Chapter 11
A Simulation Model of Intra-organisational Conflict Regulation in the Crime World

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11.1 Introduction

This chapter can be seen as a sequel to Chap. 10, where the qualitative analysis of texts from police investigations about a criminal network was transformed into a conceptual model of the dynamics that led to the violent breakdown of this network. This conceptual model was transformed and formalised into a simulation model, which is described in this chapter. Subsequently, results gained from simulation experiments with the model are presented.

11.2 Simulation Model Description

The implementation of the simulation model follows closely the modelling process developed in the EU project OCOPOMO,[1] and uses the toolbox provided by this project. The conceptual model was developed with the CCD Tool—the core component of the OCOPOMO Toolbox—which also provides a transformation tool called CCD2DRAMS that allows the semi-automatic transformation into a basic simulation model. The applied modelling process is presented in (Lotzmann, Neumann, & Möhring, 2015). The target platform of this transformation tool is the popular simulation framework Repast (North, Collier, & Vos, 2006), with the declarative rule engine DRAMS (Lotzmann & Meyer, 2011) as an extension for specifying the agent behaviour. Primarily the use of DRAMS shapes the implementation style in a

[1] http://www.ocopomo.eu/.

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particular direction: The entire agent behaviour is specified by declarative rules, which operate on the knowledge stored as facts in the so-called fact bases. As DRAMS is designed as a distributed rule engine, each agent is equipped with its own fact base and own rules, while for 'world knowledge' and also communication purposes a global fact base is provided. Also global rules are allowed to implement activities that cannot be located to concrete agents. Each rule consists of a condition part, the so-called left-hand side (LHS) and an action part, the right-hand side (RHS). The conditions in the LHS are specified using a set of clauses, e.g. for performing fact base queries, binding variables, comparing variables and constants, doing mathematical calculations and so on. The RHS consists of clauses that allow for modifications of fact bases (asserting new facts, retracting existing facts) as well as clauses for writing simulation outcomes in different ways. The basic mechanism of the rule engine is then to evaluate the LHS of all rules for which the facts are available and other matching conditions are fulfilled, and then fire the rule by executing the RHS, setting the condition for new rules to fire, and generating the simulation log.

The actual implementation of the simulation model follows closely the conceptual model, not least due to the code generation facility provided by the toolbox. All the actions modelled in the CCD action diagram are also present as DRAMS rules in the simulation model. In order to achieve a consistent implementation, a number of aspects had to be added to the model which are not described in the evidence base, instead relying on cognitive heuristics. On the other hand, some details included in the conceptual model had to be left out to keep the complexity of the simulation model manageable, but also due to decisions to concentrate the focus on some crucial aspects of interest for deeper analysis of the case. These implementation decisions were in most instances discussed with the data analysis expert and partly also with domain experts.

Another reason to ground the simulation model on DRAMS is the opportunity to benefit from the traceability functionality built in the OCOPOMO toolbox (Lotzmann & Wimmer, 2013). Herewith it becomes possible to trace simulation results back to the phrases from the evidence base annotated to elements of the conceptual model. That is, this functionality opens a way to efficiently perform qualitative analysis of simulation results by means of unveiling the relations between dynamics in simulations runs and events in the real criminal network described in the evidence base.

The following section gives an overview of the simulation model both in terms of static and dynamic aspects. The former includes the agents and related attributes from which the model is comprised, the latter the control flow in the different parts of the model. In the subsequent sections this control flow is further detailed in order to give quite deep insights on concrete design decisions to show how the evidence is reflected in the implementation.

11.3 Simulation Model Overview

In the simulation model agents are included for the CCD actor types Black Collar Criminal, White Collar Criminal and Police (cf. Chap. 10 on white collar and black collar criminals). While for the two types of criminals arbitrary numbers of instances can be set for simulation runs, the police is represented as an institutional agent, i.e. a single agent instance covers the activities of this actor. In a typical simulation run there exists a single White Collar Criminal, who is responsible for money laundering and is typically also part of the legal world, but might become involved in aggressive practices of the Black Collar Criminals. These are the actual representatives of the illegal world of the criminal network. There are two types of Black Collars distinguished, one called the Reputable Criminal which is initially in the so-called rational mental frame, while the other 'ordinary' Criminal only acts in the emotional mental frame. In the course of the simulation also the Reputable Criminal might switch to the emotional frame, e.g. due to violent events. This distinction between the two types of mental frame is illustrated below and argued in Chap. 10.

The model is implemented in a tick-based way where the course of time is represented by discrete ticks, but no defined time period between ticks is specified. Actions or reactions involving multi-staged decisions process are typically spread across a number of ticks, as are the consequences of actions and police investigations, to give a few examples.

This temporal relationship is one of the pieces of information given in the activity diagram in Fig. 11.1, which furthermore shows the control flow between the important behavioural elements (represented by activities) of the entire model, structured in different parts (grey background boxes). Some of the edges are labelled in order to improve readability. So are temporal relations as mentioned above put in square brackets, phrases in italics give further details on conditions, if the subsequent activities do not allow inferring this information. The most important edge label is printed in bold font: the (type of) agent who is executor of the following activity. Edges with no label indicate the transition to the next activity within the same tick and as part of the behaviour of the same agent. The diagram can be read as follows.

The dynamics start with an initial normative event at the first tick regarding a random criminal. This is an unspecified violation of intra-organisational norms that stimulates the necessity of conflict regulation. This normative event is observed by fellow criminal at the next tick, who might adapt the image of this criminal. In case of a norm violation event the image is decreased, which triggers a decision process on whether and how to perform aggressive actions against the deviating criminal. In the next tick the possibly many criminals who decided to sanction the norm violation 'negotiate', and finally one of them performs a single aggression, whose consequence manifests in the next tick:

Either the aggression is lethal, which might cause panic and 'fear for life' among other members of the criminal network, or the victim of the aggression experiences the aggression and starts with an interpretation process.

