



Who Pursues the Bomb? Leaders' Education Abroad and the Development of Weapons of Mass Destruction

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Abstract

What personal characteristics influence political leaders to pursue weapons of mass destruction (WMDs)? Although an extensive body of research addresses the factors that contribute to WMD proliferation, systematic studies on the impact of leaders' biographical factors remain scarce. Thus, this study presents a new theory that focuses on the effects of Western educational experiences on leaders' beliefs and values regarding WMD development. A statistical analysis using data on leaders' studies abroad from 1945 to 2000 found that, in general, studying in Western countries made leaders less likely to pursue both nuclear weapons and chemical and biological weapons. However, leaders who studied in Western nuclear powers were more likely to pursue nuclear development after taking office but less likely to pursue chemical and biological weapons. Our findings that study-abroad destinations have contrasting causal effects on nuclear and as well as chemical and biological weapons proliferation provide an alternative perspective to the dominant view in conventional WMD proliferation studies, which understands the proliferation of chemical and biological weapons by analogy with nuclear weapons.

Introduction

What personal characteristics influence political leaders to pursue weapons of mass destruction (WMDs)? Does a leader's biography have the same effect on the pursuit of nuclear weapons as on the pursuit of chemical and biological weapons (CBWs)? The impact of individual leaders on WMD proliferation has been the subject of some research (Hymans 2006; O'Reilly 2014), and prominent examples such as former Iraqi leader Saddam Hussein and North Korean leader Kim Jong-un show the importance of the role played by individual leaders in WMD development. However, it is unclear which specific attributes and experiences drive leaders to pursue WMDs. Moreover, leaders do not always engage in nuclear or CBW development with the same zeal. For example, Pakistan's Prime Minister, Zulfikar Bhutto, said, "We will eat grass, even go hungry, but we will have our own [nuclear weapon]" (Moore 1993: 2), but did not indicate the same firm intention regarding CBWs. Are these differences due to leaders' biographical factors? If so, what personal characteristics account for these differences, and how?

To address these questions, this study adopts a bibliographic approach that systematically analyzes individual leaders' attributes and experiences (Krcmaric et al. 2020). Recently, as datasets have been developed, this approach has been widely applied in various areas of international relations, including security issues (Acosta et al. 2023; Carter 2023a; Bertoli et al. 2023; Barceló 2020; Fuhrmann 2020). However, except for the seminal work by Fuhrmann and Horowitz (2015) focusing on leaders' experiences as rebels, surprisingly little research exists on WMD proliferation, leaving open the question of how numerous other personal characteristics of leaders affect WMD proliferation, both theoretically and empirically. Furthermore, previous research to date has been limited to nuclear proliferation, with no consideration of CBWs.

Therefore, this study focuses on leaders' experiences studying abroad as a biographical factor that influences the pursuit of WMDs, including nuclear weapons and CBWs. Specifically, we argue that, after taking office, leaders who previously studied in nuclear-armed Western countries are more likely to pursue nuclear weapons development but less likely to pursue CBWs. The mechanism underlying this proposed effect is that studying abroad enables leaders to update their causal and normative beliefs regarding WMD development. Specifically, studying in Western countries with widespread taboos against CBWs encourages leaders' socialization and inhibits CBW development. However, the situation differs regarding nuclear weapons, as although anti-nuclear norms are prevalent in Western countries, nuclear taboos are not as widespread in nuclear-armed Western countries, resulting in a lack of normative learning for leaders. Instead, leaders undergo instrumental learning about the substantial material benefits of possessing nuclear weapons, which, in turn, increases their

inclination toward nuclear development.

The contributions of this study are twofold. First, we apply a biographical approach to the study of WMD proliferation. The relationship between individual leaders' attributes and experiences, and WMD development under their regimes has received little attention. To the best of our knowledge, this study is the first to use a biographical approach to examine WMD proliferation, including that of CBWs, by focusing on the characteristics of leaders' experiences studying abroad.

Second, our finding that leaders' educational experiences in nuclear-armed Western countries have different effects on the pursuit of nuclear weapons versus that of CBWs provides new insights for WMD proliferation research. Traditionally, proliferation scholarship has tended to analyze nuclear weapons and CBWs separately, and few studies have considered both within their scope (Horowitz and Narang 2014; Asal et al. 2012; Asal et al. 2023; Campbell and Murdie 2023). In addition, accumulating evidence suggests that factors that influence nuclear proliferation, such as security threats, deterrence, and international norms, affect CBW proliferation similarly (Sagan 2000; Martin and Sagan 2001; Price 2007). In contrast, this study questions the validity of simply applying the same logic to both CBW and nuclear proliferation by showing that the same factor, the leader's experience of studying in nuclear-armed Western states, has opposite causal effects depending on the type of proliferation.

The remainder of this paper is organized as follows. After reviewing prior research in the next section, we present a theory of the effects of a leader's experiences studying in the West on both nuclear and CBW proliferation. We then use statistical analysis to substantiate this theory.

Literature Review

Political Leaders in WMD Proliferation Studies

A considerable body of research has been accumulated on the factors that contribute to WMD proliferation, with the overwhelming majority focusing on nuclear weapons (Bell 2016; Singh and Way 2004; Jo and Gartzke 2007; Way and Weeks 2014; Sagan 1996; Sagan 2011; Kroenig 2015; Fuhrmann 2009a; Solingen 2007; Rublee 2009; Debs and Monteiro 2017). In addition to traditional security-based explanations (Monteiro and Debs 2014), the field has recently developed theoretical and empirical analyses that focus on domestic-level explanations (Saunders 2019). However, systematic analyses of the role of individual leaders remain sparse (Schneider 2020).

The importance of political leaders in nuclear decision-making has not been entirely overlooked. For example, a seminal theoretical study by Hymans (2006) focuses on the conception of leaders' national identity. According to Hymans, a leader's national identity conception is classified by the solidarity (sportsman-like or oppositional) and status (nationalist or subaltern) dimensions, with leaders classified as oppositional nationalists being the most committed to developing nuclear weapons. Similarly, O'Reilly (2014) has argued that how leaders perceive the strategic environment influences whether they will move toward nuclear development. Specifically, O'Reilly shows that the dyadic interactions within a leader's perceptions of the international environment, a combination of how leaders envision both themselves and others, influence proliferation outcomes. Whitlark (2017) presented a leader-focused theory of counterproliferation by analyzing the policies of US Presidents Kennedy and Johnson toward China to show that a leader's propensity to wage preventive war against an adversary pursuing nuclear weapons depends on the leader's beliefs about the consequences of nuclear proliferation and the threat posed by the adversary.

