1. Introduction

The prevalence of inter-group conflict throughout the world over the past century has been widely examined from a broad range of substantive perspectives. An extensive empirical literature exists, which examines the political, structural and economic factors associated with the incidence, character and duration of conflict between groups within a political entity and across political entities. Some investigators have incorporated a variety of these substantive perspectives into game-theoretic frameworks. This line of theoretical and empirical research has yielded insights into some of the factors associated with the incidence and persistence of inter-group conflict (see for example [3], [4], [7]). Despite this extensive body of work, however, uncertainty exists concerning of the factors that account for the persistence of inter-group conflicts in situations that are clearly at odds with the well being of the respective groups general populations that are in conflict.

Several reasons may help account for current gaps in our understanding the incidence and persistence of inter-group conflicts. For the most part, existing research on the in-
cidence and persistence of inter-group conflicts has most often focused on the economic, structural/political factors and historical factors as the underlining reasons for the persistence of inter-group conflicts ([4], [7]).

Among the factors that have received less attention in terms of their potential role in inter-group conflicts are the psychological dynamics associated with changes in the political attitudes of the populations of groups in conflict and also those of their leaders as well as factors relating to the perceived success of conflict related strategy. This is perhaps not surprising, in that research over the last five decades on public opinion and beliefs has fairly consistently found that political attitudes and support for public policies are stable over time and appear resistant to many environmental events ([1], [14]).

More recently however, research has begun to identify circumstances under which the public or segments of the public dramatically and abruptly alters their attitudes and opinions. Some research focusing on human cognition has identified, in at least some contexts, a somewhat automatic quality of many political choices and decisions ([10]). Research has also shown that physiologically relevant traits, such as feelings of disgust and fear, have been found to be related to political attitudes and political beliefs and “can be predicted by observing brain activation patterns in response to unanticipated events” ([11]). These reactions are postulated to be linked with survival mechanisms that illicit abrupt defensive bodily responses to perceived threats.

Unlike most political, structural and economic factors associated with inter-group conflict, which may account for the relative stability found in much public opinion research, psychological factors are potentially far more volatile and, as a result, potentially more likely to produce abrupt impacts on public perceptions within fairly brief time spans. Research at the social psychological level has found that public attitudes may be especially susceptible to change under conditions of threat from outside groups that affect individuals’ sense of mortality or their mortality salience ([5], [6] and [17]).

Under such conditions, perception of threat may have significant effects on public attitudes, support for public policies, tolerance of dissent, and support for political leaders ([16]). Huddy found that as perceived threat increased, there was heightened support for a wide range of domestic and international government actions to combat the threat of terrorism, including overseas military action, a curtailment of civil liberties, and increased surveillance ([9]).

Supporting these findings, recent analysis by Pierce et al [13] of Palestinian public opinion and Palestinian casualties arising from conflict with Israel found that support for military operations against Israel was highly correlated with the level of Palestinian conflict-related casualties ([12]). This research found that support for military operations against Israel among Palestinians doubled from 35.7% in a May 1999 survey to 72.1% in a December 2000 survey, following the start of the Second Intifada in late September 2000 (see Section 6, Appendix Figure). Importantly, the sharp increase in support for public support for military action was associated with a dramatic rise in Palestinian casualties immediately following the Second Intifada ([12]). This research also found, in a time series analysis, that the level of Israeli conflict-related causalities and rocket attacks on Israeli was negatively related to support for the peace process among Israeli citizens.

Further, not only do individuals support retaliatory action, they want a leader who is strong, active, and powerful and experiences increased levels of intolerance, ethnocentrism,
xenophobia, and prejudice ([8], [9]). In addition, such reactions may become more intense when threatening events are perceived to be unfair. De Quervain et al. ([2]) found that penalizing those we think are deserving of punishment is a rewarding behavior and that the action excites the reward centers in the brain. More severe consequences may arise when threatening events are perceived to be unfair.