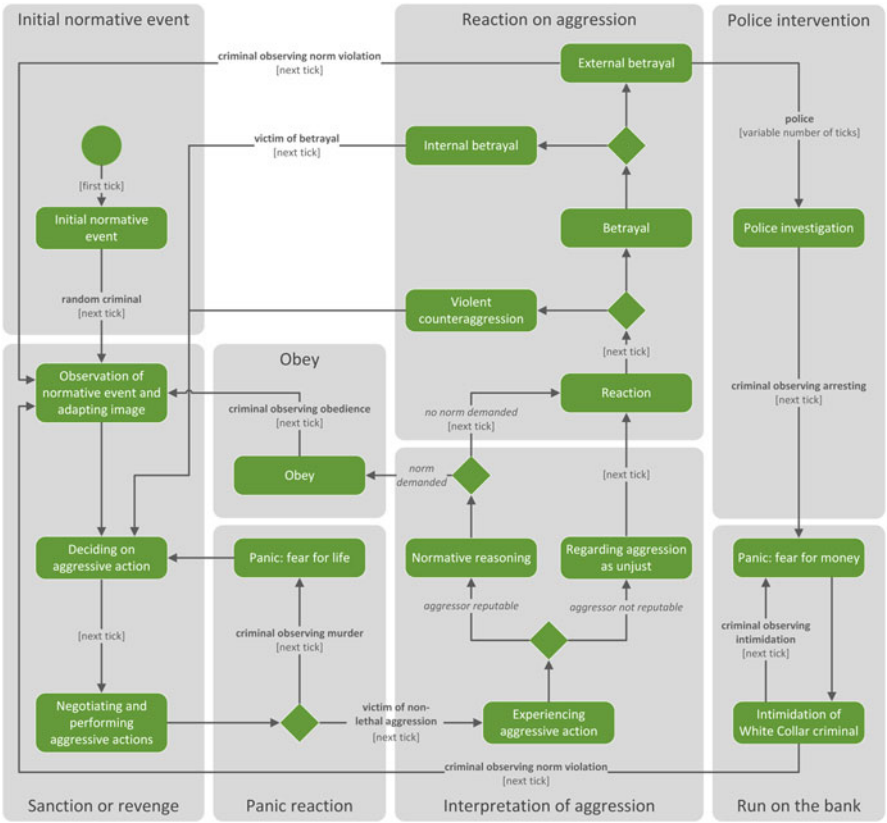

Fig. 11.1 UML activity diagram providing an overview of the simulation model (see text for meaning of edge label styles)

This interpretation begins with the distinction whether the aggressor is reputable or not. In the latter case, the aggression is regarded as unjust which triggers an obligatory reaction in the next tick. If the aggressor is judged to be reputable, then a normative process is performed that leads to the conclusion that either a norm is indeed demanded, persuading the criminal to obey to the norm (which in the next tick might motivate fellow criminals to increase the image of this member, if they get to know about the obedience), or no norm is demanded which again triggers an aggressive reaction in the next tick.

About the actual reaction a decision process is conducted (taking one more tick), with one of the following results:

- A violent counteraggression is performed, employing the same activities as for normative sanctioning (as described above), this time of course executed by the reacting agent.

- The criminal that issued the original aggression is betrayed internally, i.e. involving just the two criminals. The victim of this betrayal will decide on a responding aggression in the next tick.
- An external betrayal is performed, which can either be to inform the police or to go to the media and revealing the criminal network (or its members) to the public. Both actions trigger police investigations, while the latter one in addition is recognised as a norm violation, which might be observed by fellow criminals in the next tick and might furthermore lead to the already known consequences of new aggressive actions.

Police investigations ultimately lead to interventions, i.e. the arresting of members of the network. This arresting might also be observed by other members and in the next tick cause a panic about the potential loss of invested money. This fear usually triggers an intimidation of the White Collar Criminal, which might also be observed by other criminals, starting (with a time delay of one tick) a vicious cycle of cascading acts of extortion towards the White Collar in form of a 'run on the bank'. The refusal of repayment of invested money by the White Collar is at the same time regarded as a norm violation, observable by further criminals (again with a delay of one tick).

11.4 Decision Processes

The functional blocks shown in Fig. 11.1 are described in more detail in the following subsections, complementing the very brief walk through the model. A number of concepts partly introduced already are repeatedly used throughout the chapter. These are as follows:

- Rational and emotional mental frame. As mentioned above, these different 'modes of operation' of criminals influence their behaviour. In the emotional frame the criminal is less able to foresee the consequences of the performed actions; hence, the probability for severe aggressions and acts of strong violence is higher than for the rationally acting criminal (cf. Chap. 10).
- Following Sabater-Mir, Paolucci, and Conte (2006) criminals are endowed with image and reputation. Both are properties expressing the standing of a criminal, the rank in the hierarchy in a way. Reputation is initially set for each criminal agent in the initialisation of a simulation run, is known to all members of the criminal network and does not change in the course of time. In contrast, the image is an information private to each criminal agent. That is, each criminal has his own view on the image of each fellow criminal. The image values do change during simulation runs. Thus reputation is an objective property of the criminals while image denotes the subjective evaluation of the fellow criminals by each member of the gang.
- Levels of image and reputation. These are ordinal scaled attributes: very high, high, modest low and very low.
- Levels of severity of aggressive actions. The severity of an aggressive action is measured by the ordinal scaled attribute 'strength': low, modest and high.