These studies offer suggestions by elucidating the connection between individual leaders' beliefs, perceptions, and ideas and nuclear proliferation; however, theoretical and empirical problems remain. The first question concerns what shapes a leader's beliefs.¹ Does a leader's national identity conception originate from external factors that have traditionally been identified, such as the security environment? Alternatively, is this rooted in individual leaders' attributes, and, if so, what attributes influence the formation of a leader's beliefs? Second, previous leader-focused studies have

¹ Whitlark (2017) traces the formation of Kennedy and Johnson's prior beliefs back to their early life and empirically analyzes the formation of their prior beliefs but does not examine theoretically what leads them to develop such beliefs.

predominantly been qualitative case analyses, with a lack of sufficient systematic empirical research on the roles of individual leaders. Several excellent studies have focused on a small number of leaders and analyzed their policy decisions in depth, whereas large-N analyses remain limited. The recent development of data on individual leaders' attributes and experiences and relevant research methods represents a significant gap in the literature.

Policy and detailed individual case analyses have accumulated in previous studies on CBW proliferation (Livingstone and Douglass 1984; Carus 1991; Shoham 1998; Cohen 2001; Cross 2017; Dederling 2021); however, few theoretical and systematic studies exist on the factors and mechanisms of proliferation. The logic presented in this area is similar to that on nuclear weapons, such as deterrence, norms, international institutions, and regime security (Sagan 2000; Martin and Sagan 2001; Price 2007; Tucker 2000; Koblenz 2013). Although systematic and statistical approaches have been increasingly used as datasets on CBW proliferation have been developed (Horowitz and Narang 2014; Mezzour et al. 2018; Poor Toulabi 2023), recent research interest has focused primarily on using experimental methods to elucidate public preferences and taboo attitudes (Blair et al. 2022; Smetana et al. 2023; Tezcür and Horschig 2020; Smetana and Vranka 2020), with no attempts made in the field to conduct a large-N analysis focused on individual leaders.

Thus, previous studies on WMD proliferation, whether of nuclear weapons or CBWs, have not thoroughly examined the influence of individual leader factors. Some studies have focused on leaders' beliefs and perceptions in the nuclear realm; however, whether the same logic applies to CBW proliferation remains unclear. Furthermore, the accumulation of empirical evidence is not yet sufficient to determine whether these beliefs and perceptions are derived from individual leaders' attributes and personal experiences or are shaped by reactions to external factors.

Applying the Biographical Approach to WMD Proliferation

One way to address these issues is to collect individual leaders' biographical information and systematically examine the impact of individual-level attributes and experiences on outcomes. Research using the biographical approach has seen recent rapid growth in the field of international relations (Krcmaric et al. 2020), and various applications have also been presented in the field of security (Carter 2023b), including armed conflict, military spending, and alliances (Acosta et al. 2023; Carter 2023a; Bertoli et al. 2023; Barceló 2020; Fuhrmann 2020).

However, the effects of a leader's biography on WMD proliferation have received little attention, with the only exception being Fuhrmann and Horowitz (2015), who argued that leaders with rebel experience before assuming office are more likely to seek to develop nuclear weapons. According to Fuhrmann and Horowitz, leaders who have engaged in rebellions are more likely to have a strong commitment to preserving state sovereignty and independence and show higher risk tolerance, making them more likely to pursue nuclear weapons development. Although their argument illuminates how individual leaders' previous social experiences can lead to the pursuit of nuclear weapons as a state policy, they focus only on nuclear weapons and do not include CBW proliferation in their scope. Furthermore, the attributes and experiences of individual leaders presented in previous studies using the biographical approach are extremely diverse and not limited to rebel experience. Therefore, the application of this approach to the wider research area of WMD proliferation remains underexplored, with considerable room to explore other biographical factors that might have effects on leaders' attitudes toward WMDs.

Thus, in terms of the influence of leaders' biographical experiences on WMD proliferation, we focus on studying abroad. As we show in the section, we theorize that, once in office, leaders' educational experiences in Western nuclear powers encourage them to pursue nuclear weapons but not CBWs. The argument that the impact of educational experience differs between nuclear weapons and CBWs differs from existing approaches to identifying the causal mechanisms by which biographical factors influence political outcomes.

As Krcmaric et al. (2020) noted, one challenge with biographical approaches is that multiple causal pathways may exist through which explanatory variables influence outcomes that are difficult to distinguish. Thus, an individual leader's attributes and experiences may matter; however, whether this effect is through the leader's beliefs and values, competence and skills, material interests, or others' perceptions of them remains unclear (Krcmaric et al. 2020: 135-136). For factors such as educational

experience, which can take all these causal pathways, it is particularly difficult to empirically elucidate the mechanism by which they affect outcomes. Even some notable studies that have examined the impact of leaders' educational experience in the West have not fully addressed the issue (Gift and Krcmaric 2017; Barceló 2020). However, as we show below, our logic that the experience of studying in Western nuclear powers has differential effects between the pursuit of nuclear weapons and that of CBWs is unlikely to be outside the causal pathway of influence on leaders' beliefs and values.

Theory

We posit that a political leader's experience studying abroad in the West influences his or her position on WMDs after taking office. As previous studies have noted, the stimuli and experiences gained from higher education are extremely influential in shaping the political values and beliefs applied throughout one's life after graduation (Gift and Krcmaric 2017: 675). In particular, political leaders' experiences studying abroad in the West have been found to influence various policy outcomes, primarily through socialization into Western values (Gift and Krcmaric 2017; Barceló 2020). However, when examining the effects of this experience on WMD policy, we argue that the conventional logic cannot be applied. Specifically, we propose that the effects of leaders' experiences studying abroad on nuclear and CBW development differ depending on the type of host country. Studying abroad in the West has an inhibitory effect on both nuclear and CBW development, whereas studying abroad in a Western nuclear state inhibits CBW development while promoting nuclear development.

Regarding the mechanism underlying differentiated outcomes, we focus on the renewal of values and beliefs through the learning process during a leader's experiences studying abroad. Learning as understood in this context can be divided into two types: learning as socialization, in which a leader is exposed to and internalizes new norms and moral values, and instrumental learning, such as the renewal of causal beliefs and acquisition of knowledge about material realities (Haas 1992; Checkel 2001; Radaelli 2009).

First, studying abroad in the West facilitates the updating of leaders' normative beliefs. Being immersed in student life abroad provides leaders with opportunities to absorb and internalize the widely shared culture and values of the host country, leading them to redefine their interests and identities. Regarding WMD policy, leaders' experiences studying abroad influence their normative beliefs regarding the development and possession of nuclear weapons and CBWs, including the moral and ethical debates surrounding these issues.