The present analysis attempts to integrate the potential psychological effects of threat into a model of intergroup conflict that also incorporates actors’ vested interest in conflict-oriented policies and also the actors’ perception that such policies will be successful. In this model, we posit that the immediate psychological effects of an external threat may be very similar for both the general public and political leaders. Moreover we expect such reactions to be in line with at least some of the responses hypothesized from mortality salience theory. Other types of reactions to an external threat may be quite different for the general public versus their political leaders (mainline/majority and fringe or opposition leaders). These differences arise, in part, because the personal career interests of political leaders are directly affected by how they respond to an external threat, whereas the career interests of the general public are not directly linked. In addition, political leaders are also directly responsible for organizing collective responses to external threats. Finally, in managing responses to external threats political leaders are typically privy to information that is largely unavailable to the general public. This type of potential divergence in interests and available information can create opportunities for intra-group competition and also for the selection of sub-optimal solutions for inter-group conflict.

The analysis attempts to incorporate into a game theoretic framework, the likely impact of perceived and/or actual external threats on internal intra-group political dynamics, and the potential consequence of these responses on the informal and formal strategies selected to deal with perceived/actual threats. From a game-theoretic perspective, the analysis has a three-fold focus; 1) the psychological nature of responses to external threats by the general public and by political leaders, 2) the potential impact of such responses to external threats on the character of payoffs members of the general public political leaders are likely to need and/or look for under conditions of external threat, and 3) the relationship between shifts in payoffs to different players and the resulting consequent abrupt shifts in the types of inter-group strategies supported and/or advocated by the general public and its leaders. We propose that the payoffs to both the general public and to the leaders of competing groups are functions of a variety of internal and external factors that are really variable in nature, not static. These factors change as conditions, events, and time change. These factors include socio-economic variables such as the societal history, cultural values, the ability to tolerate risk, the strength of intra and inter group sanctions for defecting against a societal response to a perceived external threat, institutional strength to enforce intra group cooperation (violence to perceived external threat), ease of obtaining information and the immediate economic needs of the society.

2. The Intergroup Conflict Model

This paper presents the results of an intergroup conflict simulation model designed to incorporate the psychological effects of perceived threat on decision-making, without necessarily contradicting rational choice theory. The model is a discrete dynamical system whose state
space consists of sets of utility functions. Moving through the system is comparable to moving through a set of separate, but closely related games, and in this manner the system is formulated in terms of game theory. Actors behave according to the utility functions defined in the current state.

Possible strategies are defined in terms of events (or "attacks") and their corresponding probabilities. Events are one of the basic components of the simulation. They represent an attack or aggressive action by an actor. However, only mainstream leaders or fringe leaders can take such actions (As noted, the general public affect on the system is through their support for specific leaders). For each "day" in the simulation, a random number is generated for each of the actors. If a player’s random number is less than their current assignment of probability, then an event is registered for that day, for that actor. For each registered event, a second random number is generated representing strength and a third random number is generated representing success.

The probability of an event by a player at any given time is determined by the current values of three behavioral dimensions: Perceived Threat (T), Perceived Success (S) in the strategy, and Vested Interest (V) in the strategy. In the model Perceived Threat represents the psychological, subconscious impact of external shock. In theory, Threat has an immediate, relatively large influence on decision making. The effect however, decays rather rapidly. Vested Interest (or commitment to the conflict strategy) represents personal motivation for perpetuating or working against a conflict strategy. Perceived Success represents the effect of previous event success and resource levels on perpetuating the conflict. It depends on a history of successful responses and high levels of resources both tend to increase the probability of an actor perpetuating a conflict.

For each time period, model actors are assigned to a point in a three dimensional state space (with each dimension representing one of the above model components). Within each state, a predetermined utility function assigns a Bernoulli distribution to each actor in the model, uniquely determined in terms of three dimensions, perceived threat, the perceived success of a given strategy and vested interest in a given strategy. This distribution, heavily influenced by current levels of these three dimensions represents the actor’s current strategy. The state space can thus mathematically be described as a set of functions from a subset of $\mathbb{R}^3$ to the unit interval in $\mathbb{R}$. The images of these functions ultimately determine the behavior of the actors, and hence define rational choice for each state of the state space.

The model is designed to roughly approximate a two-level game ([15]). There are two groups, A and B, each consisting of a mainline leader and a fringe leader. Mainline leaders are able to generate resources more quickly than fringe leaders and usually begin with higher resource levels. Mainline leaders and fringe leaders of a group are in one sense treated as a coalition in opposition to the other group.