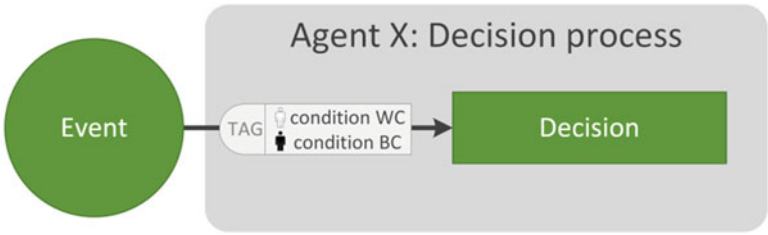

Fig. 11.2 Notation of decision trees used in the chapter

Some of the detailed descriptions in the subsequent sections use decision trees to illustrate the model behaviour. Fig. 11.2 shows an example of such a tree. The circle represents the trigger event, starting the decision process. The different stages of the process are displayed as rectangles, while the specific condition for a decision is attached to the respective edge. If the conditions differentiate for the different kinds of criminal agents, a little black or white actor symbol is shown, referring to the Black Collar and White Collar Criminal, respectively. Some of the edge descriptions are extended by a tag, which refers to a concrete description in the text. These are typically examples for important parameters of the simulation model.

11.4.1 Initial Normative Event

To create the initial event that a member of the criminal network all of a sudden becomes disreputable—as discussed in Chap. 10—a global rule throwing an external event is provided. This rule picks randomly one of the members and issues a normative event about an alleged violation of the norm of trust by this member. This event is triggered just once, at tick 1.0.

11.4.2 Sanction or Revenge

This functional block basically implements the CCD action 'perform aggressive actions against member X' (Fig. 11.3), and is an example where the implementation that formalises this action is much more convoluted than the action might indicate. Reason for this discrepancy in granularity is the fact that for this action not much evidence is available—the internal decision processes of criminals that lead to aggressive actions have to be regarded as a black box. Therefore, the mechanisms have to be constructed in some plausible and—where possible well informed—way, with the provisio that the events known from empirical evidence can be observed in simulations as results of these decisions.

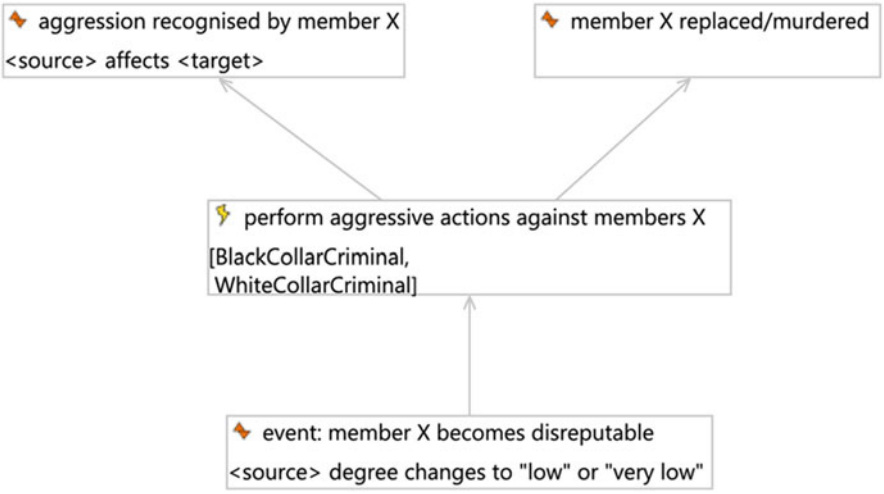

Fig. 11.3 CCD action 'perform aggressive actions against member X'

In Fig. 11.4 the decision tree formalising this action is shown. The initial condition—a criminal 'X' violates a norm—can in principle be observed by each fellow criminal and might lead to a reaction. This perception involves the observation of the event, but also the 'willingness' to care about the event, and is modelled as a stochastic process.

As annotated in (A1), the White Collar criminal perceives this event with a very low probability of 0.05 since he typically keeps out of the thuggish business of the Black Collar criminals, while for the Black Collar criminal the probability is dependent on the image of the criminal respective to the event: with a very high image, the probability is 0.1, with high image 0.2 and otherwise 0.3. The rationale behind this differentiation is that a norm deviation of a criminal with higher image seems less likely to be an offending act against fellow criminals or a threat for the entire network.

The first step of the process that is triggered on successful perception is a change in the image of the criminal. If the normative action was a norm violation, then the image strongly decreases ('two levels'); in the case of norm obedience (not shown in the decision tree) the image increases by one 'level'.

The new image of the criminal related to the normative event then triggers the next step of the decision process, where the behaviour differs if the criminal is in rational or emotional mental frame.

In both cases an aggression is planned only if the new image of the criminal related to the normative event is low or even very low, but in the case of rational frame the planning is followed only with a probability of 0.9 (A2), whereas an emotionally acting criminal would always punish, because he might not be able to foresee the consequences of his aggressive actions (A3).

