

**Simulating the Effects of Israeli-Palestinian Violence, Fundamentalist  
Mobilization, and Regional Disruption on Regime Stability and  
USA-Friendly Outcomes in Middle East Polity**

**Ian S. Lustick**

**[ilustick@sas.upenn.edu](mailto:ilustick@sas.upenn.edu)**

**University of Pennsylvania**

**January 2004**

Prepared for Presentation at the Santa Fe Institute Workshop on “Origins and Patterns of Political Violence 1: Violence in Civil Wars” January 16-18, 2004. This paper is a corrected version of the paper by the same title presented at the Annual Meeting of the American Political Science Association, Philadelphia, Pennsylvania, August 27-31, 2003. It reports data generated by experiments that were somewhat compromised by subtle but not insignificant irregularities the computer operationalization of some variables. Earlier versions of this paper were prepared with support of the U.S. Government, the Carnegie Corporation, the National Science Foundation, and the Solomon Asch Center for Study of Ethnopolitical Conflict. Crucial research assistance for this project was provided by Ben Eidelson.

## Background

Since September 2000, Israelis and Palestinians have been locked in bloody cycles of violence. The collapse of the Oslo peace process ended a kind of “armistice” which had prevailed since 1993, when the beginning of that process brought an end to the first Intifada. Despite efforts to launch a new peace process or secure changes in Israeli and Palestinian orientations, and despite ups and downs in overall levels of violence, no end to cycles of provocation, terrorism, and retaliation, is in sight.

The United States has important interests in the resolution of this conflict, but it also has crucial interests in the Middle East that lie beyond the Israeli-Palestinian or even the Israeli-Arab conflict. This simulation study is an effort to contribute to understanding the implications of not finding a resolution to the Israeli-Palestinian imbroglio for the Middle Eastern context within which the US will seek to secure those larger interests over the next

## MEPolity

MEPolity is presented as a squarish but irregularly shaped array of agents whose activated identities and whose repertoires of identities are established in patterns that conform to the distribution of loyalties and affiliations observed in real Middle Eastern countries. It should be considered as a composite model of Middle Eastern Arab states with semi-authoritarian regimes who stand in a relatively friendly relationship with the United States—countries such as Egypt, Jordan, Saudi Arabia, Morocco, and Tunisia. The polity is comprised of approximately 2450 agents surrounded by a perforated

boundary that exposes agents along the edge of the polity to direct contact with many agents operating within the regional and global environment adjacent to the polity. The power structure of the regime is represented not only by the prominence of its red-orange identity (“0”), but by interlocking networks of “influentials” or “bureaucrats,” activated on that identity at  $t=0$  and sharing a certain mix of identities and affinities.<sup>1</sup> The regime’s bureaucratic center is located inside the polity, within the well-controlled northwestern quadrant of the state. The varying density of the regime’s control apparatus is signaled by the webs of agents bearing bureaucrat or “influential” icons and activated on “0” (reddish-orange). A circle stands for a high-echelon bureaucrat—with an influence level four times that of an ordinary agent; a spiral cross for a mid-echelon bureaucrat—with an influence level three times that of an ordinary agent; or a simple cross for a low-level bureaucrat or influential—with an influence level twice that of an ordinary agent).

The environment is presented as comprised of approximately 8500 agents, in a torus (that is borderless) array. The activated and unactivated identities of these agents are established in patterns that reflect the dominance of European and globalizing American market-oriented orientations in the international arena. But the environment also features specifically Middle Eastern features.

An important element in MEPolity’s regional environment is the presence of specific media outlets. Three television broadcasting channels operate in the MEPolity landscape. One of them, “Al-Jazeera,” reflects in its coverage of Israeli-Palestinian violence the attitudes and outlooks of Islamists (Muslim fundamentalists) or Pan-Arabists. Which of these particular messages is broadcast at any particular time is a function of the relative success in the Middle East region as a whole that these competing

formulas for political identity and mobilization are experiencing. Another station, an “independent” broadcasting channel, carries either a European secular democracy oriented message, a pragmatic state centered nationalist (wataniyah) message, or a modernizing Islamic message. Again, which of these particular messages is broadcast at any particular time is a function of the relative success of these competing moderate formulas for political identification and mobilization in the Middle East region. The regime broadcasting channel carries a constant message of support for the regime identity. About half the inhabitants of MEPolity listen to these broadcasts—predominantly those living within the urbanized and semi-urbanized areas of the northwest and a ring surrounding it.

Another significant feature of MEPolity is the presence of “unemployed youth.” Present mainly in the urban areas, where the regime’s administrative and repressive apparatus is concentrated, they are highly sensitive to change, ready to mobilize in response to relatively small provocations or rewards, and all entertain a wide range of possible allegiances, including both Pan-Arabism and Islamic fundamentalism.

#### Simulations and Operationalizations

Hundreds of computer simulations were run under carefully controlled conditions. These experiments fall into three categories.

1. Simulations of the effects of violence under various conditions that reduce expectations of survival by a regime considered valuable to US interests.
2. Simulations of the effects of increased regime repression in coping with the unrest generated by Israeli-Palestinian violence under these different conditions.
3. Simulations of the results of how United States diplomacy to resolve the Israeli-Palestinian dispute might help to bolster a threatened regime or otherwise foster positive (USA-friendly) outcomes.

To appreciate the results and limitations of these simulations it is important to understand key. The effects of violence on MEPolity were simulated by adjusting the probabilities of positive vs. negative biases being assigned to identities or political affiliations assumed to be affected by widespread reporting about the violence.<sup>2</sup> Thus, for the entire landscape (including both MEPolity and its regional environment), "violent" conditions (i.e. violence elsewhere, between Israelis and Palestinians) was seen to be associated with a bias floor for identities 5 and 15 (Pan-Arab nationalism and Muslim Fundamentalism) of -1 and a bias ceiling of +3. These identities, in other words, are assumed to benefit from or be energized by a general climate created by ongoing Israeli-Palestinian violence. On the other hand, the biases assigned in such "violent" conditions to the regime identity (0)<sup>3</sup> and to the identity associated with the USA (8), were set with a floor of -3 and a ceiling of +1. All other identities were allowed assignments of biases ranging from between -3 and +3.<sup>4</sup>

In these simulations I sought as well to capture the aspect of violence and its highly-charged reporting that varies temporally. That is violence and its reporting does not occur as a continuous and evenly distributed stream. Especially in this particular case, violence appears as a distribution of incidents over time. These incidents, and reports of incidents, can cluster together or be spread relatively evenly over a period. Depending on their distribution such incidents can produce relatively sharp spikes in the impact of a chronically violent situation on people and societies who experience that violence as relevant to their own lives and aspirations.

This crucial aspect of political violence was integrated into the simulations as follows. With a set probability for any time step, "violent incidents" are imagined to

occur at randomly designated points in each simulation run--in each future of MEPolity explored. Reports of these incidents, as soon as they "occur," are imagined as transmitted through the regional media to a portion of the "listening public" in MEPolity. The listening public is comprised of the portions of the society who have some politically sensitive views and, for the most part, live in urban areas and towns. This has the general result of amplifying the impact of messages being broadcast by Al-Jazeera which, depending on the regional balance of forces at the time, may mean either a Pan-Arab, Muslim Fundamentalist, or, less frequently, a "modernizing Islamic" message.

In the immediate aftermath of violent incidents the proportion of the listening public actually paying attention to specific broadcasts about the violence, from perspectives consistent with those with which they have affinities, increases. In addition, after violent incidents, a random portion of ordinary citizens not actively expressing radical views (Pan-Arab nationalist or Muslim fundamentalist) are "de-energized." Their responsiveness to their surroundings is slowed down and they are less apt to exploit new political opportunities that may arise.<sup>5</sup> As the violent incident recedes with the passage of time the likelihood that agents not already affected by it in this way decreases rather rapidly. Unless a new violent incident is reported, the agents then return to their normal state (after 20 time steps).