In another sense, mainline and fringe leaders are in opposition with each other, each competing for greater public support. As such, public interaction with mainline and fringe leaders determines to a great extent their respective behaviors. Ultimately, the public for each group is intended to be built in to the simulation as a separate actor. At this point however, they act implicitly. The following model components determine most of the behavior of actors.
2.1. Perceived Threat ($T$)

The equation for this component of the model is based on an exponential model intended to represent the absorption of chemicals into the bloodstream:

- The main idea is that each "shock" or attack creates its own jolt of threat. The ultimate term is a summation of all perceived threat.

- In other words, events cause the initial spikes determined by the bloodstream equation, while time continually lowers the level of threat at a constant rate.

We consider Threat that may directly affect the behavior of leaders and/or indirectly be used as a device by both mainline and fringe leaders to control the motivation behavior of the population they represent. We theorize that Perceived Threat has the same effect on all actors of a particular union. In other words, fringe leaders and mainline leaders experience the same level of perceived threat for the same shock. This is clearly evident in the simulation by comparing graphs for a specified trial. A driving force of the simulation, the basic formula for Perceived Threat at time $t$ (due to event $n$) is

$$ T_n(t, t_n, I_n) = (t - t_n) \cdot e^{(I_n - C)(t - t_n)}, \quad (2.1) $$

- $t_n$ represents the point in time when event $n$ occurred;
- $I_n$ represents the strength of event $n$;
- $C$ is a positive constant.

Total Perceived Threat at time $t$ is a summation of all existing Perceived Threat up to time $t$ (or equal to zero if no event has occurred):

$$ T = \sum_{i=1}^{n} T_i. \quad (2.2) $$

2.2. Public Support for Conflict ($P$) and the Amplification Constant ($A$)

This component represents the influence of public support for aggressive behavior on the behavior of political leaders. In a simplified form for the current simulation, we introduce two factors that affect the public support for conflict; Perceived Threat (as described above) and “Amplification”. Amplification represents an abstract, quantified scale of media influence on the public’s perception of threat. It is represented in the simulation by a positive constant real number referred to as the “Amplification Constant”. Thus, the equation for public support is as follows:

$$ P_t = A \cdot T_t, \quad (2.3) $$

- $T_t$: Perceived Threat at time $t$;
- $A$ is amplification constant.
2.3. Perceived Success of the Strategy ($S$)

This component of the model represents both the effect of previous strategic success and the current capacity for action on public policy regarding inter and intra group conflict. While drastically simplified for the purpose of the simulation, the primary factors involved in Perceived Success at this stage are: 1) current resource levels, 2) success levels of previous events, and 3) the time elapsed since earlier events in interaction with a leader’s vested interest in a conflict strategy:

$$ S = \frac{2}{1 + e^{-C.s_t}} - 1, $$

$$ s_t = s_{t-1} + r_t - r_{t-1} + u_t - u_{t-1}, $$

- $r_t$ is the level of resources at time $t$;
- $u_t$ represents total past history of success at time $t$. It is a summation of past histories of all events, and in the case of $t = 0$, a user defined input selected from the interval $(-1, 1)$:

$$ u_t = \sum_{i=1}^{n} u_{i_t}, $$

$$ u_{i_t} = L_n \cdot e^{-C(t-t_n)}; $$

- $u_{i_t}$ is the effect of event $n$ on Success Level at time $t$;
- $t_n$ is the point in time at which event $n$ occurred;
- $L_n$ represents the “success level” of event $n$. For the purpose of the simulation, it is a random number selected from the interval $[0, 1]$;
- $C$ is a positive constant.

2.4. Vested Interest

The Vested Interest component represents the “internal” motivation for perpetuating or suppressing conflict. The dimension is a composition of two functions:

- The first function, $x(N, t)$ or $x_t$, depends on the total number of events made by a specific leader and time. Commitment to Conflict grows smaller with time and larger as one contributes to the conflict. Proportionally, the effect of time is on a significantly smaller scale than that of Event total.