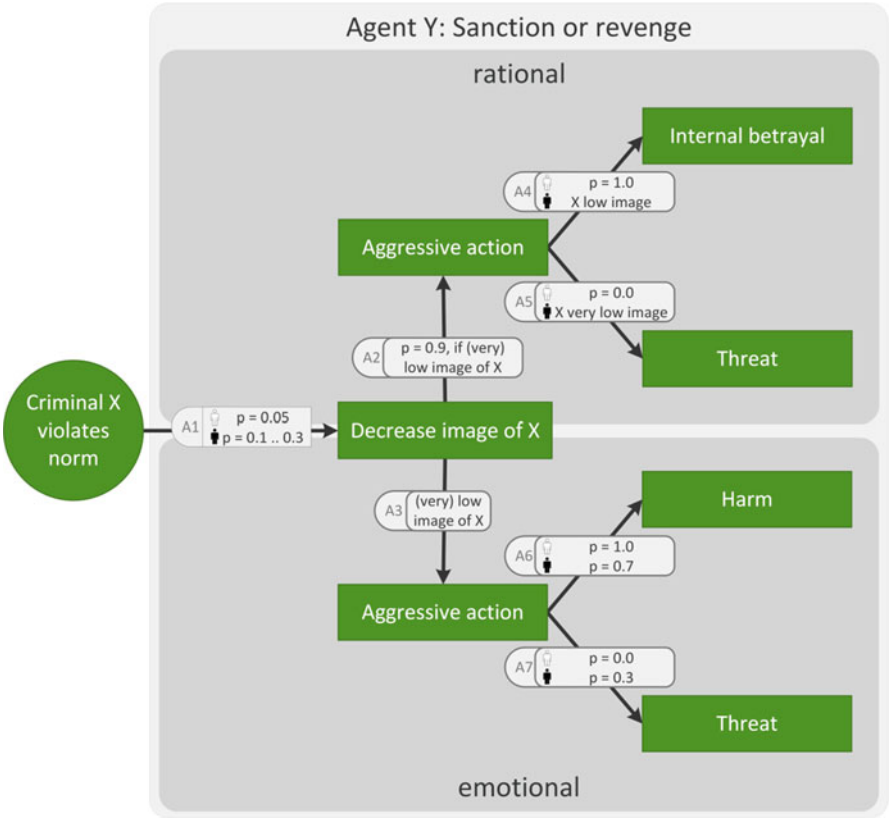

Fig. 11.4 Decision tree for sanction or revenge

If once the plan is conceived, then again the category of criminal (Black or White Collar) and the mental frame determine the type of reactions, but in some cases also the image of the criminal to be punished (decisions A4 and A5 of Black Collar criminal).

A rational White Collar criminal will always (A4) perform the—compared to the other options—mild punishment of (internal) betrayal, while in the emotional frame he will always answer with violence (A6). A rational Black Collar criminal considers the option of betrayal only if the target of the aggression has still a low image (A4); in the case of very low image (A5), the only appropriate action is considered to be threat. An emotionally acting Black Collar criminal tends more towards a violent reaction (probability of 0.7; A6) than a threatening action (probability of 0.3; A7). The cognitive heuristics modelled in these decisions are suggested by information from the evidence base; this connection to evidence becomes more concrete when deciding on the actual aggressive action. Figure 11.5 shows this decision process for internal betrayal, Fig. 11.6 for threat and Fig. 11.7 for harm. The

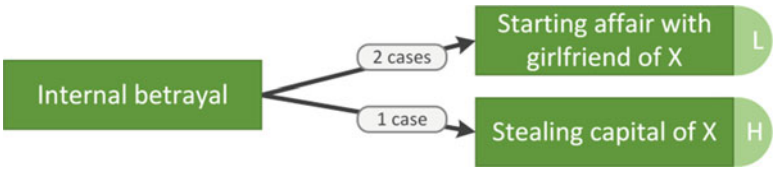

Fig. 11.5 Decision tree for internal betrayal

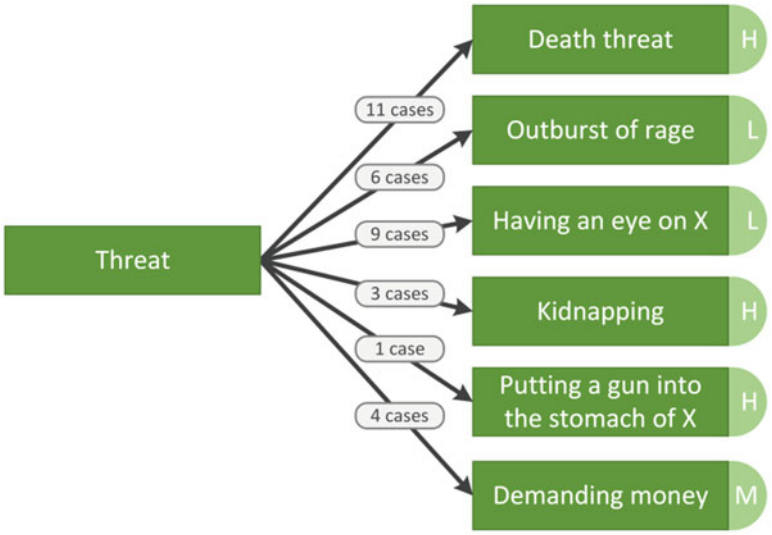

Fig. 11.6 Decision tree for threatening actions

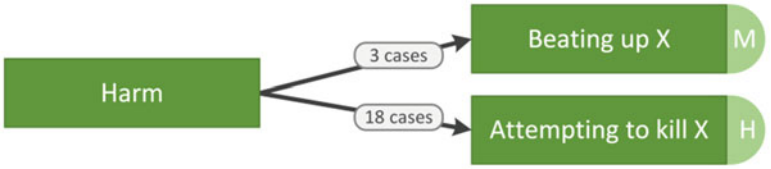

Fig. 11.7 Decision tree for violent actions

letters right to the decision boxes point to the severity of the action: (H)igh, (M)odest and (L)ow.