Reports of Israeli-Palestinian violence have other effects as well on small but not insignificant proportions of randomly chosen categories of agents:

- Transformation of some lower level influentials associated with the US identity or the regime identity into ordinary citizens (thereby weakening the administrative apparatus of the regime)
- Transformation of some ordinary citizens activated on Pan-Arab or Muslim fundamentalist identities into fanatics or influentials;

- Transformation of some ordinary citizens activated on Wataniyah or Modernizing Islamic identities into political entrepreneurs.

The exact pattern of violence over the two-three year time period imagined as simulated in the histories run with MEPolity is randomized, but the overall probability of violence being reported at any time period is set at 2.5% for the “violent” condition and “5%” for the “extreme violent” condition.<sup>6</sup>

MEPolity begins its journeys into the future with small communities of Pan-Arabists activated and ready to take advantage of opportunities to increase their political weight within the country. Agents in MEPolity harboring Muslim Fundamentalist sentiments, however, tend not to be activated or “mobilized” on that identity—expressing in public, instead, identities such as traditional Sunni Islam, modernizing Islam, or Pan-Arabism. By adjusting MEPolity so that clusters of fundamentalists are present early in the futures, comparable to the clusters of Pan-Arabists. I sought to observe the interaction between Muslim Fundamentalist mobilizations and the effects of sustained Israeli-Palestinian violence.

### Results of Simulation Experiments

To assess the effects of prolonged Palestinian-Israeli violence on likely trajectories for domestic political change within MEPolity it was first necessary to establish a baseline for comparison. Accordingly, the series of simulations reported here began with the production of 100 futures under “baseline” conditions, *i.e.* in the absence of Israeli-Palestinian violence, Fundamentalist Mobilization, or regional disturbances. The effect of these different unsettling conditions on the outcomes of competition among the various

political identities and affiliations in MEPolity were then explored by comparing the distributions of futures produced under different conditions.

One measure used was identity prevalence. How many agents within MEPolity were activated on any particular identity of interest at the end of the measured future (i.e. at  $t=308$ )? Figures 1-4 display some of the results of my simulations.

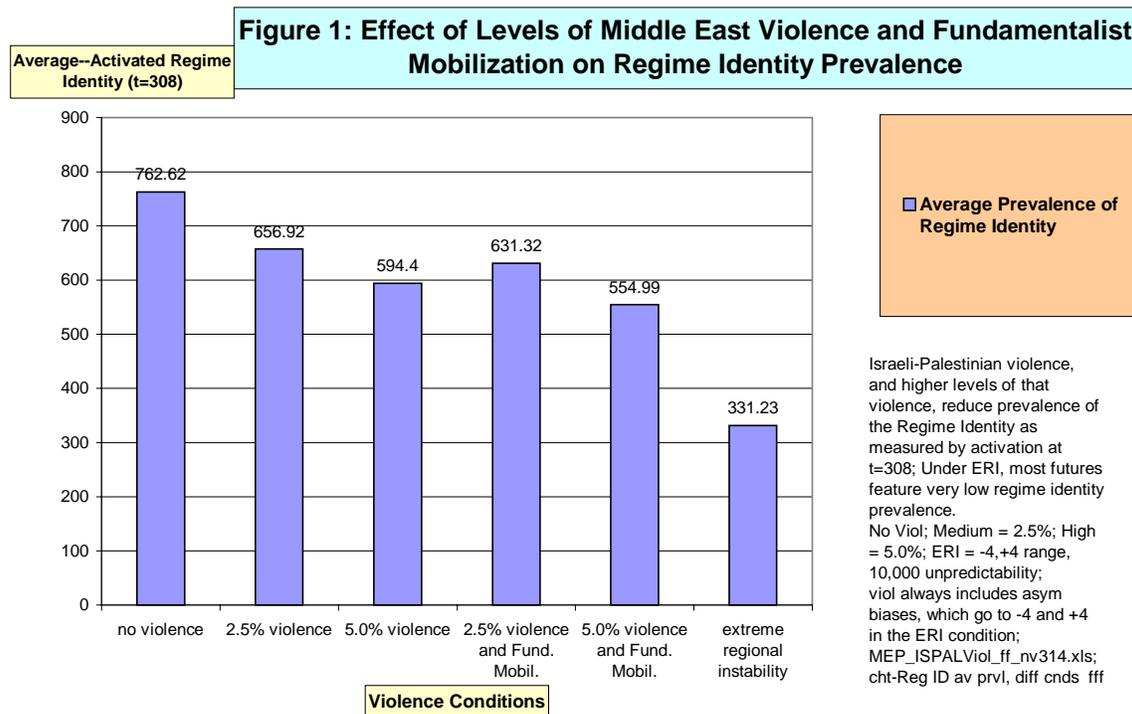
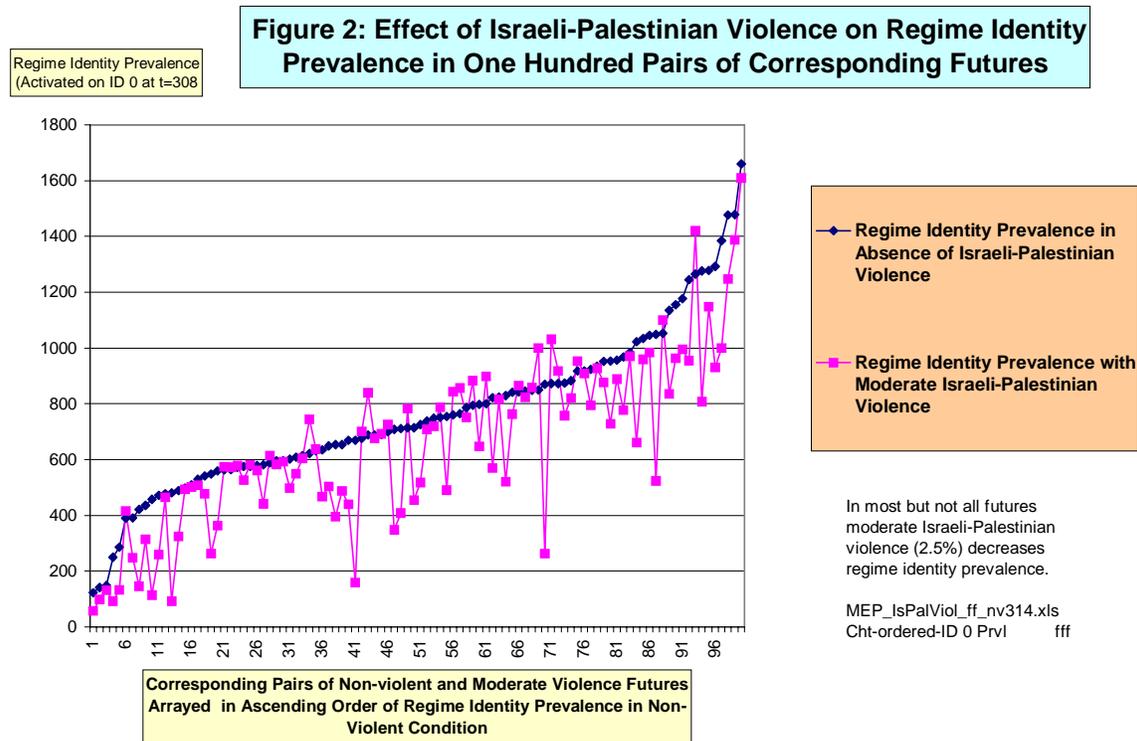


Figure 1 compares the effect of different levels of violence, separately and in combination with Fundamentalist Mobilization and other elements comprising “Extreme Regional Disturbance” on the distribution of prevalence scores for the regime identity. We see that Israeli-Palestinian Violence and increasing levels of that violence, as well as extreme regional disturbance (which includes a 5% rate of violent incidents) decrease the

prevalence of regime identity. Under extreme regional disturbance conditions a large minority of futures feature drastic reductions in regime identity prevalence.