- The image of $x_t$ is then mapped onto the Sigmoid Function (see Fig. 1) with range $R = (-1, 1)$, which behaves as follows: When commitment to conflict is close to neutral, it is prone to change drastically. When commitment to conflict is swayed to one side, changes are significantly less noticeable.
Thus, given the above, the basic formula for Vested Interest at time $t > 0$ is

$$V(t) = \frac{2}{1 + e^{-C \cdot x_t}} - 1,$$  \hspace{1cm} (2.8)

where

$$x_t = x_{t-1} + P_t - P_{t-1} + V_{t-1} + E_t - F,$$  \hspace{1cm} (2.9)

- $V(0)$ is defined as a user parameter selected from the interval $(-1, 1)$;
- $P_t$ represents public support for conflict at time $t$;
- $E_t$ is a binary term, equal to 1 if an event occurs at time $t$ and equal to 0 otherwise;
- $F$ is a positive constant.

Figure 1. An illustration of the sigmoid input for vested interest

2.5. **Total Conflict Level**

Arguably the most informative variable of the simulation, Total Conflict Level at time $t > 1000$ is defined as the sum of current event intensities (or attack frequencies), over the set of all leaders in the simulation:

$$C = \sum_i E_i,$$  \hspace{1cm} (2.10)

where

$$E_i = C \cdot \sum_j t - 1000 \cdot e_j,$$  \hspace{1cm} (2.11)

- $t$ is the current time;
- $e_j$ is a binary term equal to 1 at time $j$ if an event occurs and 0 otherwise.
3. Simulation Model Program Description

Procedurally the simulation is based on a set of predesigned three-dimensional probability arrays. These conditions determine to a great degree where on the probability matrix an actor will begin. On day one, each actor has an individual attack probability of \( p = 0 \). The initial levels of the three dimensions, perceived success, perceived threat, and vested interest can be generated by a variety of factors, some of which we have directly incorporated into the simulation model and are specified in the discussion above. Factors incorporated into the simulation model include, success history of a strategy, commitment to conflict, starting resource levels, and public media amplification of perceived threats. Different levels of each of these factors can be set at the start of a simulation and they will determine the initial position of an actor in the probability array established by the three dimensions. This spot determines the probability that an actor initiates an attack within the next day. Starting on day two, a random number is generated uniformly from \((0,1)\) for each actor. If the number is lower than the actor’s current assigned probability, then an attack is registered and the simulation responds accordingly. Otherwise, the simulation behaves as if no attack is made. At the end of each day or cycle, the probability matrix positions are reassigned for each actor and the process repeats.

4. Sample Simulation Outcomes and Graphical Output

4.1. Unbalanced Commitment to Conflict with Varying Levels of Perceived Threat Amplification

The first subset of three trials we describe as unbalanced in the sense that fringe leaders and mainline leaders start the simulation with opposing positive and negative levels of initial commitment to conflict respectively. For each of the trials in this subset, we vary levels of perceived threat amplification: with the amplification constant varying from 0.1 to 10, holding constant the initial starting conditions of mainline leaders’ and fringe leaders’ commitment to conflict. Also held constant are initial resource levels for mainline leaders and fringe leaders with mainline leader starting with 1000 units and fringe leaders starting with 100 units. As outlined above, resources are a key component of perceived success. The initial starting conditions for this subset of the simulation are indicated below.

- Mainline leader initial commitment to conflict is set at -0.6.
- Fringe leader initial commitment to conflict is set at 0.6.
- Mainline leader initial resource levels are set at 1000 units.
- Fringe leader initial resource levels are set at 100 units.
4.1.1. Low Amplification Constant $A = 0.1$

In this simulation trial, the effect of low amplification and perceived threat leads to a very quick decline in the already low vested interest in conflict levels for mainline leaders. The low amplification of perceived threat means that public support for conflict remains relatively unaffected by external attacks (as might happen if there was very little news coverage of a terrorist attack). Since public support is an important determinant of a leaders vested interest/commitment to conflict in this model, the lack of public support for conflict means that leaders with already low commitments to conflict are likely to remain so or actually decrease. As a result, most of the conflict is carried out by fringe leaders. Thus, the total conflict level graph indicates a significant level of attacks, most of these events are caused by fringe leaders, which is a direct result of the relatively high fringe leader initial commitment to conflict.