As a side remark, the decision trees in Fig. 11.5 to Fig. 11.7 and also in Fig. 11.16 refer back to the first phase of a qualitative analysis as described in Chap. 10. In the step of the analysis of the textual data the so-called in vivo codes had been created, i.e. annotations of characteristic brief text elements. These had then been subsumed to broader categories which provide the building blocks of the conceptual model. In Chap. 10 we only provided examples of these in vivo codes to illustrate how the categories can be traced back to empirical evidence. However, the relative frequency of in vivo codes subsumed to the different acts of betrayal, threatening or violence

enables a specification of the probabilities. Certainly these have to be used with caution: first the categorisation has been undertaken by one of us (Neumann) and cross-checked by the other (Lotzmann). Thus an element of subjective arbitrariness comes into play when subsuming a description of a concrete action under a category such as 'outburst of rage' etc. Second, the relative frequencies in data might not be very reliable. As they are based on police interrogations, an event such as an attempted assassination is more likely to be subject of the interrogation than, e.g. an 'outburst of rage'. It might well be the case that the respondents did not remember or that the talk simply did not approach the issue. Nevertheless, for instance the high absolute number of death threats or attempted assassinations compared to other courses of action found in the data provides a hint for the high disposition of violence in the group. Thus given the problem of dark figures inherent in any criminological research, the relative frequencies provide at least a hint of the empirical likelihood of the different courses of action.

The finally decided aggression is then 'discussed' among the agents that decided to react. So the final result of this decision process is an individual aggression. However, not all criminals who decided to react perform their aggression individually, but rather a single aggression is perpetrated against the criminal X. After some kind of 'negotiation' among the potential aggressors, one aggressor and the related aggression is determined. This two-staged process is not associated with any agent, but part of the 'global' environment. In the first stage the criminal with the highest image is chosen. In the second stage the aggression with the highest severity (as referred to in Fig. 11.5 to Fig. 11.7) is selected, involving a stochastic process if more than one candidate fulfils these criteria.

The subsequent (implicit) execution of the aggression is immediately evaluated in terms of impact for the victim (by another global rule). For acts of violence a certain (quite low) probability for lethal consequences are considered (0.2 for murder attempt, 0.1 for beating-up). All other possible types of aggression are not assumed to be lethal, anyway.

11.4.3 Panic Reaction

If the aggression turned out to be lethal, the CCD action for 'fear for life' panic in Fig. 11.8 comes into play. This is a simplification of the original action diagram from Chap. 10 where also a more general panic might lead to fear for life, if the overall trust in the criminal network has been destroyed. This simplified implementation, however, covers the aspect of loss of trust in the network quite well, based on the loss of image of individual fellow criminals.

Panic is a situation where rational deliberations do no longer play a role in the behaviour of the individual criminal. It plays a central role in terms of escalating aggression and violence among the network members.

However, the implementation as shown in Fig. 11.9 does not need to be particularly complicated. As soon as a murder of a fellow criminal is observed, the 'fear for

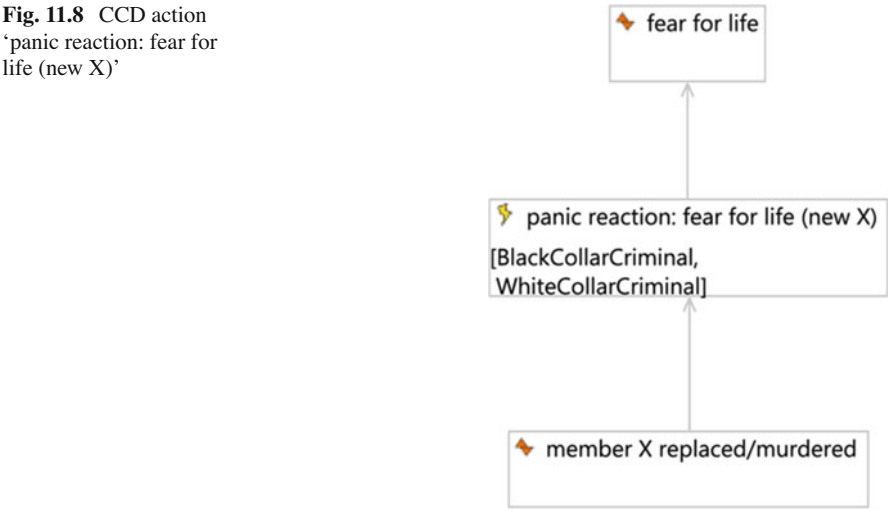

Fig. 11.8 CCD action 'panic reaction: fear for life (new X)'

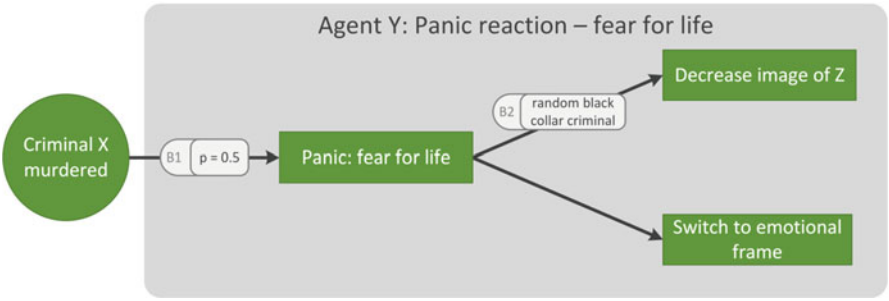

Fig. 11.9 Decision tree for panic reaction: fear for life

life' panic state is established with a probability of 0.5 (B1). The criminal 'switches' into emotional frame and becomes active in some way in order to defend himself. Here he just picks randomly one of the fellow criminals (B2)—which can be interpreted as the one guilty for the murder as perceived by the criminal in panic—and just decreases strongly the related image. This decrease of image might then trigger further actions, as shown in Fig. 11.9. Hence, the spiral of violence escalates.

11.4.4 Interpretation of Aggression

If the aggression was not lethal, the victim has to interpret the reasons for being attacked.