Figure 2 arrays the one hundred prevalence scores of the regime identity in the absence of Israeli-Palestinian violence in order of increasing prevalence (the smooth line). Each of these data points is then matched with the score produced in the corresponding history (meaning the same stream of “accidents” or bias changes) when Israeli-Palestinian violence is present. We see that in most but not all futures Israeli-

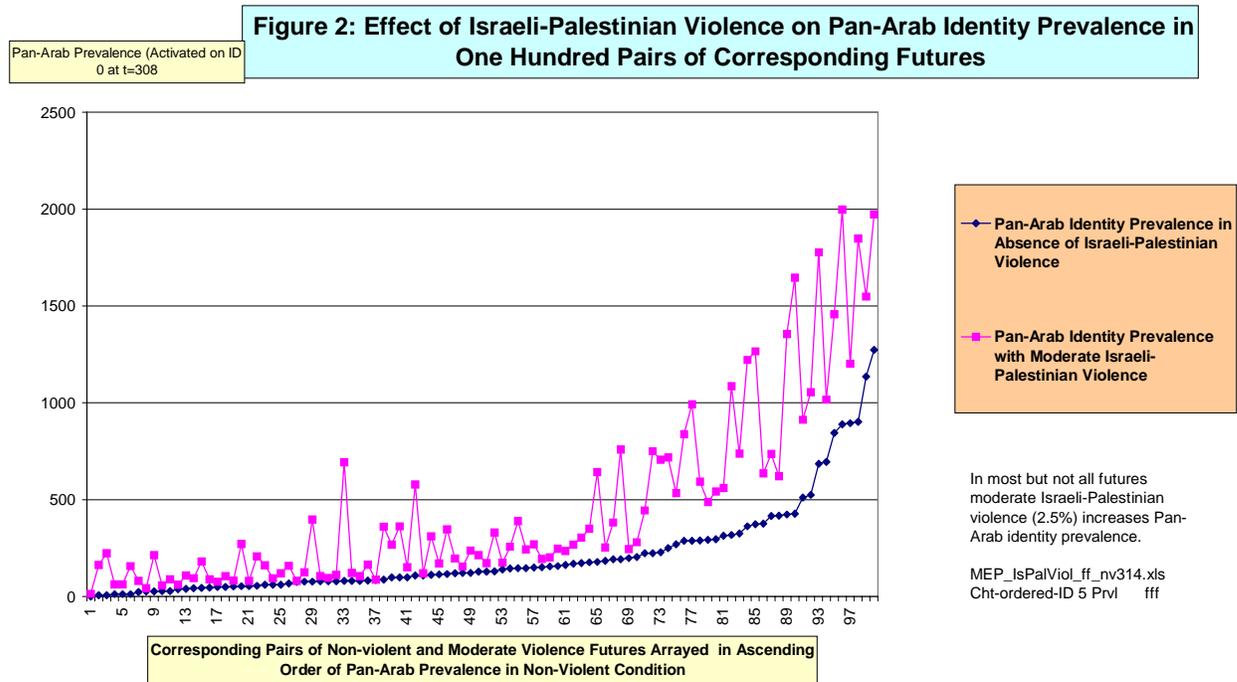


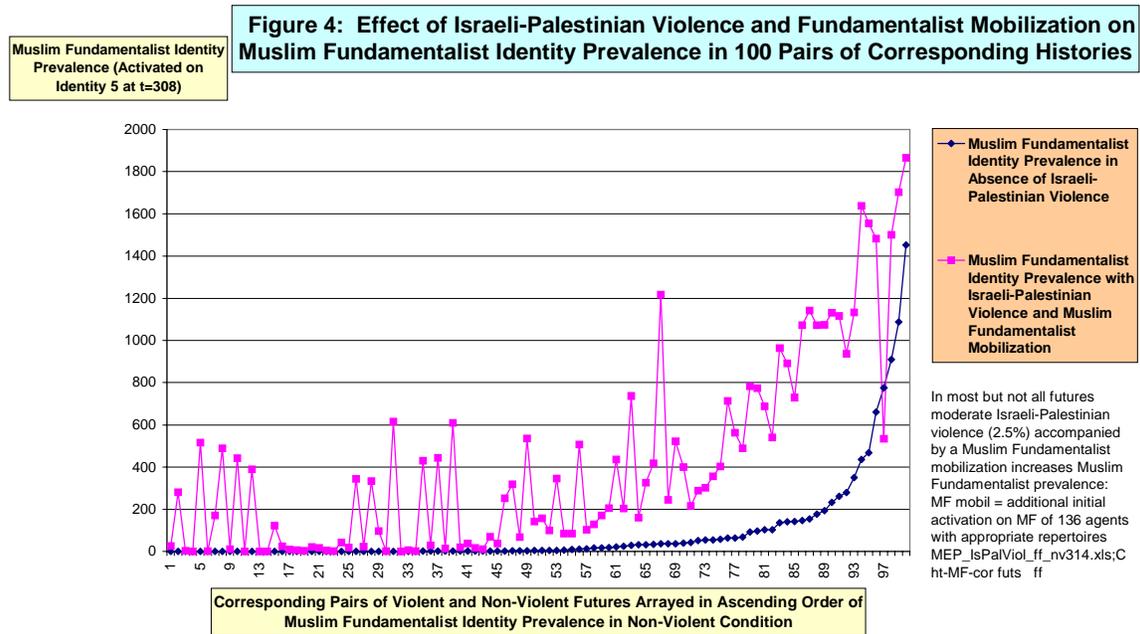
Palestinian violence (2.5% incident rate) reduces the prevalence of the regime identity.

Over all futures the average reduction is approximately 14%.

The same technique is used in Figures 3 and 4 to examine the effects of Israeli-Palestinian violence on Pan-Arab Nationalist identity prevalence (Figure 3) and the effects of such violence combined with Fundamentalist Mobilization on Muslim

Fundamentalist identity prevalence (Figure 4). In Figure 3 we see that in most but not all futures Israeli-Palestinian violence (2.5% incident rate) increases the prevalence of the Pan-Arab nationalist identity. The effect is strongly concentrated in approximately 35% of these futures—those in which that prevalence is generally higher. Thus violence has relatively little effect in most futures. This aspect is obscured by an overall average increase of 247.72 or 116.2%.<sup>7</sup> In Figure 4 we see that in most but not all futures Israeli-





Palestinian violence (2.5% incident rate) and Fundamentalist Mobilization prevalence of the Muslim Fundamentalist identity increases. The effect is strongly concentrated, but not confined to the 50% of these futures in which it is most prominent. This pattern is obscured by an overall average increase of 319.77 or 344%.<sup>8</sup>