Second, apart from socialization based on the "logic of appropriateness," leaders studying abroad in the West undergo instrumental learning driven by functional logic. During periods studying abroad, classroom experiences and coursework, along with interactions with peers and faculty members, cause leaders to update their policy-related information and academic knowledge. In the context of WMD policy, causal beliefs about military, political, economic, and social gains, costs, and risks associated with developing nuclear weapons and CBWs are updated through learning experiences in the host country.

Thus, we theorize that the outcomes of the two abovementioned learning processes significantly vary depending on whether the study destination is in a nuclear state. In the following section, we specifically examine the mechanisms underlying policies on nuclear weapons compared with those on CBWs.

Nuclear Weapons

We first examine the impact of studying nuclear-armed Western countries on leaders' orientations toward nuclear weapon development. Previous research on nuclear politics has highlighted that possessing nuclear weapons provides substantial benefits. These advantages are not limited to security aspects such as deterrence and coercion but also include enhanced international status and stronger domestic political cohesion (Sagan, 1996; Solingen 2007: 40-47). Thus, leaders studying abroad in Western nuclear states personally witness considerable material gains associated with nuclear possession. Such instrumental learning about the utility of being a nuclear power facilitates leaders' orientations toward nuclear development.

In addition to learning about these material benefits, studying abroad in Western nuclear powers can update leaders' normative beliefs about nuclear weapons, such as the importance of nuclear

weapons as symbols or elements of national identity (Sagan 1996). As noted above, possessing nuclear weapons enhances a country's status in the international community. Attaining status as a great power or modern state in this way is not only a strategically rational act but often transcends cost-benefit analysis for leaders, driving them to consider it a worthy goal and legitimate behavior (Renshon 2017). Leaders who study in countries that are part of the "nuclear club" may internalize this symbolism and come to pursue nuclear development as part of their national identity.

However, studying abroad in Western nuclear powers is unlikely to instill a learning effect that internalizes the nuclear taboo (Tannenwald 1999). Several studies have empirically shown that views of nuclear weapons being taboo are not widely shared in countries that possess nuclear weapons (Press et al. 2013; Sagan and Valentino 2017). The tendency for a diluted nuclear taboo is evident in not only the US but also countries such as the UK, France, and Israel (Dill et al. 2022). Therefore, that leaders will internalize such norms through studying abroad in Western nuclear powers is improbable, as anti-nuclear norms are not widely shared among citizens.

In summary, by studying abroad in Western nuclear-armed states, leaders undergo instrumental learning about the material benefits associated with nuclear development as well as normative learning about the legitimacy of nuclear weapons as symbols of national identity. However, this experience is unlikely to foster a learning effect that cultivates taboos regarding nuclear weapons. Consequently, leaders are more likely to pursue nuclear development after returning from their educational experience abroad.

Essential to note regarding the experience of studying abroad in Western countries is that the logic discussed above is not directly applicable. First, leaders studying abroad in non-nuclear states, which comprise the majority of the West, would naturally face challenges to directly experiencing the material benefits of possessing nuclear weapons. Furthermore, strong anti-nuclear sentiments are prevalent among the citizens of non-nuclear Western countries. Even in NATO countries that share nuclear weapons with the US, such as Germany and the Netherlands, long-standing public support exists for the withdrawal of US nuclear weapons, as well as opposition to these countries developing their own nuclear weapons and endorsement of nuclear disarmament norms (Onderco et al. 2022; Everts 1985; Onderco and Joosen 2022; Onderco 2024). Leaders who study in environments with strong nuclear taboos are likely to internalize these values and thus hold a negative perception of nuclear development. Consequently, when considering the overall impact of studying in Western countries on leaders' orientations toward nuclear development, the promoting tendency of studying in some nuclear powers would be counteracted and a restraining effect observed.

CBWs

Regarding the impact on CBW development orientation, studying abroad is expected to provide similar learning effects for leaders regardless of whether the host country possesses WMDs. First, regarding instrumental learning, during their time spent studying abroad in Western countries, leaders are unlikely to experience firsthand the military, diplomatic, and political benefits of developing and possessing CBWs. While the motivation for CBW development in Third World countries is often cited as external deterrence (Burck and Flowerree 1991: 536; Spiers 1989: 234; Wheelis et al. 2006; Chevrier 1993: 409), acquiring such causal beliefs by studying in Western countries is less probable. Instead, major CBW-holders, such as the UK and the US, began to reevaluate the military utility of CBWs after World War II, with the UK discontinuing its CBW program in the late 1950s (Cirincione et al. 2005), and the US ending its biological weapons program and declaring a no-first-use policy for chemical weapons in the 1970s (Tucker 2002). Moreover, after the Vietnam War, CBW programs incurred high political and reputational costs domestically and diplomatically in Western countries.

Second, from the perspective of normative learning, unlike with nuclear weapons, CBW development essentially does not demonstrate national strength, indicate scientific and technological capabilities, or serve as a source of national identity or symbol of national prestige (Tucker 2000: 28; Harris 1990: 71-72; Koblentz 2013: 503-504). Furthermore, taboos against CBWs have become widely internalized in Western countries (Price 1995; Cole 1998; Bentely 2024). As evident from the 1899 Hague Declaration Concerning Asphyxiating Gases and the 1925 Geneva Protocol, the anti-CBW norm was developed in Western societies even before World War II and was later reinforced by international agreements such as the Biological Weapons Convention of 1972 and Chemical Weapons

Convention of 1993. The strength of the taboo has been empirically validated in recent cross-sectional studies also reporting that the taboo against chemical weapons is more robust than that against nuclear weapons (Smetana and Vranka 2020; Smetana et al. 2023).

In summary, studying abroad in Western countries, regardless of whether they possess WMDs, does not encourage leaders to learn about the material benefits of CBW development. Instead, it fosters normative learning that internalizes strong CBW taboos. Therefore, it can be hypothesized that educational experience in Western countries has a restraining effect on leaders' tendencies to pursue CBW development.

The theoretical hypotheses examined above regarding leaders' views on nuclear weapons and CBWs following their experience studying abroad can be summarized as follows:

H1: *Educational experience in a Western nuclear power* has opposing effects on the propensity of a leader to pursue WMDs.

H1a: It encourages leaders to pursue nuclear weapons.

H1b: It discourages leaders from pursuing CBWs.

H2: *Educational experience in a Western country* has an overall discouraging effect on a leader's propensity to pursue WMDs.