4.1.2. Medium Amplification Constant $A = 1$

In the second trial, amplification has been changed from 0.1 to 1. The initial conditions are the same as in Subsection 4.1.1.
Here, since the public constant is set slightly higher, mainline leader vested interest is affected more heavily by perceived threat in the form of higher public support for conflict. While the average conflict level in this trial is very close to that in the first trial, the event distribution in this case is spread more evenly among leaders, as opposed to the first trial, in which most action was taken by fringe leaders. Ultimately, however, the effect of amplification on mainline leader vested interest is not strong enough to prevent it from eventually slipping down to levels similar to the first trial. This drop in vested interest is due to the forget rate. As described above in the equation for vested interest, this term works as a spoiler whose effect is amplified by the sigmoid function representation of vested interest.

4.1.3. High Amplification Constant \( A = 10 \)

For this trial, amplification was changed from 1 to 10. The initial conditions are the same as in Subsection 4.1.1.
For this trial, we see that the effects of a high amplification constant are present in all graphs and also in the event distribution among leaders. First, notice the immediately skyrocketing level of vested interest. This is a direct result of high amplification constant, which leads to significantly higher public support for conflict, which in turn weighs heavily in vested interest; the positive force of public support, in this case, is strong enough that vested interest remains high throughout the duration of the entire trial. This is in contrast to both of the last examples, where vested interest dropped to low levels by the halfway point of the trial.

A second result to notice is that not only are event totals for all leaders higher than in the previous two trials, but also the total event distribution among actors is noticeably more even. For instance, in trial two, the total number of events caused by mainline leaders is approximately 33% the total number of events caused by fringe leaders, while in this case, the total number of events caused by mainline leaders is closer to 50% the total number of events caused by fringe leaders. Hence, given the initial conditions listed above, a higher amplification constant translates to both more conflict and more evenly distributed conflict.
4.2. **Modestly Balanced Commitment to Conflict with Varying Levels of Perceived Threat Amplification**

In the following three trials, mainline leader initial commitment to conflict has been changed from -0.6 to 0. Thus, we will refer to this set of trials as having an "increased" level of conflict. As before, the amplification is set at different levels for different trials, while the following initial conditions remain constant:

- Mainline leader initial commitment to conflict is set at 0.
- Fringe leader initial commitment to conflict is set at 0.6.
- Mainline leader initial resource levels are set at 1000 units.
- Fringe leader initial resource levels are set at 100 units.

4.2.1. **Low Amplification Constant \( A = 0.1 \)**

Here, although the amplification is quite low in this trial, mainline leader vested interest remains in the middle range for the first two thousand days. This is a direct result of their initial commitment to conflict level, which places them at a volatile position with respect to vested interest. In this case, the low level of amplification enables vested interest to fall...
down to the lower range, in spite the high level of perceived threat instigated mainly by fringe leaders. This falling vested interest explains why mainline leader event totals are especially low in comparison to fringe leader event totals, in spite of the mostly high levels of perceived threat.

This behavior is another example of the effects of the sigmoid function in calculating vested interest. Because the level of vested interest tends to act more volatile when centered in its possible range, the effects of the forget rate as a spoiler are exaggerated without a high level of public support to supply positive feedback. This is reflected visually in the noticeable but temporary spikes in mainline leader B’s vested interest graph.

### 4.2.2. Medium Amplification Constant $A = 1$

For this trial, amplification was changed from 0.1 to 1. The initial conditions are the same as in Subsection 4.2.1.

<table>
<thead>
<tr>
<th>Event Totals:</th>
<th>Mainline A</th>
<th>Mainline B</th>
<th>Fringe A</th>
<th>Fringe B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>175</td>
<td>182</td>
<td>361</td>
<td>328</td>
</tr>
</tbody>
</table>

*Average Conflict Level: 0.1046
Maximum Conflict Level: 0.147945*
For this trial, the medium amplification level combined with the initial volatility of mainline leader vested interest leads to a situation where perceived threat sustains mainline vested interest. This is observed by comparing the graphs of perceived threat and vested interest and noting the corresponding "hills" and "valleys." As a result of the sustained vested interest, the event distribution in this case is more level compared to the last trial.

### 4.2.3. High Amplification Constant $A = 10$

For this trial, amplification was changed from 1 to 10. The initial conditions are the same as in Subsection 4.2.1.