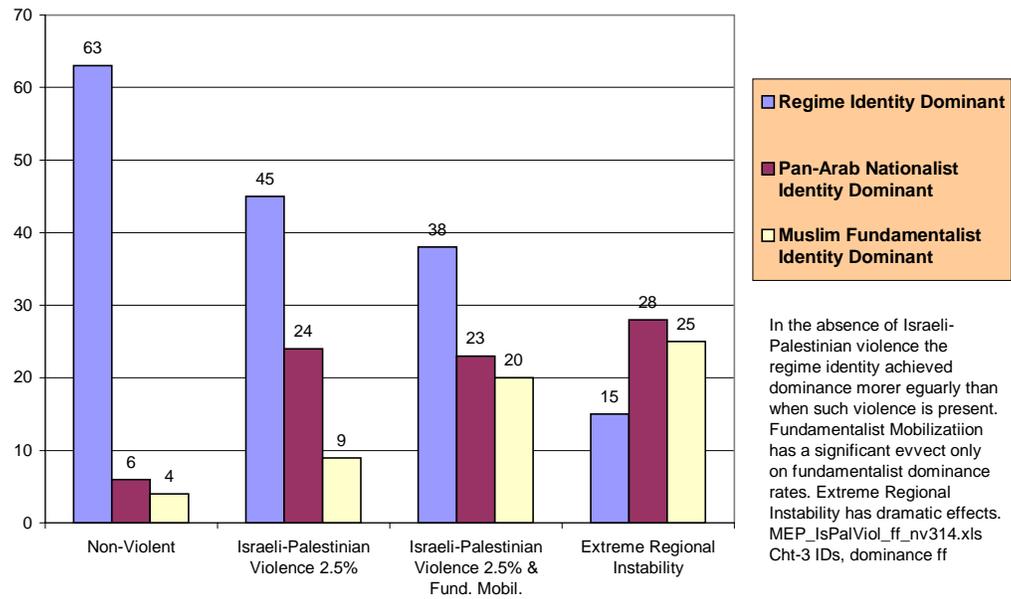
Although prevalence scores are of great interest, another way to quickly assess patterns of results in these simulations is to focus on “dominance.” Here the question is whether or not a particular identity, or one identity from a group of identities, enjoys a plurality of activated agents within MEPolity at t=308. Of the 100 MEPolity futures produced in this baseline condition, the regime identity emerged as the dominant identity in 63.<sup>9</sup> That is, in 63 of these 100 futures more agents were activated on the semi-authoritarian regime identity than on any other at the end of the simulation period (t=308). By adding to regime dominant outcomes in this distribution those featuring

dominance by USA-oriented, secular democratic, modernizing Muslim, or Wataniyeh nationalists, I produced a category of “USA friendly” outcomes. Absent Israeli-Palestinian violence there were 67 USA friendly futures, versus 10 unfriendly futures (with either the Pan-Arab nationalist or Muslim Fundamentalist identity dominant).<sup>10</sup>

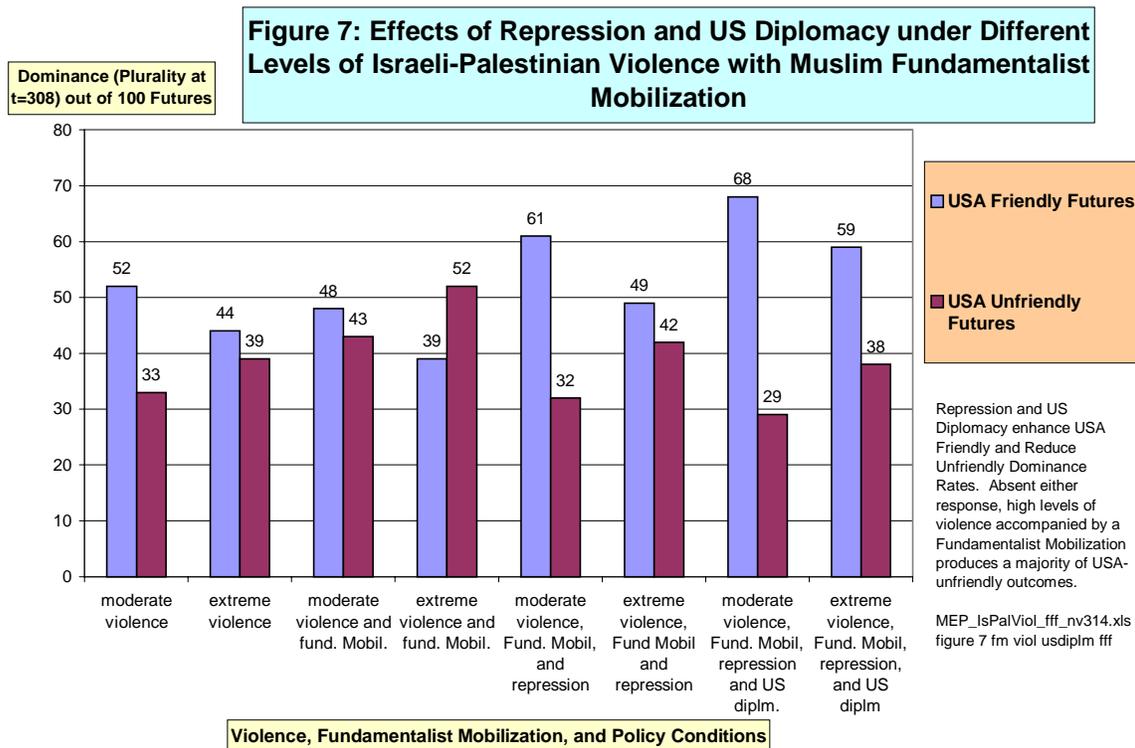
A central question inspiring this series of simulations was how prolonged Israeli-Palestinian violence would impact the regime’s prospects and prospects for USA friendly outcomes. Of 100 futures for MEPolity analyzed with Israeli-Palestinian violence present, the regime emerged as dominant 45 times (a drop of 29%) from 63 (see Figure 5). USA-friendly outcomes dropped from 67 to 52. (see Figure 6). By contrast, USA unfriendly outcomes rose rather sharply, from 10 futures out of 100 in the absence of Israeli-Palestinian violence to 33 when it was present. The data displayed in Figure 6 also show interesting patterns in the effects of repression and a public and active US diplomatic effort to resolve the Israeli-Palestinian conflict on distributions of outcomes. Both repression and US diplomacy counter the effects of violence by increasing the frequency of USA friendly futures and decreasing the frequency of USA unfriendly futures. US diplomacy works considerably better than repression in this regard, but when repression in MEPolity accompanies US diplomacy it appears that the effectiveness of the latter is substantially but not wholly reduced.

Dominance (Plurality Activated) at t=308 Out of 100 Futures in Each Condition

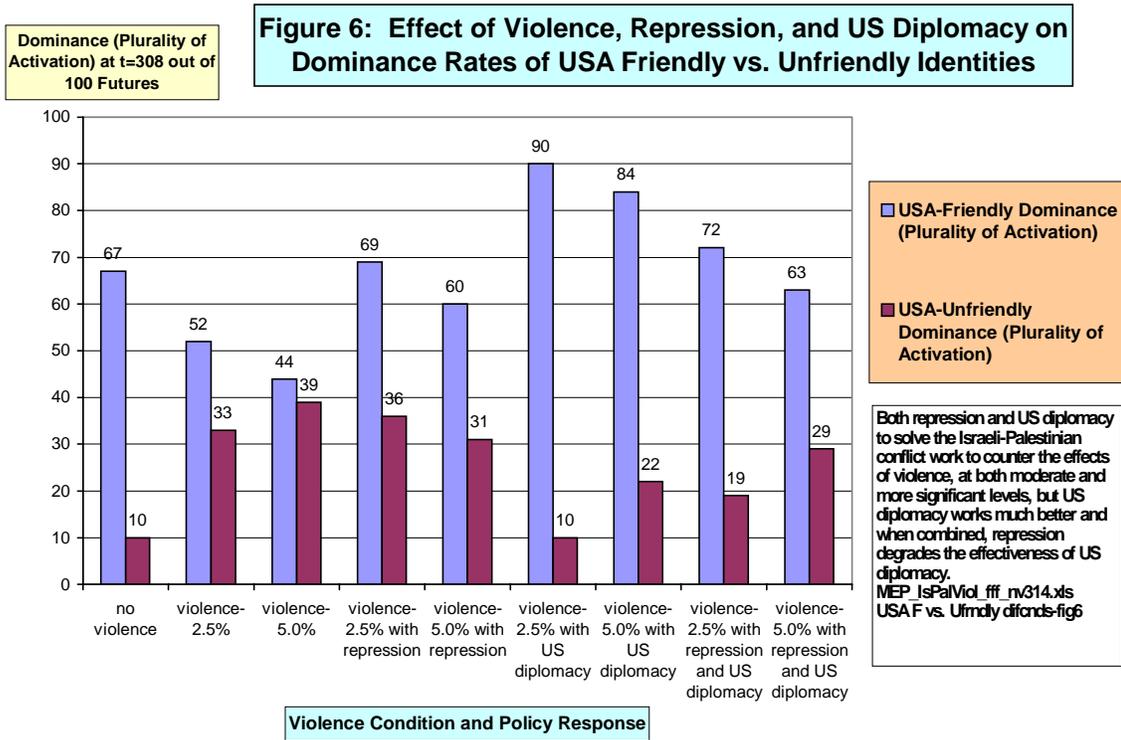
**Figure 5: Effect of Different Conditions on Dominance Rate of Regime, Pan-Arab, and Muslim Fundamentalist Identities**