One source of novelty in our hypotheses is that studying abroad in a Western nuclear power has contrasting causal effects on the development orientation of nuclear weapons compared with that of CBWs. As noted above, the social experience of studying abroad may affect policy outcomes through various causal pathways, such as altering beliefs and values, developing competence and skills, influencing material interests, or shifting others' perceptions of the leader. For example, in WMD policies, leaders might enhance their leadership skills through study, enabling them to coordinate the interests of domestic actors and manage complex WMD development projects. Existing research using the biographical approach has found it challenging to distinguish between these mechanisms empirically. However, our theory that the causal effects on nuclear power and CBW development vary depending on whether the study destination is a nuclear power is difficult to interpret through mechanisms other than those influenced by the learning process. Thus, if the empirical analysis reveals a variance in the tendencies between nuclear and CBW policies based on the nuclear status of the host country, it will provide strong evidence supporting our proposed causal mechanisms. Considering this, in the next section, we apply statistical analysis to examine the empirical validity of our theory.

Statistical Analysis

Unit of Analysis

The unit of analysis in our is the leader-year. Researchers using the biographical approach have identified at least three options for analytical unit choice: country-year, leader-year, and leader's tenure (Krcmaric, et al. 2020). Although each has its own merits, we deem leader-year to be the most appropriate for the purposes of our study.

The country-year unit is the most common choice among international relations scholars. However, it faces the problem of leadership turnover. When a change in leadership occurs during a year, country-year units can confound the estimation because the outgoing leader has a completely different background from that of the incoming leader. For example, Indira Gandhi became Prime Minister of India on January 1, 1966, after Prime Minister Jawaharlal Shastri died suddenly from a heart attack. While India is coded as having pursued nuclear weapons during both of their tenures, Shastri was educated at Mahatma Gandhi Kashi Vidyapith, the state university of India, whereas Indira was educated at Oxford in the UK. Therefore, the country-year unit of analysis would complicate the coding procedure in our study.

In addition, although leaders' tenure may appear to be a natural unit of analysis for the biographical approach, it poses several serious obstacles simultaneously that can produce unbiased results. First, it cannot effectively address the heterogeneity of leaders' tenure durations. A leader who spends most of his or her life in power should not be considered the same as a leader who was ousted from office within a few years. Second, this analysis unit makes it difficult to determine the proper

timing for measuring control variables. While we can, for example, use moving averages as proxies, leader-year units come closer to reality.

Therefore, leader-year units are the most appropriate for our statistical analysis, albeit with some limitations. We rely on the Archigos dataset (Goemans et al. 2009) to identify leaders and their terms in office. We selected 1945–2000 as our analysis period because in the post-World War II era, WMD proliferation became a relevant global threat, and after some world powers acquired nuclear weapons, many other countries at least tried to follow suit.

Data and Method

The dependent variables in this study reflect the pursuit of WMDs. All three variables are binary and coded as 1 if a leader ran a given WMD development project in a given year and 0 otherwise. For the pursuit of nuclear weapons, the status of each country at a given time is obtained from Gartzke and Kroenig (2009). As a cautionary note, we excluded the US and the UK from our dataset to avoid the endogeneity problem, as they are the independent variables in our research. Furthermore, France, which has close relationships with these countries, was excluded from the study.

In contrast, the status of CBW pursuit is less commonly used in the WMD proliferation literature. To the best of our knowledge, Horowitz and Narang (2014) provide the most systematic and detailed tracking of these data. They assumed complementarity between nuclear weapons and chemical *or* biological weapons; thus, while biological and chemical weapons pursuits are counted independently in their dataset and are useful for WMD proliferation researchers overall, little need ultimately exists for separating these variables in our research. As we make no theoretical distinction between biological and chemical weapons, we treat both *en masse*.

The key independent variable in this study is a leader's educational destination. While some comprehensive datasets code leaders' educational attainment levels (e.g., Ellis et al. 2015), few studies have meticulously attempted to identify the locations where leaders studied abroad, with Gift and Krcmaric (2017) being the exception. Their coding criteria were as follows: if a leader received a higher education (i.e., at the undergraduate level or above) in Western countries, he or she is counted as Western-educated. Implicitly, they considered those leaders who were educated in advanced military organizations in the West, such as the École Spéciale Militaire de Saint-Cyr or West Point, as *not* Western educated. We strictly adhere to these criteria for our analysis.

One problem, however, is that they only recorded non-OECD countries, because they coded leaders' educational locations to estimate the likelihood of democratization. Therefore, we extended Gift and Krcmaric's (2017) data to include other world leaders. While we consulted various sources, some leaders' educational histories remain unconfirmed.

To mitigate the omitted variable bias, we include several control variables. As a proxy for economic development conditions, we use GDP per capita to measure economic prosperity. This is because a relatively wealthy country is likely to pursue nuclear weapons, whereas an economically constrained country may develop CBWs as a substitute, which is why CBWs have been referred to as the "poor man's atomic bombs." We also include a measure of economic openness to test whether the connection between a country's economy and the global economy might confound the results for a similar reason.

As we focus on WMD development, security environment variables must also be included in the model. Regardless of whether they are intended as deterrents, WMDs are most needed in severe security environments. While a country's involvement in a militarized interstate dispute may reflect its security environment, these disputes tend to be affected by many variables and are thus endogenous (Way and Weeks 2014; Fuhrmann and Horowitz 2015). Therefore, we adopt the sum of shared land borders as a fully exogenous proxy for the security environment.

We also need to include control variables that affect the prospects for WMD. Superpower alliances with a country that holds nuclear weapons can reduce states' fear of not having a nuclear weapon or use of CBWs as a substitute (Fuhrmann and Horowitz 2015). This is a binary measure based on whether a state has signed a formal security treaty with a superpower that possesses nuclear weapons. Similarly, this logic fits, in part, with nuclear cooperation agreements. According to the supply-side theory of nuclear proliferation, states with knowledge of nuclear technology are more likely to proliferate. Moreover, the ease with which a state can acquire nuclear weapons

simultaneously discourages it from pursuing CBWs. Therefore, the total number of civilian nuclear cooperation agreements should be included as a control (Fuhrmann 2009a, 2009b).

A country's domestic context is also important in the state calculus of WMD acquisition. First, we include the regime scores for each country derived from the Polity Project. As some studies have noted (Way and Weeks 2014), regime characteristics, including domestic interest groups and constraints on the leader's power, can alter the path a country takes regarding the development of either nuclear weapons or CBWs. Second, we use a dummy variable to determine whether a leader was part of a rebel organization. This variable is thought to have a significant positive effect on the likelihood of pursuing nuclear weapons (Fuhrmann and Horowitz 2015). Owing to our biographical approach, the characteristics of leaders that are believed to affect WMD pursuit behavior must be considered when running the models.