This is modelled in the part of the CCD action diagram displayed in Fig. 11.10. In addition to the condition focussed on here—the aggression motivated by an

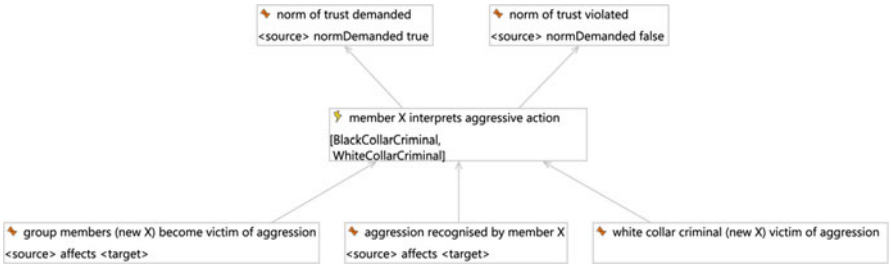

Fig. 11.10 CCD action 'member X interprets aggressive action'

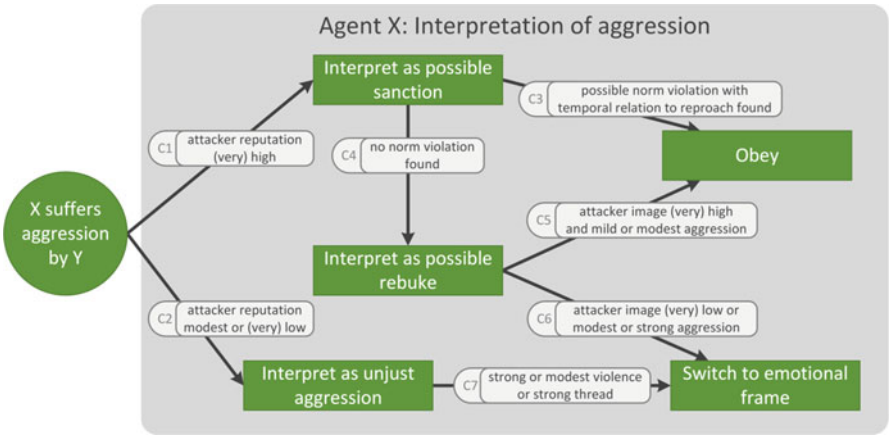

Fig. 11.11 Decision graph for interpretation of aggression

alleged norm deviation 'recognised by member X'—there are two other circumstances when a criminal becomes victim of an aggression: either as a result of a counteraggression or—as a special case—the intimidation of the White Collar criminal. Both cases are not directly linked to a normative event and become relevant at later stages in the dynamics. This interpretation process remains the same for all cases.

In the implementation it is assumed that the victim always perceives the aggression against him. In the following, the implementation of the quite complicated reasoning process is spread out in more detail.

This interpretation process, again, consists of several sub-processes, as shown in Fig. 11.11. The first stage covers the perception of the aggression, followed by a first evaluation of the appearance of the attacker—deduced from the attacker's reputation.

Dependent on this reputation information, the interpretation is fundamentally different. For the case of a reputable attacker (C1) the second stage is a reasoning about whether the attacked criminal might have violated a norm in the recent past which would have led to a sanction of another fellow criminal. This interpretation

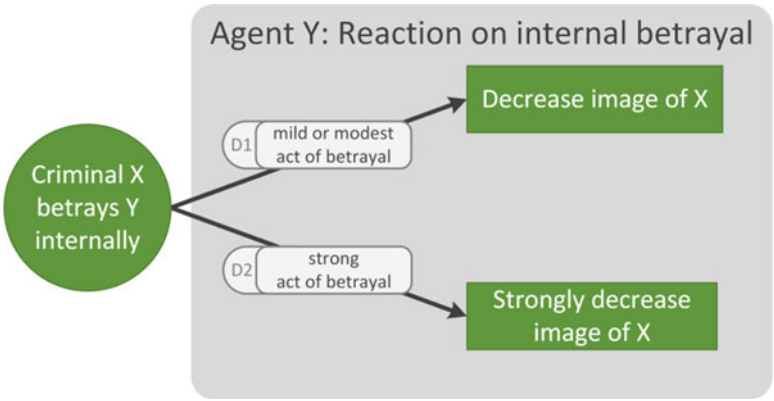

Fig. 11.12 Decision tree for the reaction on internal betrayal

as a possible sanction is done by a 'normative process'. The basic idea of this normative reasoning is quite simple: It is evaluated whether own aggressive actions performed in the past stand in some kind of temporal relationship with a normative event assigned to this criminal. In order to conduct this evaluation, each criminal can access a global event board where all aggressions performed by each criminal are recorded. Also the normative events are logged in a similar way, so that temporal relations between these types of events can easily be derived. The normative process is considered successful, if aggressions are found which at most 16 ticks later led to normative events (C3). If such relations exist, the criminal regards a norm demanded and typically reacts by obeying to the normative request.

Even if the normative process failed (C4), the aggression might still be regarded as a justified sanction: If the attacker has a high or very high image and the aggression was mild or modest (C5), then it is assumed that a norm is demanded as well. This cognitive heuristic has been included in the model to cover the possible aptitude of criminals with high image (and high reputation) to mitigate conflicts, either by mediating or by just exercising authority.

In contrast, if either the attacker's image is modest or low (C2), or the aggression was of high severity ('strong aggression'; C6), then the aggression is perceived as arbitrary, which means that no norm can be demanded. As victim of such a kind of aggression the change into the emotional mental frame appears to be indicated. The same holds for the case of a non-reputable attacker: the aggression is interpreted as unjust. As a consequence the mental frame might change to emotional (due to fear or rage), namely in case of strong or modest violence or strong threat (C7). Entering the emotional frame triggers a reaction, as described in the next but one subsection.

A special case is the internal betrayal, where the affected criminal always reacts by decreasing the image of the betraying criminal (Fig. 11.12). A betrayal with low or modest severity initiates a decrease of image by one level (D1), while highly severe betrayal causes a drop by two levels (D2). Without bothering about

Fig. 11.13 CCD action 'member X obeys'

normative reasoning, a responding action might immediately be triggered according to Fig. 11.4.

