclear weapons effects include the following: lack of test data, the dependence of certain weapons effects such as fallout distribution on environmental conditions (wind, rain, etc.), the unpredictable nature of longer-term effects (such as long-term radiation poisoning), the difficulty of estimating the environmental (nuclear winter), social, political and economic effects of large-scale nuclear use – and in particular how those would interact at the macro level.

Students should make the connection between the difficulty of estimating these effects and the assignment of nuclear weapons to targets in far greater numbers than necessary to achieve the required level of destruction (Hughes 2006, commenting on Eden 2004). Students should reference the exclusion of fire damage from US targeting plans, due to its unpredictability. The exclusion of fire damage could have led to a large underestimation of the destruction inflicted by each nuclear weapon, meaning more weapons were assigned to targets than necessary.

Good answers will provide some reasons for difficulty and make a broad statement about uncertainty and excessive targeting. Very good to excellent answers will provide a more comprehensive list of sources of uncertainty and a more specific description of the exclusion of fire damage and over targeting.

<u>Long questions</u>

5. **Why do regional nuclear powers acquire nuclear weapons and what influences the development of their nuclear posture? Answer using both theory and empirical cases.**

This question tests students' knowledge of Scott Sagan's "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb" (1996-1997) and Vipin Narang's "What Does It Take to Deter? Regional Power Nuclear Postures and International Conflict" (2013).

Students should provide an explanation of Sagan's three models: the security model, the domestic politics model, and the norms model. The security model is a classic realist argument that states that face a nuclear-armed adversary are likely to develop nuclear weapons. An example would be the chain reaction of proliferation since US acquisition in 1945, which can be explained on security grounds. The domestic politics model emphasizes the importance of domestic coalitions in favor of developing nuclear weapons, including its nuclear energy establishment, elements in the military (such as the air force), and certain politicians or political parties. An example would be India. The norms model argues

that states acquire nuclear weapons due to their national identity, for example as a great power. An example would be France.

Students should be able to outline Narang's argument: outlining the three types – catalytic, assured retaliation, and asymmetric escalation. They should explain the factors that go into a region nuclear power's selection of its nuclear posture. If a state has a powerful third-party patron then it will probably choose a catalytic nuclear posture. If it has no powerful third-party patron, but the ability to develop an assured second-strike capability then it will develop an assured retaliation posture, if it faces a conventionally superior opponent, then it will probably select an asymmetric escalation posture.

A good answer will reference both Sagan and Narang's arguments in a general terms but not comprehensively and may not mention the articles. A very good answer will mention the articles and provide greater detail, including well-chosen empirical examples of to support their case. An excellent will provide a comprehensive description of both Sagan and Narang, and their answer will also explain how the empirical examples illustrate the key elements of the theory.

6. **"The Chinese nuclear posture has been significantly different from the nuclear postures of the United States and Russia and will continue to be so." Do you agree or disagree? Justify your answer.**

This question tests student's knowledge of the uniqueness of China's nuclear posture and understanding of the ongoing debate over its future development.

Students should answer the first part in the affirmative (China's nuclear posture has been significantly different from the US and Russia"): as Henrik Hiim outlined in his lecture and argued by Fravel and Medeiros (2010), China has possessed a relatively small nuclear arsenal compared to the United States and Soviet Union/Russia and maintained a minimum assured retaliatory capability. Students could highlight elements of Chinese nuclear strategy such as an aversion to nuclear warfighting, a focus on general deterrence and countering coercion only, China's no first use policy, and the absence of pre-delegation, the lack of mating of warheads to missiles, and no tactical/non-strategic nuclear weapons.

Students could agree or disagree with the second part ("and will continue to be so"). Students could disagree by pointing out to evidence for the recent expansion of China's nuclear forces, such as the discovery of over 300 silos in northern and western China in the summer of 2021. They could point to US Department of Defense projections that estimate that China will acquire 1,000 nuclear weapons by 2030. They could also reference China's nuclear modernization, including mobile systems and a new generation bombers and submarines, as well as the development of shorter-range systems capable of executing limited nuclear options as evidence that China's nuclear strategy is becoming more ambitious. They could also argue that China's aversion to arms control talks with the US as evidence that it wants to move beyond a simple assured retaliatory capability.

Students could also argue that China's nuclear posture is not changing, because the new additions are designed to preserve its assured retaliatory capability against new developments in the growing ability of US offensive nuclear and conventional forces to engage in counterforce missions (destroy Chinese nuclear launchers) and the development of US missile defense capabilities, in the context of worsening US-Chinese political relations. The expansion of China's nuclear forces are therefore designed to maintain Beijing's assured retaliatory capability by ensuring that sufficient nuclear forces survive a US first strike and are able to penetrate a future American defensive shield to deliver a sufficiently powerful retaliatory blow. This is in conformity with behavior outlined in Fravel and Cunningham 2015.