Finally, we include time-related variables in our models to reduce probable temporal dependence in the binary time-series cross-sectional data (Beck et al. 1998). Following the conventional advice of Carter and Signorino (2010), we include a cubic polynomial for the number of years since a leader decided not to start a nuclear weapons program (Fuhrmann and Horowitz 2015). Thus, the number of years as well as its square and cube are considered.

As our dependent variables are binary, we use a logistic regression model. Based on our concern that the pursuit of WMDs is a relatively rare phenomenon, to avoid cases in which our results depend on the model, we also include a rare event logistic regression model (King and Zeng 2001). We find that the results hold after testing the different models.

Results

Table 1 presents the main findings of the analysis. After including control variables, the results support our hypotheses. As Model 1 demonstrates, the coefficient of *education in Western nuclear powers* is both positive and significant at a 99% confidence interval. As predicted by H1a, leaders educated abroad in Western nuclear power are more likely to pursue nuclear weapons in their own countries. In a stark but interesting contrast, Model 3 shows the opposite effect of education in Western nuclear powers on a leader's propensity to pursue other types of WMDs. The coefficient of the same variable was negative and significant at a 99% confidence interval. Consistent with H1b, leaders educated abroad in nuclear-armed states are more likely to refrain from developing CBWs. Therefore, we can confidently argue that experience studying abroad in Western states with nuclear weapons has differentiated effects on a leader's propensity to pursue WMDs. Leaders who receive a Western education abroad in nuclear states are more likely to pursue nuclear weapons but less likely to pursue CBWs.

Next, we examine the coefficients of *education in Western countries*. As predicted by H2, Western education has an overall discouraging effect on a leader's propensity to pursue WMDs. Model 2 shows that leaders educated abroad in Western countries are less likely to pursue nuclear weapons. The coefficient is negative and significant at a 99% confidence interval. Likewise, Model 4 shows that leaders with educational experience abroad in a Western country are less likely to pursue CBWs during their political tenure. The coefficient is negative and significant at a 99% confidence level. Considering these results, leaders educated abroad in Western countries are less likely to attempt to develop WMDs, whether they be nuclear weapons or CBWs.

How can we best interpret the effect of foreign education on the likelihood that leaders will pursue WMDs during their tenure? To understand the marginal effects of our models, the predicted probabilities of WMD pursuit by foreign education (in nuclear-possessing states and Western countries) are shown in Figure 1. All other continuous variables were expressed as means and dichotomous variables as modes, and the three time-related variables are set to 0. As Table 1 shows, the substantial effect of foreign education in a Western state that possesses nuclear weapons increases the probability of nuclear pursuit. However, the effects of the other models work in a negative direction in terms of WMD pursuit. Western education had the strongest effect on CBW pursuit, which is plausible because Western countries are generally ardent advocates of CBW disarmament and non-proliferation.

Thus far, the logistic regression models indicate that while receiving education abroad in Western nuclear power encourages leaders to pursue nuclear weapons and discourages them from pursuing

CBWs simultaneously, Western education exerts a strong negative influence on a leader's propensity to pursue WMDs, whether they be nuclear weapons or CBWs. However, we should remain cautious not to make our estimations dependent on our choice of model. In international relations, our targets of interest occur relatively infrequently. Therefore, we also test our theory using rare-event logistic regression models (King and Zeng 2001). As Table 2 shows, the results remain unchanged after running a different model, indicating their robustness to different model specifications.

Table 1 Logit Regression: leader-year

	Nuclear pursuit		BC weapon pursuit	
	(1)	(2)	(3)	(4)
Education in Western nuclear powers	0.875*** (0.313)		-0.433** (0.193)	
Education in the West		-1.044*** (0.310)		-1.172*** (0.161)
GDP per capita	-0.0002*** (0.00004)	-0.0002*** (0.00004)	0.00002** (0.00001)	0.00003*** (0.00001)
Economic openness	-0.018*** (0.005)	-0.019*** (0.005)	-0.008*** (0.002)	-0.007*** (0.002)
Superpower alliance	-1.707*** (0.313)	-1.697*** (0.308)	-0.776*** (0.121)	-0.776*** (0.121)
Nuclear cooperation agreements	0.485*** (0.033)	0.468*** (0.031)	0.145*** (0.014)	0.157*** (0.014)
Polity2 score	-0.104*** (0.019)	-0.077*** (0.019)	-0.048*** (0.009)	-0.032*** (0.009)
Rebel leader	2.027*** (0.287)	1.686*** (0.277)	0.782*** (0.116)	0.680*** (0.116)
Land borders	0.163*** (0.033)	0.183*** (0.034)	-0.042** (0.019)	-0.043** (0.019)
Time	-0.869*** (0.101)	-0.883*** (0.101)	-0.137*** (0.033)	-0.128*** (0.033)
Time squared	0.048*** (0.011)	0.049*** (0.012)	0.008*** (0.003)	0.007** (0.003)
Time cubed	-0.001** (0.0003)	-0.001** (0.0003)	-0.0001* (0.0001)	-0.0001* (0.0001)
CONSTANT	-4.342*** (0.377)	-3.843*** (0.359)	-2.235*** (0.173)	-2.073*** (0.172)
<i>Observations</i>	6,848	6,848	6,848	6,848
<i>Log likelihood</i>	-443.071	-440.379	-1,601.527	-1,572.858
<i>Akaike information criterion</i>	910.142	904.759	3,227.053	3,169.717

Notes: *** p < .01; ** p < .05; * p < .1

Table 2 Rare Event Logit Regression: leader-year

	Nuclear pursuit		BC weapon pursuit	
	(1)	(2)	(3)	(4)
Education in Western nuclear powers	0.879*** (0.313)		-0.418** (0.192)	
Education in the West		-1.020*** (0.309)		-1.164*** (0.161)
GDP per capita	-0.0002*** (0.00004)	-0.0002*** (0.00004)	0.00002** (0.00001)	0.00003*** (0.00001)
Economic openness	-0.017*** (0.005)	-0.019*** (0.005)	-0.008*** (0.002)	-0.007*** (0.002)
Superpower alliance	-1.679*** (0.312)	-1.671*** (0.307)	-0.773*** (0.120)	-0.774*** (0.121)
Nuclear cooperation agreements	0.477*** (0.033)	0.461*** (0.031)	0.145*** (0.014)	0.157*** (0.014)
Polity2 score	-0.102*** (0.019)	-0.076*** (0.019)	-0.048*** (0.009)	-0.032*** (0.009)
Rebel leader	1.989*** (0.286)	1.651*** (0.276)	0.778*** (0.116)	0.676*** (0.116)
Land borders	0.161*** (0.033)	0.181*** (0.034)	-0.041** (0.019)	-0.042** (0.019)
Time	-0.842*** (0.101)	-0.857*** (0.101)	-0.134*** (0.033)	-0.125*** (0.033)
Time squared	0.044*** (0.011)	0.046*** (0.012)	0.007** (0.003)	0.006** (0.003)
Time cubed	-0.001** (0.0003)	-0.001** (0.0003)	-0.0001* (0.0001)	-0.0001 (0.0001)
CONSTANT	-4.295*** (0.376)	-3.799*** (0.358)	-2.235*** (0.173)	-2.073*** (0.172)
<i>Observations</i>	6,848	6,848	6,848	6,848
<i>Log likelihood</i>	-443.071	-440.379	-1,601.527	-1,572.858
<i>Akaike information criterion</i>	910.142	904.759	3,227.053	3,169.717