As expected, the increased commitment to conflict of mainline leaders serves to hasten their attack timing, resulting in the highest levels of conflict over all trials. While the total conflict level is higher than before, it must be noted that the effects of higher mainline leader commitment to conflict are muted. That is, they become less noticeable as conflict levels grow higher. There is a cutoff point where factors corresponding to higher levels of conflict lose their relative effect. This explains the very small difference between average conflict...
level in this trial, versus the previous trial, where amplification was lower by a factor of 10.

4.3. Balanced Commitment to Conflict with High Level of Perceived Threat Amplification

For the last example, mainline leader commitment to conflict levels are set to 0.2 and fringe leader commitment to conflict levels are set at 0.2. This results in a “balanced situation” with respect to commitment to conflict, in the sense that neither mainline and fringe leaders have a significant initial propensity for or against conflict. Hence, the initial conditions are as follows:

- Mainline leader initial commitment to conflict is set at 0.2.
- Fringe leader initial commitment to conflict is set at 0.2.
- Mainline leader initial resource levels are set at 1000 units.
- Fringe leader initial resource levels are set at 100 units.
- Amplification is set at 10.

Event Totals:

<table>
<thead>
<tr>
<th>Mainline A</th>
<th>Mainline B</th>
<th>Fringe A</th>
<th>Fringe B</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Average Conflict Level: 0.0001
Maximum Conflict Level: 0.00274
In this situation, fringe leaders have relatively low initial commitment to conflict, creating a situation where no actor has a significant reason for perpetuating conflict. Vested interest sinks quickly for all actors, and when mainline leader B finally causes an event (most likely due to the random components of the simulation), it is low enough so that the high amplification constant has very little effect on the other actors’ vested interest. Also, notice the lack of activity in the perceived success graphs for all actors. Since there is only one event in the entire trial, there is very little change in perceived success for all actors except mainline leader B.

4.4. Summary of Sample Output

The simulation output described above is summarized below in the following Tables. Table 1 lists average conflict levels for each trial, according to initial conditions. The first column corresponds to Initial Commitment to Conflict, taking values of Unbalanced (U), Modestly Balanced (M) or Balanced (B), as inspired by the labeling above. The second column is amplification constant and the third column is average conflict level.

<table>
<thead>
<tr>
<th>Commitment</th>
<th>Amplification</th>
<th>Average Conflict</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>0.1</td>
<td>0.0704</td>
</tr>
<tr>
<td>U</td>
<td>1.0</td>
<td>0.0778</td>
</tr>
<tr>
<td>U</td>
<td>10</td>
<td>0.1037</td>
</tr>
<tr>
<td>M</td>
<td>0.1</td>
<td>0.0634</td>
</tr>
<tr>
<td>M</td>
<td>1.0</td>
<td>0.1046</td>
</tr>
<tr>
<td>M</td>
<td>10</td>
<td>0.1061</td>
</tr>
<tr>
<td>B</td>
<td>10</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

Table 2 lists event totals for each trial, according to initial conditions. The first and second column are identical to figure one, and the last four columns list the total number of events created by each actor for each trial.

<table>
<thead>
<tr>
<th>Commitment</th>
<th>Amplification</th>
<th>Total M.L. A</th>
<th>Total M.L. B</th>
<th>Total F.L. A</th>
<th>Total F.L. B</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>0.1</td>
<td>33</td>
<td>52</td>
<td>262</td>
<td>357</td>
</tr>
<tr>
<td>U</td>
<td>1.0</td>
<td>76</td>
<td>136</td>
<td>250</td>
<td>316</td>
</tr>
<tr>
<td>U</td>
<td>10</td>
<td>182</td>
<td>184</td>
<td>335</td>
<td>336</td>
</tr>
<tr>
<td>M</td>
<td>0.1</td>
<td>20</td>
<td>80</td>
<td>225</td>
<td>279</td>
</tr>
<tr>
<td>M</td>
<td>1.0</td>
<td>175</td>
<td>182</td>
<td>361</td>
<td>328</td>
</tr>
<tr>
<td>M</td>
<td>10</td>
<td>197</td>
<td>195</td>
<td>348</td>
<td>321</td>
</tr>
<tr>
<td>B</td>
<td>0.1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
4.5. Summary of Results