Further consideration of the effect of the fundamentalist mobilization (FM) condition reveals the importance of multiple measures. As noted earlier, violence in combination with fundamentalist mobilization did not strongly effect outcomes measured as average prevalence scores for the regime or the Muslim Fundamentalist identity. This combination of factors had a much more substantial effect on rates of Muslim Fundamentalist identity dominance and of USA-friendly vs. unfriendly outcomes. When FM was present, along with moderate levels of Israeli-Palestinian violence, the regime achieved dominance 38 times out of 100 futures, *i.e.* close to but down from the 45 times it achieved dominance when subjected to the consequences of Israeli-Palestinian violence, but in the absence of FM. There was an even greater increase associated with FM in Muslim Fundamentalist dominant futures--from 9 in the presence of Israeli-Palestinian violence, but absent fundamentalist mobilization, to 20 out of 100 futures when MEPolity also experienced FM. Associated with this sharp increase in

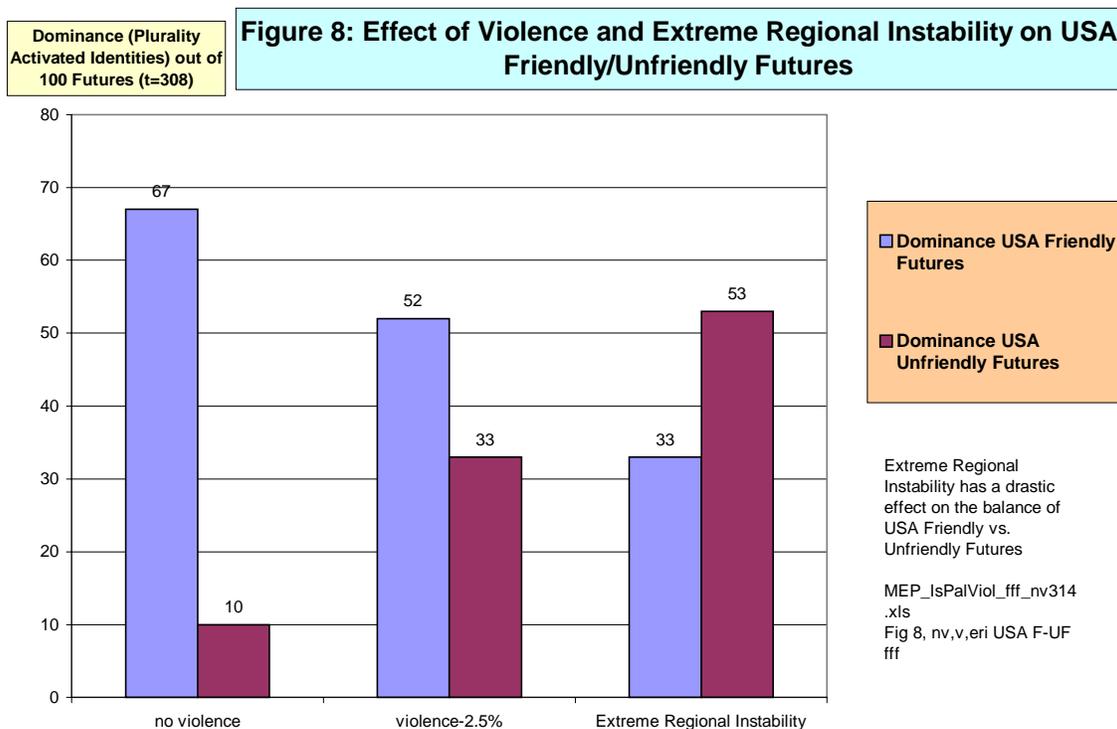


fundamentalist success was an increase in USA-unfriendly dominance outcomes from 33 to 43. (See Figure 5) Interestingly, the number of USA friendly futures did not exhibit a proportionate drop (52 to 48). This reflects the fact that most of the increase in unfriendly futures came from a transformation of futures that would have been dominated by Traditional Sunni Muslims, into Muslim Fundamentalist dominance.



I now consider the extreme regional instability (ERI) condition, meant to simulate the results of sustained and high levels of Israeli-Palestinian violence combined with extensive disruption and instability elsewhere in the region. As indicated in the operationalization table in Appendix 3, ERI features a 5.0% rate of violent incidents. It also includes fundamentalist mobilization, a 22% expansion of the range within which biases can be assigned to identities (from -3,+3 to -4,+4), and a significant increase in

the unpredictability of the direction and extent of bias reassignments. As expected, ERI had a powerful effect on rates of regime-favorable and USA-friendly futures. In the ERI condition average regime identity prevalence dropped from 762.63 to 331.23 and emerged as dominant in only 15 of 100 futures, compared to 63 in the absence of Israeli-Palestinian violence, and 48 when it was present. If the larger category of USA-friendly outcomes is considered, it was observed that 33 out of 100 futures figured as USA-friendly under conditions of extreme violence, compared with 53 futures featuring dominance by USA-unfriendly identities (Pan-Arab nationalist and Muslim fundamentalist). See Figure 8.



So far I have reported the results of subjecting MEPolity to three conditions:

1. Israeli-Palestinian violence;
2. Israeli-Palestinian violence with fundamentalist mobilization;

3. extreme violence (which includes Israeli Palestinian violence and fundamentalist mobilization).

We have seen that these conditions reduce the prominence of regime and USA-friendly dominance within the distributions of futures produced by the model. These reductions range from rather moderate, but not insignificant, in the Israeli-Palestinian violence condition, to quite dramatic in the extreme violence condition. The question to which I now turn is how various responses, by the regime and by the US, to the presence of these conditions, can help mitigate their negative implications for the dominance prospects of the MEPolity regime in particular, and for USA-friendly identities in general.

Two responses—domestic repression within MEPolity and US sponsored diplomacy to end Israeli-Palestinian violence--were simulated, separately and in combination. In the real Middle East these policies are regularly considered to have the potential to protect the regime identity in MEPolity from the consequences of sustained Israeli-Palestinian violence, to inhibit the political success of forces and orientations unfriendly to the United States, and to strengthen US-friendly sentiments within the kind of country MEPolity represents.

The remedial effects of these policies can be assessed by comparing dominance rates for the regime identity and USA-friendly and unfriendly identities associated with conditions of Israeli-Palestinian violence, Muslim Fundamentalism, and extreme regional violence. The results of these simulations are conveniently displayed in Table 1.