Notes: ***p < .01; **p < .05; *p < .1

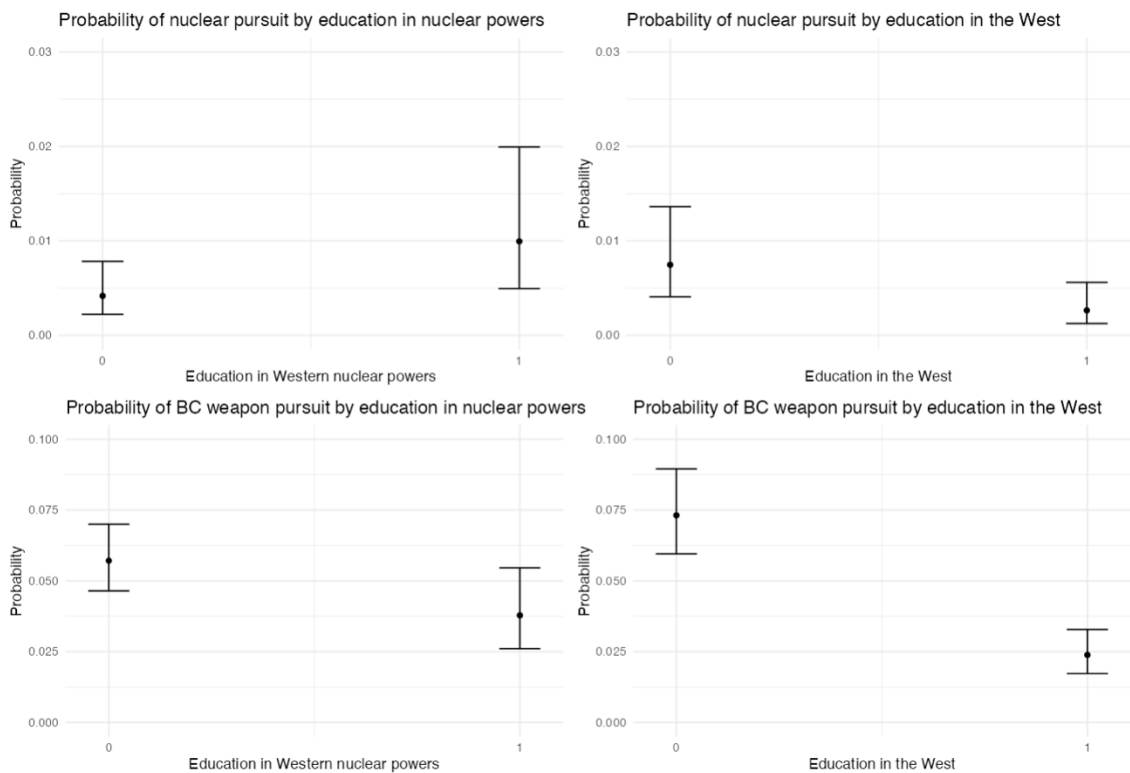


Figure 1 Predicted Probabilities of WMD Pursuit

Conclusion

This study examined the effects of individual leaders' biographical factors on WMD proliferation, which has received little attention in previous studies. Specifically, we developed and statistically tested a new theory on how leaders' experiences studying abroad in nuclear-possessing Western states affect their development of nuclear weapons and CBWs after taking office. The analysis revealed two key findings. First, leaders who have studied Western nuclear powers are more likely to pursue nuclear weapons but less likely to pursue CBWs. Second, leaders who have studied in Western countries, in general, tend to be less inclined to pursue either nuclear weapons or CBWs.

Our findings contribute to the literature in several ways. First, we introduce a biographical approach that has rarely been applied in WMD proliferation studies. While previous research has focused on the role of individual political leaders, few attempts have been made to systematically analyze the effects of their biographical factors. Moreover, no theoretical or empirical analyses have been conducted on the impact of individual leader attributes and experiences on the entire WMD category, which includes nuclear weapons and CBWs. By focusing on the factors affecting leaders studying abroad, this study fills the gaps in previous research and elucidates how nuclear and CBW proliferation are influenced by individual leaders' social experiences.

Second, we provide an alternative perspective to the dominant view in conventional WMD proliferation studies in which the proliferation of CBWs is understood as analogous to that of nuclear weapons. As we have shown, the biographical factors of an individual leader's experiences studying abroad have a contrasting causal effect on nuclear and CBW proliferation. This leads to the important policy implication that WMD nonproliferation policies may sometimes conflict. In particular, our finding that studying abroad in a nuclear-possessing state makes political leaders more likely to seek to obtain nuclear weapons is instructive for reexamining the effectiveness of educational exchange policies. Extant research has painted a picture in which the acceptance of foreign leaders' experiences studying abroad has positive implications for the West, including leaders' democratization orientations (Gift and Krmaric 2017). However, to the extent that study-abroad experiences have diverse effects

on leaders' preferences for pursuing WMDs, it does not necessarily follow that educational exchanges have favorable outcomes for the countries involved.

Regarding future research directions, since we have empirically shown the quantitative validity of the causal relationship of our hypotheses, it would be beneficial to substantiate the specific mechanisms underlying these effects through the accumulation of detailed case analyses. Moreover, significant room remains for systematic examination of the effects of leaders' biographical factors other than studying abroad, such as age, gender, business experience, and religious beliefs, on WMD proliferation. In addition, a leader's experience studying abroad may influence other political behaviors related to WMD proliferation, such as strategies for WMD development (Narang 2022), or policies after WMD possession (Bell 2015; Sechser and Fuhrmann 2017). Such explorations based on this study's findings will provide a more systematic understanding of how individual leaders' characteristics and experiences relate to the political dynamics surrounding WMD proliferation.