11.4.5 Obey

The action diagram fragment shown in Fig. 11.13 covers the criminal's reaction if the normative reasoning resulted in the insight that the experienced aggression is likely to be justified, be it as a sanction for an own actual norm violation or just due to the high image of the aggressor. The only possible action implemented here is to obey the aggression in order to recover the trust among the criminals.

The respective implementation in the simulation model foresees two possibilities for this obeying behaviour, one for each of the two circumstances to obey as mentioned above:

- a rule 'member X obeys', if the normative process classified the aggression as a sanction, and
- a rule 'member X obeys due to high image of aggressor'.

The result in both cases is the same: a normative event carrying the message that the criminal is willing to obey to the norm of trust is send to the environment, i.e. made known to the other members of the criminal network, who might react by increasing the image of the obeying member.

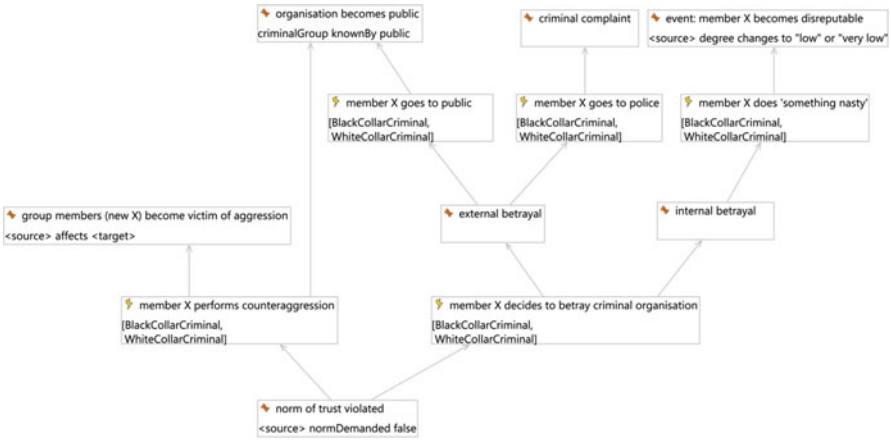

Fig. 11.14 CCD action diagram for reaction on aggression

11.4.6 Reaction on Aggression

The opposite result of the normative reasoning is the awareness that the aggression cannot be a justified sanction or the aggressor has such a low image that he is ineligible to be a sanctioner (i.e. aggression by non-reputable attacker). This particular instance only leaves margin for two types of reaction, either betrayal or violent aggression. This is conceptually modelled in the CCD action diagram fragment shown in Fig. 11.14.

The pre-selection between betrayal and violence is implicitly modelled in the different actions branching from the condition 'norm of trust violated'. One of the two options to respond to unjust aggression is to perform counteraggression, which in this context means some kind of violent act. The second option is to betray the criminal network. There are basically two possible categories of betrayal: the quite harmless internal betrayal, and the serious and (for the criminal network and the individual) existence-threatening external betrayal. If the choice in the pre-selection is internal betrayal, then a 'nasty' action is performed which remains invisible for the environment outside the criminal network. The consequence for the attacker (as mentioned in the last but one subsection) is to become disreputable in a similar way as it is the case with the initial normative event, provoking respective aggressive actions. The two options for external betrayal are either that the criminal provides a hint (or a criminal complaint) directly to the police, or details of the criminal network or associated activities are revealed to the public (and, hence, also to the police) by informing newspapers or other media.

Although the implementation of this part of the simulation model is quite similar in functionality to the implementation for deciding on a reaction on decreasing image (e.g. due to a norm violation, as described above), the actual implementation is quite different. The reason is that here the implementation follows much closer

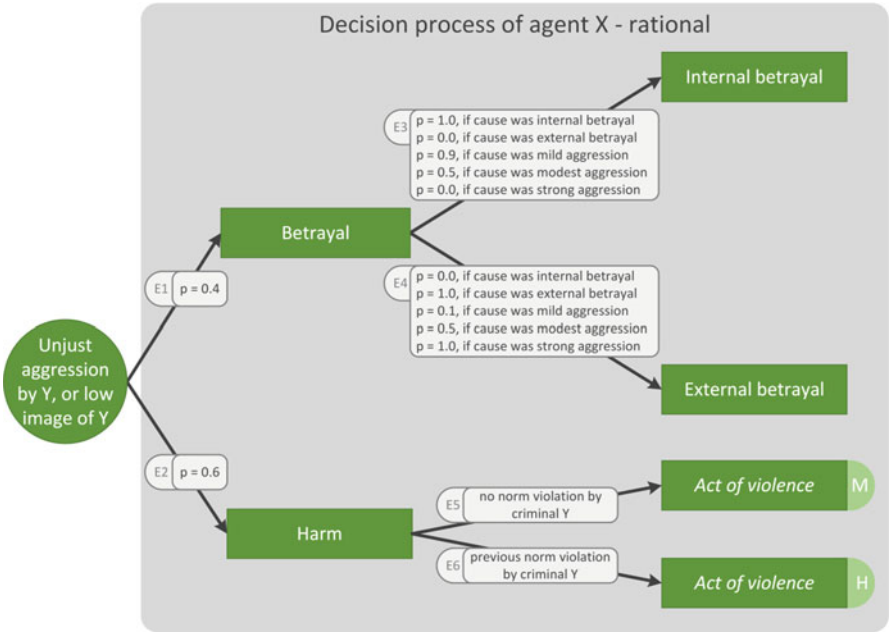

Fig. 11.15 Decision tree for rational reaction on aggression

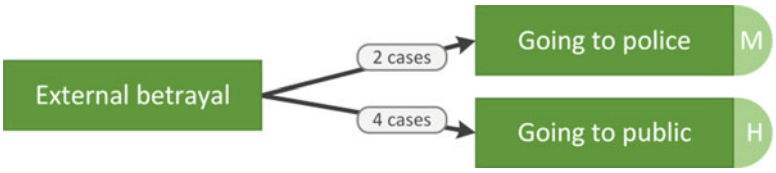

Fig. 11.16 Decision tree for external betrayal

the CCD action diagram, as more concrete evidence is available for these parts of the model.