**Table 1.**

**Effects of Repression and/or Diplomacy on the Consequences  
of Israeli-Palestinian Violence, Fundamentalist Mobilization, and Extreme Regional Instability**

(Averages of 100 Futures per Condition)

POLICY RESPONSES	VIOLENCE CONDITIONS		
	Moderate Israeli-Palestinian Violence	Moderate Israeli-Palestinian Violence and Fundamentalist Mobilization	Extreme Regional Instability
<b>No Response</b>			
Regime Identity Dominance	45	38	15
Regime Identity Majority	4	4	2
Regime Officials Remaining Loyal	119.39	86.6	46.62
USA-Friendly Dominance	52	48	33
USA-Unfriendly Dominance	33	43	53
USA-Friendly Majority	4	5	11
USA-Unfriendly Majority	4	14	40
<b>Repression</b>			
Regime Identity Dominance	66	56	24
Regime Identity Majority	7	7	5
Regime Officials Remaining Loyal	131.3	124.25	90.96
USA-Friendly Dominance	69	61	39
USA-Unfriendly Dominance	22	32	51
USA-Friendly Majority	7	7	12
USA-Unfriendly Majority	8	12	31
<b>US Diplomacy</b>			
Regime Identity Dominance	90	50	26
Regime Identity Majority	19	11	13
Regime Officials Remaining Loyal	101.18	90.67	58.25
USA-Friendly Dominance	90	56	39
USA-Unfriendly Dominance	5	35	47
USA-Friendly Majority	19	11	17
USA-Unfriendly Majority	0	12	36
<b>Repression and US Diplomacy</b>			
Regime Identity Dominance	70	65	65
Regime Identity Majority	21	16	26
Regime Officials Remaining Loyal	134.61	133.95	132.15
USA-Friendly Dominance	72	68	71
USA-Unfriendly Dominance	19	29	24
USA-Friendly Majority	21	16	26
USA-Unfriendly Majority	7	8	13

When considering the data displayed in Table 1 it is worth noting the corresponding baseline values. These are displayed in Table 2. We can then analyze the extent to which different policy responses to different kinds of violence-impacted scenarios succeed in reshaping the expected distribution of futures to correspond with, or even improve upon, the baseline.

**Table 2.**

(Averages of 100 Futures per Condition)

**NO VIOLENCE CONDITION**

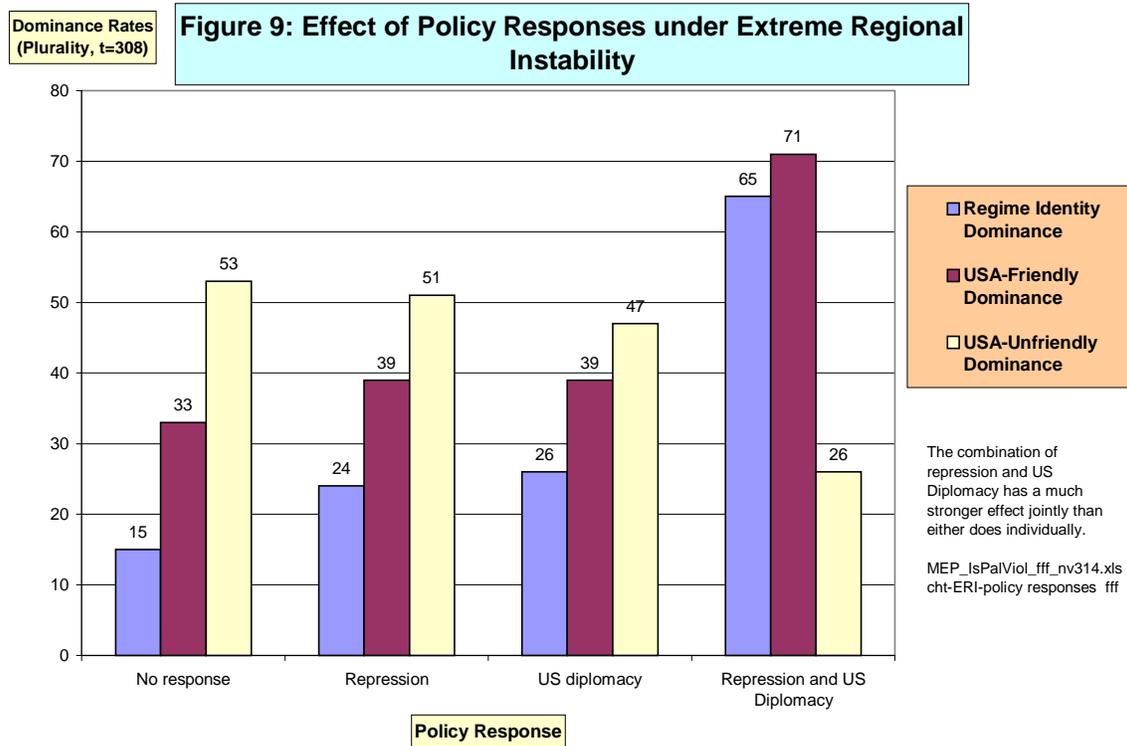
Regime Identity Dominance	63
Regime Identity Majority	9
Regime Officials Remaining Loyal	119.39
USA-Friendly Dominance	67
USA-Unfriendly Dominance	10
USA-Friendly Majority	9
USA-Unfriendly Majority	2

We can see that domestic repression in response to moderate Israeli-Palestinian violence provides the regime identity with a significantly higher number of dominant outcomes than it enjoyed in the absence of repression (66 vs. 45). When repression was applied in reaction to both violence and Fundamentalist Mobilization the dominance rate of the regime identity dropped to 38 from 56. Repression had a comparable effect when measured in terms of USA-friendly dominance. In the face of violence, repression produced 69 instead of 57 USA-friendly outcomes in the baseline, and reduces the number of USA-unfriendly outcomes from 33 to 22. In neither the moderate violence nor the Fundamentalist Mobilization condition with moderate violence does repression reduce the number of USA-unfriendly outcomes to near the baseline number of 10, though it does reduce the rate of USA-unfriendly dominance below the levels under these conditions but absent repression (33 vs. 22 and 43 vs. 32).

The data in Table 1 show that in response to both Israeli-Palestinian violence and Israeli-Palestinian violence with Fundamentalist Mobilization, US diplomacy improves outcomes for the regime and for the US. In fact the rate of regime identity dominance doubles, from 45 to 90, when US diplomacy is employed with moderate Israeli-Palestinian violence. When that violence is accompanied by FM within MEPolity, US diplomacy increases the rate of regime identity prevalence from 38 to 50. Absent FM, these improvements are considerably more robust than those associated with repression, but when FM is present in MEPolity, repression does better than US diplomacy. What is of particular interest is that when Israeli-Palestinian violence is accompanied by a local fundamentalist mobilization, combining repression and US diplomacy works better than either response separately, while that combination does worse than diplomacy alone (though somewhat better than repression alone) when confronting moderate Israeli-Palestinian violence without FM. The data for simulations run with diplomacy and repression combined show small improvements over repression for each measure and in both the violence and Fundamentalist Mobilization conditions.