References

- Acosta, B., Huang, R., & Silverman, D. (2023). Introducing ROLE: A database of rebel leader attributes in armed conflict. *Journal of Peace Research*, 60(2), 352-361.
- Asal, V. H., Ackerman, G. A., & Rethemeyer, R. K. (2012). Connections can be toxic: Terrorist organizational factors and the pursuit of CBRN weapons. *Studies in Conflict & Terrorism*, 35(3), 229-254.
- Asal, V., Avdan, N., & Ackerman, G. (2023). Breaking taboos: Why insurgents pursue and use CBRN weapons. *Journal of Peace Research*, 60(2), 193-208.
- Barceló, J. (2020). Are Western-educated leaders less prone to initiate militarized disputes? *British Journal of Political Science*, 50(2), 535-566.
- Beck, N., Katz, J. N., & Tucker, R. (1998). Taking time seriously: Time-series-cross-section analysis with a binary dependent variable. *American Journal of Political Science*, 42(4), 1260-1288.
- Bell, M. S. (2015). Beyond emboldenment: How acquiring nuclear weapons can change foreign policy. *International Security*, 40(1), 87-119.
- Bell, M. S. (2016). Examining explanations for nuclear proliferation. *International Studies Quarterly*, 60(3), 520-529.
- Bentley, M. (2024). *The Biological Weapons Taboo*. Oxford University Press.
- Bertoli, A., Dafoe, A., & Trager, R. (2023). Leader age and international conflict: A regression discontinuity analysis. *Journal of Peace Research*, 00223433231201447.
- Blair, C. W., Chu, J. A., & Schwartz, J. A. (2022). The two faces of opposition to chemical weapons: Sincere versus insincere norm-holders. *Journal of Conflict Resolution*, 66(4-5), 677-703.
- Burck, G. M., & Flowerree, C. C. (1991). *International Handbook on Chemical Weapons Proliferation*. Greenwood.
- Campbell, B., & Murdie, A. (2023). Keep the informants talking: The pursuit and use of CBRN weapons by terrorist organizations. *Studies in Conflict & Terrorism*, 46(7), 1088-1107.
- Carter, D. B., & Signorino, C. S. (2010). Back to the future: Modeling time dependence in binary data. *Political Analysis*, 18(3), 271-292.
- Carter, J. (2023a). Political leaders and military spending. *Conflict Management and Peace Science*, 41(2), 132-154.
- Carter, J. (2023b). Introduction to special issue: New research on leaders and peace science. *Conflict Management and Peace Science*, 07388942231210298.
- Carus, W. S. (1991). *The Poor Man's Atomic Bomb? Biological Weapons in the Middle East*. Policy Papers. The Washington Institute for Near East Policy.
- Checkel, J. T. (2001). Why comply? Social learning and European identity change. *International Organization*, 55(3), 553-588.
- Chevrier, M. I. (1993). Deliberate disease: Biological weapons, threats, and policy responses. *Environment and Planning C: Government and Policy*, 11(4), 395-417.
- Cirincione, J., Wolfsthal, J. B., & Rajkumar, M. (2005). *Deadly Arsenals: Nuclear, Biological, and Chemical Threats*, (second edition). Carnegie Endowment.
- Cohen, A. (2001). Israel and chemical/biological weapons: History, deterrence, and arms control. *The Nonproliferation Review*, 8(3), 27-53.

- Cole, L. A. (1998). The poison weapons taboo: Biology, culture, and policy. *Politics and the Life Sciences*, 17(2), 119-132.
- Cross, G. (2017). *Dirty War: Rhodesia and Chemical Biological Warfare 1975-1980*. Helion and Company.
- Debs, A., & Monteiro, N. P. (2017). Conflict and cooperation on nuclear nonproliferation. *Annual Review of Political Science*, 20, 331-349.
- Dederling, T. (2021). South Africa's secret chemical weapons project, 1933-1945. *The International History Review*, 44(2), 263-281.
- Dill, J., Sagan, S. D., & Valentino, B. A. (2022). Kettles of hawks: Public opinion on the nuclear taboo and noncombatant immunity in the United States, United Kingdom, France, and Israel. *Security Studies*, 31(1), 1-31.
- Ellis, C. M., Horowitz, M. C., & Stam, A. C. (2015). Introducing the LEAD data set. *International Interactions*, 41(4), 718-741.
- Everts, P. (1985). Public opinion on nuclear weapons, defense, and security: The case of the Netherlands. In G. Flynn and H. Rattinger (Ed.), *The Public and Atlantic Defense*. Rowman & Allanheld, 221-275.
- Fuhrmann, M. (2009a). Taking a walk on the supply side: The determinants of civilian nuclear cooperation. *Journal of Conflict Resolution*, 53(2), 181-208.
- Fuhrmann, M. (2009b). Spreading temptation: Proliferation and peaceful nuclear cooperation agreements. *International Security*, 34(1), 7-41.
- Fuhrmann, M. (2020). When do leaders free-ride? Business experience and contributions to collective defense. *American Journal of Political Science*, 64(2), 416-431.
- Fuhrmann, M., & Horowitz, M. C. (2015). When leaders matter: Rebel experience and nuclear proliferation. *The Journal of Politics*, 77(1), 72-87.
- Gartzke, E., & Kroenig, M. (2009). A strategic approach to nuclear proliferation. *Journal of Conflict Resolution*, 53(2), 151-160.
- Gift, T., & Krcmaric, D. (2017). Who democratizes? Western-educated leaders and regime transitions. *Journal of Conflict Resolution*, 61(3), 671-701.
- Goemans, H. E., Gleditsch, K. S., & Chiozza, G. (2009). Introducing Archigos: A dataset of political leaders. *Journal of Peace Research*, 46(2), 269-283.
- Haas, P. M. (1992). Introduction: Epistemic communities and international policy coordination. *International Organization*, 46(1), 1-35.
- Harris, E. D. (1990). Chemical weapons proliferation: Current capabilities and prospects for control. In Aspen Strategy Group *New Threats: Responding to the Proliferation of Nuclear, Chemical and Delivery Capabilities in the Third World*, University Press of America, 67-87.
- Horowitz, M. C., & Narang, N. (2014). Poor man's atomic bomb? Exploring the relationship between "weapons of mass destruction." *Journal of Conflict Resolution*, 58(3), 509-535.
- Hymans, J. E. (2006). *The Psychology of Nuclear Proliferation: Identity, Emotions and Foreign Policy*. Cambridge University Press.
- Jo, D. J., & Gartzke, E. (2007). Determinants of nuclear weapons proliferation. *Journal of Conflict Resolution*, 51(1), 167-194.
- King, G., & Zeng, L. (2001). Explaining rare events in international relations. *International Organization*, 55(3), 693-715.
- Koblentz, G. D. (2013). Regime security: A new theory for understanding the proliferation of chemical and biological weapons. *Contemporary Security Policy*, 34(3), 501-525.
- Krcmaric, D., Nelson, S. C., & Roberts, A. (2020). Studying leaders and elites: The personal biography approach. *Annual Review of Political Science*, 23, 133-151.
- Kroenig, M. (2015). *Exporting the Bomb: Technology Transfer and the Spread of Nuclear Weapons*. Cornell University Press.
- Livingstone, N. C., & Douglass, J. D. (1984). *CBW, the Poor Man's Atomic Bomb* (No. 1). Institute for Foreign Policy Analysis.
- Martin, S. B., & Sagan, S. D. (2001). Responding to chemical and biological threats. *International Security*, 25(4), 193-198.
- Mezzour, G., Frankenstein, W., Carley, K. M., & Carley, L. R. (2018). A socio-computational approach