The simulation results presented above are summarized in Table 1 and 2. Table 1 presents the average conflict level results for each simulation trial. The first column in Table 1 provides the simulation’s trial starting condition for commitment to conflict for the Unbalanced commitment (U) subset of trial (Mainline leaders starting at -.6 and Fringe leaders at +.6), the Increased commitment (I) subset (Mainline leaders starting at .0 and Fringe leaders at +.6), and finally the Balanced (B) commitment subset (both Mainline and Fringe leaders starting at .2). The second column in Table 1 provides starting the amplification constant and the third column provides the overall average conflict level. Table 2 lists event totals for each trial where the first and second columns are same as those in Table 1, and the last four columns list the number of events/attacks created by each actor during a trial.

A review of the summary results in Table 1 and 2 shows that the model behaves in a manner expected. Examining Table 1 we see that for the Unbalanced subset of trials the overall conflict levels are fairly similar for trials with starting Amplifications of 0.1 and 10. The results in Table 2 show however, that even though in this subset of trials the average conflict level is similar for starting Amplification conditions of .1 and 1.0, it also appears that the number of attacks/events initiated by Mainline and Fringe leaders becomes somewhat more equal. When the starting Amplification level is increases to 10 more changes occur. With the starting Amplification condition raised to 10, the overall average level of conflict increased to .1037 or by about 30 percent over the level for the Unbalanced trial with an Amplification of 1.0. In addition number of attacks/events initiated by Mainline and Fringe leaders becomes increasingly more equal.

Examination of the summary results in Table 1 and 2 for the Increased commitment subset of trials shows that the model behaves in a manner similar to the results generated by the Unbalanced subset, but with two exceptions. The first exception is that the increase in overall average conflict level in this subset of trials occurs when Amplification levels are raised from 0.1 to 1.0 (versus from 1.0 to 10.0 for the Unbalance subset). Specifically, the overall average conflict level raises from .0634 to .1046 between Amplification levels 0.1 and 1.0 for the Increased commitment subset. The second difference between the Unbalanced and Increased subset of the trials is that the number of attacks/events initiated by Mainline and Fringe leaders also starts to become more equal when the Amplification starting condition is raised to 1.0 (versus 10.0 for the Unbalanced subset).

Finally, the summary results in Table 1 and 2 show a significantly different outcome for the Balanced (and fairly reduced) commitment to conflict simulation trial. In this trial the starting conditions for commitment to conflict for both Mainline and Fringe leaders was 0.2 and the Amplification level was set at 10. Even at an Amplification level of 10 there are virtually no attacks initiated by either Mainline or Fringe leaders. This is a consequence of the relatively low level of commitment to conflict among all leaders. Under this circumstance, the likelihood of events being initiated is very low. With a low probability for events, leaders become increasingly less committed to conflict as a strategy, further decreasing the likelihood that they will initiate an attack. Such conditions will produce very few attacks, as shown in Table 1 and 2.
5. Conclusions

The intergroup conflict simulation model presented here was designed to integrate perceptions of threat and vested interest with the intention of extending rational choice concepts to incorporate psychological dynamics. The results from these preliminary simulation trials appear to support the proposition that the model can examine interactions between the commitment of actors to a strategy of conflict along with the magnitude of perceived external threat. This interaction operates primarily through threat’s impact on public support for a conflict strategy, which in turn can impact a leader’s vested interest in this same strategy. The model results also indicates that under certain assumptions, the level of inter-group conflict depends upon an interaction between the level of leaders’ initial commitments to such a conflict-oriented strategy and the degree to which perceptions of threat are amplified.

The present conflict model will be extended to integrate a parallel negotiation inter-group strategy model ([13]). The objective of this extension is to incorporate the interaction of alternative strategies of negotiation and conflict. The premise is that different subsets of actors within opposed groups may simultaneously pursue strategies of negotiation and conflict, and moreover, such strategies are generally interrelated. For example, a given fringe leader’s vested interest in a conflict oriented strategy may change given a situation in which there is a movement towards a negotiation oriented strategy for mainline leaders. By incorporating such interaction between such alternative strategies, this extension of the model will allow us to model situations such as the potential impact of approaching negotiated solutions on the possible continuation of intergroup conflict.

6. Appendix
References