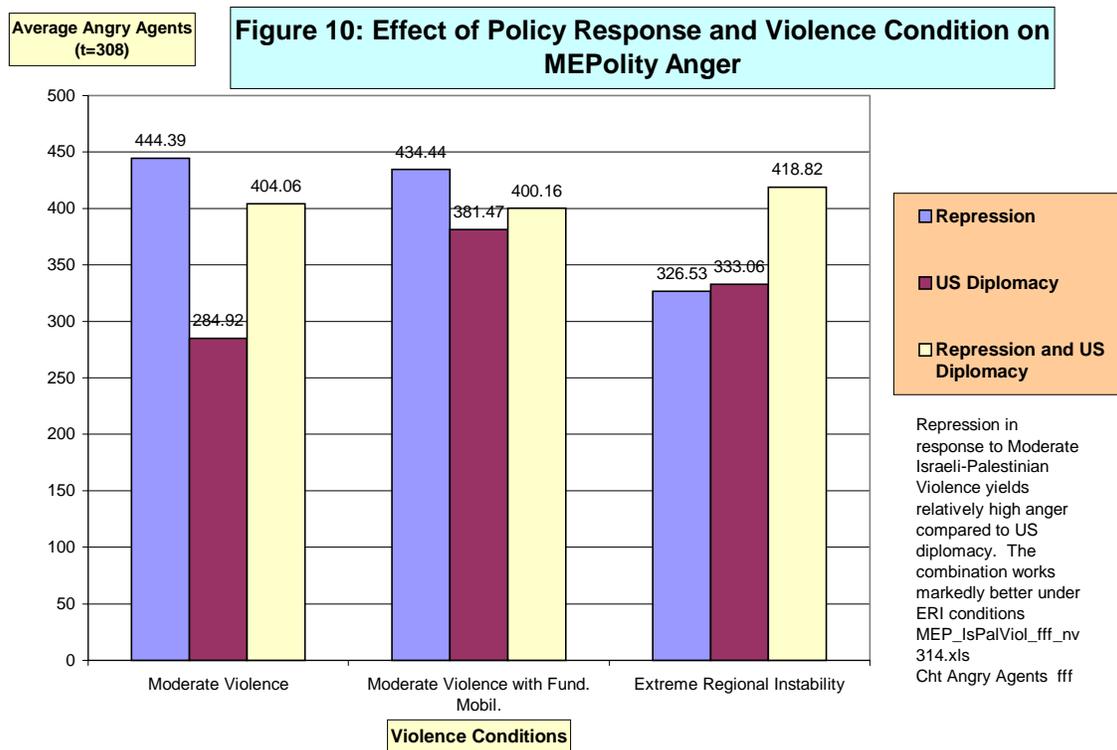
As noted earlier, conditions of Extreme Regional Instability had powerful and deleterious effects on regime identity prevalence and dominance rates as well as on both USA friendly and unfriendly outcomes. In the context of sustained Israeli-Palestinian violence, Fundamentalist Mobilization within MEPolity, and a volatile and risky pattern of disturbance in the Middle East region as a whole (ERI), the rate of regime dominance fell sharply, to only 15 out of 100 (from 63 in the absence of violence, fundamentalist mobilization, or other regional disturbances), while the balance of USA-Friendly to USA-

Unfriendly dominance outcomes shifted from 67 to 33 (in favor of USA-Friendly) to 53 to 10 (in favor of USA-Unfriendly). Figure 9 displays data describing the effect of different policy responses under the ERI condition. In the ERI condition repression substantially improves outcomes. US diplomacy improves them somewhat more. What is striking, however, is that in this condition, when high levels of Israeli-Palestinian violence are accompanied by more regional uncertain, wider fluctuations in negative and positive payoffs, and a domestic fundamentalist mobilization, the combination of US diplomacy and repression improves outcomes substantially more robustly than either policy response does by itself. Thus the rate of regime identity dominance rose 60% with domestic repression (from 15 to 24) and 73% when US diplomacy was employed (15 to 26). The rate of USA-friendly outcomes rose 18% with either domestic repression or US diplomacy as the response to Extreme Regional Violence (33 to 39). When they were combined however the rate of USA-friendly dominance rose 115%, from 33 to 71. Perhaps even more significantly, the rate of USA-unfriendly outcomes, which rose substantially under ERI conditions (53 with no response, 51 with repression, 47 with US diplomacy) dropped to 24 when the two policies were combined.



Data for all these experiments were collected for each time step up to 308. In order to evaluate what might reasonably guess would be a negative result of repression, as opposed to diplomacy a measure for “anger” or “frustration” was developed. The overall amount of anger in the polity was assessed by considering an agent at any time step as angry if it was activated on an identity whose bias, at that time step, was substantially lower than at least one of the other identities it had in its repertoire and if, in its immediate neighborhood, it encountered at least one agent activated on an identity other than its own activated identity. Such agents were coded as having enough reason to want to change their political behavior and enough exposure to others behaving differently, to be considered “angry” or “frustrated.” Higher numbers of such agents in the polity can be inferred to signal a lower level of general satisfaction, a higher likelihood of future instability, and a larger potential for sudden change in the polity’s

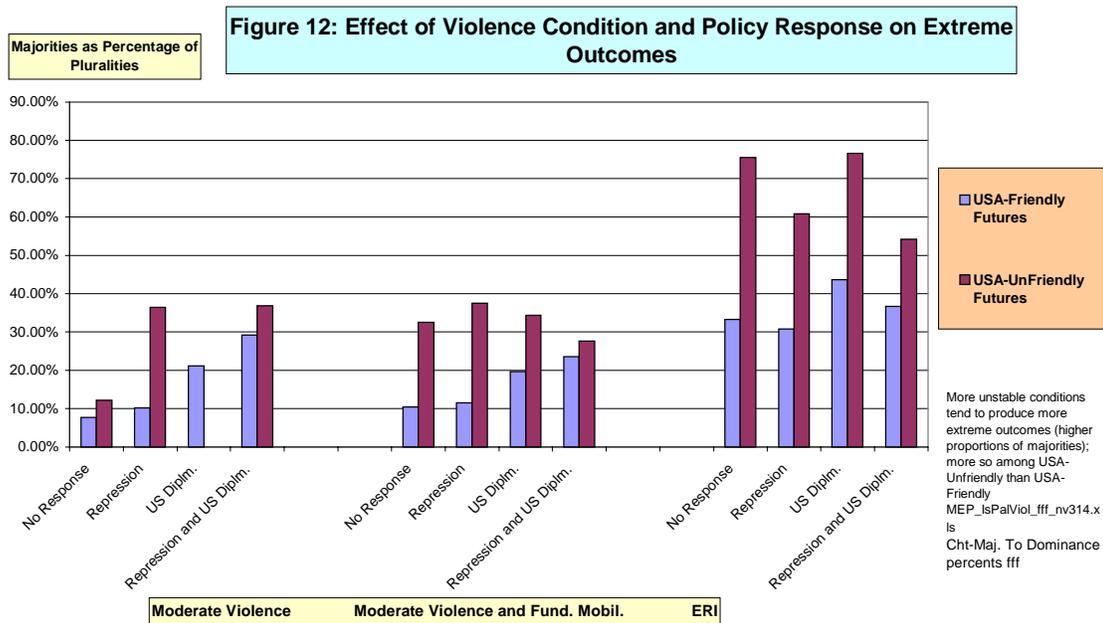
political complexion. The anger scores for the 100 futures featuring repression of the effects of Israeli-Palestinian violence are displayed in Figure 10. They are on average 56% higher than those featuring diplomacy and 14% higher than diplomacy when each technique is used to counter the effects of Israeli-Palestinian violence accompanied by Fundamentalist Mobilization.