- to predicting bioweapon proliferation. *IEEE Transactions on Computational Social Systems*, 5(2), 458-467.
- Monteiro, N. P., & Debs, A. (2014). The strategic logic of nuclear proliferation. *International Security*, 39(2), 7-51.
- Moore, M. (1993). Eating grass. *Bulletin of the Atomic Scientists*, 49(5), 2-2.
- Narang, V. (2022). *Seeking the Bomb: Strategies of Nuclear Proliferation*. Princeton University Press.
- Onderco, M., Etienne, T. W., & Smetana, M. (2022). Ideology and the red button: How ideology shapes nuclear weapons' use preferences in Europe. *Foreign Policy Analysis*, 18(4), orac022.
- Onderco, M., & Joosen, R. (2022). Nuclear weapons in the Tweede Kamer: Analysis of nuclear motions in the Dutch house of representatives in times of contestation. *Global Studies Quarterly*, 2(3), ksac028.
- Onderco, M. (2024). German public opinion on nuclear weapons before and after Russia's invasion of Ukraine. In U. Kühn (Ed.), *Germany and Nuclear Weapons in the 21st Century: Atomic Zeitenwende?* 136-154.
- O'Reilly, K. P. (2014). *Nuclear Proliferation and the Psychology of Political Leadership: Beliefs, Motivations, and Perceptions*. Routledge.
- Poor Toulabi, B. (2023). The myth of the "poor man's atomic bomb": Knowledge, method, and ideology in the study of chemical, biological, and nuclear weapons. *Journal of Global Security Studies*, 8(1), ogac037.
- Press, D. G., Sagan, S. D., & Valentino, B. A. (2013). Atomic aversion: Experimental evidence on taboos, traditions, and the non-use of nuclear weapons. *American Political Science Review*, 107(1), 188-206.
- Price, R. (1995). A genealogy of the chemical weapons taboo. *International Organization*, 49(1), 73-103.
- Price, R. M. (2007). *The Chemical Weapons Taboo*. Cornell University Press.
- Radaelli, C. M. (2009). Measuring policy learning: Regulatory impact assessment in Europe. *Journal of European Public Policy* 16(8), 1145-1164.
- Renshon, J. (2017). *Fighting for Status: Hierarchy and Conflict in World Politics*. Princeton University Press.
- Ruble, M. R. (2009). *Nonproliferation Norms: Why States Choose Nuclear Restraint*. University of Georgia Press.
- Sagan, S. D. (1996). Why do states build nuclear weapons? Three models in search of a bomb. *International Security*, 21(3), 54-86.
- Sagan, S. D. (2000). The commitment trap: Why the United States should not use nuclear threats to deter biological and chemical weapons attacks. *International Security*, 24(4), 85-115.
- Sagan, S. D. (2011). The causes of nuclear weapons proliferation. *Annual Review of Political Science*, 14, 225-244.
- Sagan, S. D., & Valentino, B. A. (2017). Revisiting Hiroshima in Iran: What Americans really think about using nuclear weapons and killing noncombatants. *International Security*, 42(1), 41-79.
- Saunders, E. N. (2019). The domestic politics of nuclear choices: A review essay. *International Security*, 44(2), 146-184.
- Schneider, J. (2020). The study of leaders in nuclear proliferation and how to reinvigorate it. *International Studies Review*, 22(1), 1-25.
- Sechser, T. S., & Fuhrmann, M. (2017). *Nuclear Weapons and Coercive Diplomacy*. Cambridge University Press.
- Shoham, D. (1998). Chemical and biological weapons in Egypt. *The Nonproliferation Review*, 5(3), 48-58.
- Singh, S., & Way, C. R. (2004). The correlates of nuclear proliferation: A quantitative test. *Journal of Conflict Resolution*, 48(6), 859-885.
- Smetana, M., & Vranka, M. (2020). How moral foundations shape public approval of nuclear, chemical, and conventional strikes: New evidence from experimental surveys. *International Interactions*, 47(2), 374-390.
- Smetana, M., Vranka, M., & Rosendorf, O. (2023). The lesser evil? Experimental evidence on the strength of nuclear and chemical weapon "taboos." *Conflict Management and Peace Science*, 40(1),

3-21.

- Solingen, E. (2007). *Nuclear Logics: Contrasting Paths in East Asia and the Middle East*. Princeton University Press.
- Spiers, E. M. (1989). *Chemical Weaponry: A Continuing Challenge*. St. Martin's Press.
- Tannenwald, N. (1999). The nuclear taboo: The United States and the normative basis of nuclear non-use. *International Organization*, 53(3), 433-468.
- Tezcür, G. M., & Horschig, D. (2020). A conditional norm: Chemical warfare from colonialism to contemporary civil wars. *Third World Quarterly*, 42(2), 366-384.
- Tucker, J. (2000). Motivations for and against proliferation: The case of the middle east. In R. A. Zilinskas (Ed.), *Biological Warfare: Modern Offense and Defense*. Lynne Reiner, 27-52.
- Tucker, J. B. (2002). A farewell to germs: The US renunciation of biological and toxin warfare, 1969-70. *International Security*, 27(1), 107-148.
- Way, C., & J. Weeks. (2014). Making it personal: Regime type and nuclear proliferation. *American Journal of Political Science*, 58(3), 705-719.
- Wheelis, M., Rozsa L., & Dando M. (Eds.). (2006). *Deadly Cultures: Biological Weapons Since 1945*. Harvard University Press.
- Whitlark, R. E. (2017). Nuclear beliefs: A leader-focused theory of counter-proliferation. *Security Studies*, 26(4), 545-574.