A good answer will provide a clear but quite general response to the question with a clear structure. A very good answer will provide a more detailed response with a clear and coherent structure. An excellent answer will take a clear position, but also engage with and argue against the case for the opposite viewpoint. The assigned readings predate the recent buildup and academic articles reacting to it have yet to be published. As a result, students may not use them as extensively as in the other questions.

7. **"Arms control has failed to reduce the risk of nuclear war." Do you agree or disagree? Discuss with reference to arms control theory and practice.**

This question focuses on students' understanding of the purposes and outcomes of US-Soviet/Russian arms control negotiations. They should reference Schelling and Halperin (1961) or Schelling (1960, republished 2005) on the purposes of arms control focusing on reducing the likelihood of nuclear war and perhaps its scope and violence if it occurs and/or refer to strategic stability with a focus on crisis stability. Arms control agreements are supposed to reduce the possibility of nuclear war and enhance crisis stability by promoting an assured second-strike capability through mutual vulnerability to retaliation after a first strike, thereby reducing the incentives to use nuclear weapons first during a crisis. They may also mention arms control's role in promoting arms race stability/the costs of being prepared for war, though crisis stability is the most important concept.

Students could agree with the question by pointing out that arms control has an imperfect record in promoting crisis stability. They could argue that states have not used arms control talks to promote stability, but to pursue competitive advantages (Maurer 2018). They most likely will point to the failure to limit multiple independently targetable reentry vehicles (MIRV) from the SALT I agreements, thereby permitting an arms race the most destabilizing offensive system of the era. They should explain that MIRV permits one offensive missile to destroy several unlaunched missiles in the targeted state, thereby incentivizing nuclear first use through a damage-limiting first strike. They should explain that neither side was willing to limit these systems and that SALT I arguably facilitated their development because it decreased domestic pressure in the United States for further cuts in nuclear arms. This created a situation in which both sides feared that the other could launch a first strike against its land-based nuclear forces, thereby exacerbating crisis instability.

Alternatively, students could argue that despite some defects arms control has nevertheless reduced the risk of nuclear war. They could point to the Anti-Ballistic Missile (ABM) Treaty that helped to promote stability based on mutual vulnerability between the United States and the Soviet Union. They could also point out that, even if agreements have fallen short of promoting military-technical stability through assured second-strike forces, they have promoted political stability between the United States and the Soviet Union/Russia and thereby reduced the chance of nuclear war in a more indirect way (Cameron 2020).

A good answer will make a general case for or against the proposition, with some reference to Schelling and Halperin/strategic stability and some detail regarding the extent to which arms control agreements have promoted those ends or not. A very good answer will provide a more specific definition of the importance of arms control for promoting crisis stability or preventing the outbreak of nuclear war and provide a more thorough justification for why US-Soviet/Russian arms control has promoted those ends or not, using the relevant readings. An excellent answer will provide a detailed discussion of the foregoing, but also engage with arguments for the opposite position to the one they have taken in a more sophisticated way.

8. **“Emerging and disruptive technologies undermine strategic stability.” Do you agree or disagree? Justify your response by reference to at least two examples for an emerging and disruptive technology.**

This question engages directly with the lecture on technology and strategic stability, as well as the readings for week 10. The question requires students to define the concept of strategic stability and examine potential implications of technology on strategic stability. Students can argue in both directions but must justify their response.

When defining strategic stability, students should mention the concepts of crisis and arms race stability. In terms of technology, students are free to pick, but given the content of the lecture and readings, will likely refer to conventional missile technology, cyber technology, and space technology — perhaps also multiple independently targetable reentry vehicles (MIRV). Students must be able to explain why this technology has potentially disruptive implications on nuclear strategy.

In answering the question, students should engage with the readings. Some students may bring up Gartzke & Lindsay’s (2017) article, arguing that uncertainty about the nuclear/cyber balance of power raises the risk of miscalculation during a crisis. They may also refer to Futter’s (2021) article, arguing that strategic non-nuclear weapons, for example in the form of advanced conventional missiles, could undermine arms race and crisis stability.

They may also suggest that the impact of technology itself is mediated by other factors, most notably military strategy and doctrine. In this regard, they could refer to Talmadge’s (2019) article, arguing that technology is more likely to serve as an intervening rather than an independent variable, thus mitigating the direct impact of technology on strategic stability.

A good answer will show an acceptable understanding of the relevant concepts (emerging and disruptive technology, strategic stability), minimal but not comprehensive engagement with the literature. The answer will be clear but may lack some coherence and structure. A very good answer will show a more sophisticated understanding of the relevant concepts, engagement with the readings and use to support their argument. They will provide a coherent and well-structured response to the question. An excellent answer will display a sophisticated understanding of the relevant concepts, critical engagement with the reading and actively uses it to support his/her arguments. The student can provide a well-structured and coherent response to the question.