Caveats and Conclusions

It bears emphasis that the technique of using computer simulation to project patterns of more or less likely outcomes is limited by identification of potent drivers for the dynamics of the systems involved and the effectiveness of the operationalizations of these drivers. It also warrants emphasis that the technique cannot be used to make “point predictions,” i.e. to anticipate exactly which future of those possible will occur. It can help establish expectations about what kinds of outcomes are possible, which types,

under what circumstances should be deemed more or less surprising, and the general impactfulness of different policy options or hypothetical conditions on these distributions of outcomes and reasonable expectations. In this context it is somewhat less than fully satisfying to report results in terms of averages, as opposed to an approach that would compare other aspects of different distributions of futures. For example, instead of focusing on average regime identity prevalence scores or average numbers of “regime dominant” futures, we can consider the ratios between “plurality” or dominance outcomes and “majority” outcomes. When at  $t=308$  the regime identity, USA-Friendly identities, or USA-Unfriendly identities, were activated by a majority of MEPolity agents, that future can be coded a “majority” outcome. When the subset of dominant futures comprised by majorities is large and divided among, for example, USA-Friendly and USA-Unfriendly identities, such distributions can be understood as evidence that cascades of change leading to more extreme outcomes (either favorable or unfavorable) are more likely under the conditions that produced such multi-modal distributions than under other conditions. In this context it is interesting to note that ERI conditions (meaning that either Muslim Fundamentalist or Pan-Arab National identities dominate within MEPolity) produce relatively large numbers of USA-Unfriendly dominant futures and that in each of these conditions a majority of these USA-Unfriendly do themselves feature majorities of Muslim Fundamentalist or Pan Arab Nationalist activated agents in MEPolity (see Figure 11).<sup>11</sup> In other words, under particularly widespread and unstable conditions, when things go bad, they have a strong tendency to go very badly indeed. Although this pattern is somewhat contained by a combination of repression and US diplomacy, it is not eliminated (see Figure 12).



It is also of specific importance to note the delicacy of the problem of time. A variety of calculations went in to treating 300 time steps as roughly equivalent to 2-3 years. But considerably more work would need to be done in order to establish this kind of claim with great reliability. At minimum, however, it may be said that these simulations capture, within the limits of assumptions and operationalizations described in this paper and in the Appendix 3, the dominant tendencies associated with the variables (and interactions among these variables) of violence, fundamentalist mobilization, extreme regional disturbance, repression, and diplomacy.

The simulations reported here, supplemented by others conducted but unreported, suggest quite strongly that sustained cycles of Israeli-Palestinian violence, especially high levels of violence (5% vs. 2.5%), significantly damage the prospects for regime stability, not only as measured by regime identity prevalence but also by the size of the apparatus of control remaining actively loyal to the regime (the number of “influential” agents

activated on the regime identity. Similarly, such violence damages general prospects for outcomes in the future that would be relatively welcome by the United States.

Fundamentalist mobilization was also shown to be a potent driver of outcomes. Under extreme and pervasive regional conditions of instability, such as may be associated with prolonged escalations of intense Israeli-Palestinian violence and dramatic and inflammatory portrayals of this violence in the Middle Eastern media, the negative effects on the likelihood of regime dominant, US-friendly, and US-unfriendly outcomes were dramatic.

In all conditions both repression by the regime and diplomacy by the United States made significant contributions toward increasing the rate of positive outcomes. Indeed repression and repression plus diplomacy were shown to produce even more positive distributions of futures than those associated with the absence of violence. In general diplomacy was more effective than repression. Its benefits were sometimes reduced by the presence of repression. In general, some costs reasonably associated with repression were not considered (damage to US foreign policy goals related to democracy, downstream increases in the likelihood of explosive discontent, etc.), though there are also costs that may be reasonably associated with diplomacy that were not considered either (including, perhaps, domestic political ramifications). A preliminary attempt to weigh the possible negative effects of repression was reflected in the observation that “anger” levels in futures featuring repression were higher than those featuring diplomacy.

---

<sup>1</sup> See Appendix 1 for a screenshots of MEPolity at  $t=0$  and for a sequence of screenshots from one run of an exemplar simulation (featuring repression and Israeli-Palestinian violence). See Appendix 2 for a chart indicating the color and numerical coding of identities theoretically available to agents in MEPolity.

<sup>2</sup> The uniqueness of each simulation “run” is due to the different ways agents behave and interact when subjected to a different stream of accidental events. Changing bias assignments are used to implement these streams of variously and complexly valenced events. At  $t=0$  all identities are assigned a bias of “0.” However, in any particular “future” represented by one simulation run of the batch of 100 produced for each experimental condition, the sequence, amount, and frequency of bias reassignment vary randomly (with a likelihood of approximately .01 per two time steps). For example, of the 100 runs, identity 5 could be assigned a bias of +1 at time 50, be reassigned a bias of 0 at  $t=120$ , and end up with a bias of -1, assigned at  $t=250$  that lasts until the end of the run ( $t=308$ ).

The reason observations are conducted at  $t=308$  and not 300, is that each run includes eight initial time steps during which the likelihood of change of a bias value (bias volatility) associated with any given identity is very high (50% as opposed to 1% during the history itself). This has the effect of “scrambling” the biases and allowing the history to begin “in media res,” rather than from an artificially “calm” position.

For a detailed explication of all operationalizations see Appendix 3: Operationalizations.

<sup>3</sup> Numbers in parentheses are the numbers assigned as labels in the statistics display of PS-I to the colors associated with specific identities in MEPolity. The regime identity (reddish orange) is “0,” traditional Sunni Islam (light green) is “1,” and so on. See Appendix 2 for a guide to the numbers and colors associated with the identities displayed in MEPolity.

<sup>4</sup> It is important to remember, that within whatever range an identity's bias is allowed to vary, it can vary many times, or not at all, within that range during any one simulation run.

---

<sup>5</sup> This sluggishness is effected by a temporary increase in the number of agents in an affected agent's neighborhood that is sampled before the agent updates its activation. An increase in the "sight radius" or "agent range" of such agents from "1" to "2" increases the size of the neighborhood sampled from 9 to 25.

<sup>6</sup> Each future in each experimental condition started from exactly the same position (MEPolity at time 0 [t=0]). For each condition 100 distinct streams of changing bias assignments were used as a set of perturbations of the model. Each future (or history, if viewed from the end of it) was unique. To maximize experimental control, all simulations were produced the same set of 100 (randomly generated) streams of bias values. This permits analysis of results, not only by comparing batches or distributions of futures to one another, but by comparing individual futures. In other words, since each run in each condition has a number (from 1 to 100) pairs of futures can be examined side by side. Differences identified can then be entirely attributed to whatever experimental "treatment" was applied (e.g. repression, US diplomacy, extreme violence, etc.) and not to "accidents" of bias perturbation or sequence.

<sup>7</sup> These and other effects reported in this paper and identified as significant or substantial differences register levels of significance beyond the .001 level based on paired two-tailed T-Tests.

<sup>8</sup> Israeli-Palestinian Violence alone, without the Fundamentalist Mobilization, has an effect parallel but less robust than that identified for Pan-Arabism. The average Muslim Fundamentalist prevalence is increased in the 2.5% violence condition by an average of 61.53 or 66%.

<sup>9</sup> Dominance, in other words, means "plurality," serving as a passable indicator of relative success. In many cases in which the regime identity is not the plurality at t=308, it continues to control most or even all of the regime bureaucracy (though that bureaucracy may be rather isolated and beleaguered. Analysis of simulation outcomes with regard to the proportion of the bureaucracy that remains under the control of different identities was not conducted for this project, but could be done.

<sup>10</sup> Traditional Sunni Muslim, which is normally the most important challenger to the regime identity, is coded as neither "USA-friendly" nor as "USA-unfriendly." The same treatment is accorded to "Regime related Ethnic Group," Kurdish, and other identities, which in any case rarely achieve dominance.

<sup>11</sup> Space does not permit the reporting or interpretation of other data that was collected (and does appear in Table 1), including numbers of "influentials" activated on the regime identity under different conditions, which would afford one systematic way to distinguish dominant outcomes in terms of prevalence from outcomes which focus on control of apparatuses of power within MEPolity.