Figure 11.15 shows the decision tree outlining the implementation for the case the criminal is in rational frame. The first stage is to decide whether to betray or to harm. Probability for the former is 0.4 (E1), for the latter 0.6 (E2).

If the decision is to betray, then the two options are selected by the conditions shown in (E3) and (E4). As a short summary, if the original aggressive action was internal betrayal, then the reaction will always be internal betrayal, too. If it was external betrayal or any other kind of strong aggression (threat or violence), then internal betrayal as a reaction is never an option. In all other cases there is a probability >0 for internal betrayal. Possible acts of internal betrayal are listed in Fig. 11.5; for external betrayal Fig. 11.16 shows the respective decision tree. The decision to inform the public results in unveiling the existence of the criminal network,

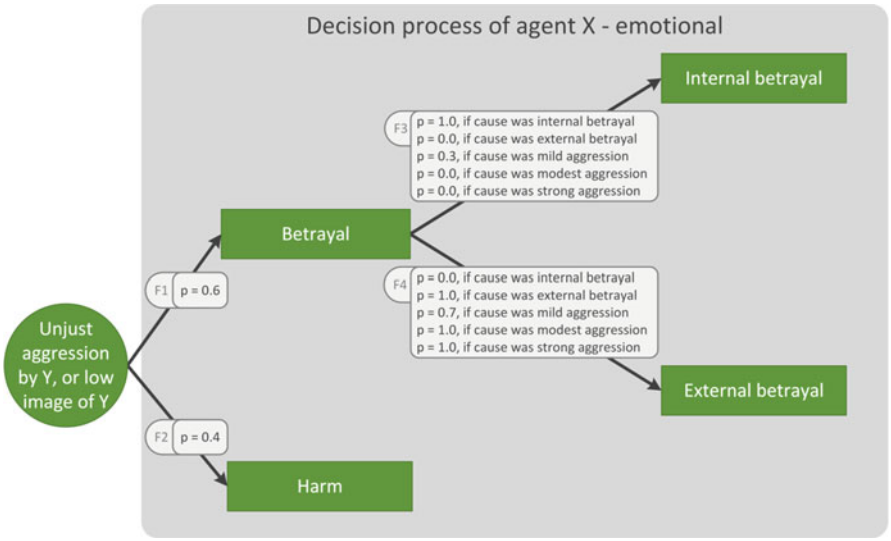

Fig. 11.17 Decision tree for emotional reaction on aggression

but also sets the grounds for having this activity regarded as a violation of the norm of trust. The consequences of informing the police are different, as this is as a covert aggression only visible to the betraying criminal and the police, who now knows about the existence of the criminal network, kicking off an investigation.

The decision to harm is just followed by the selection of an appropriate act of violence. If criminal Y is guilty a norm violation at some time in the past, then criminal X will respond with strong (highly severe) violence (E6), otherwise with modest violence (E5). The acts of violence correspond with the options in Fig. 11.7.

For the case the criminal is in emotional frame, the decision process differs slightly, as specified in Fig. 11.17. The probabilities for betrayal and harm are the other way around, i.e. 0.6 for betrayal (F1) and 0.4 for harm (F2). Also the probabilities for internal (F3) and external (F4) betrayal are different, while in the case of harm the actual violent act is selected by chance (decision tree in Fig. 11.7). In summary, the chances for more severe measures (in particular in terms of external betrayal) are higher in emotional frame than in rational frame.

11.4.7 Police Intervention

The third actor besides the Black and White Collar Criminals included in the simulation model is the police as an institutional agent. The only action modelled in the CCD action diagram is the start of an investigation because of a criminal complaint

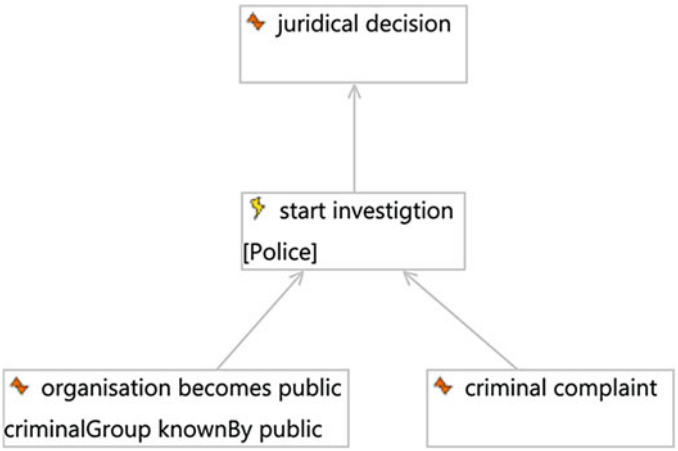

Fig. 11.18 CCD action 'start investigation' by police

or media reports, which finally results in a juridical decision, that is the arrestment of a criminal (Fig. 11.18).

The implementation of this action involves a few more aspects. Both mentioned pre-conditions trigger police activities. The first step is the generation of a report, which contains information about the reason for and the subject of investigation to initiate, as well as the source of information. Reason can be either media report or criminal complaint; subject is the criminal network. If the subject is unknown to the police so far, then a new investigation is initiated, and the investigation progress starts with 0 %. If the subject is known already, then the progress advances (with an additive calculation) by 50 %. In any case, the progress of investigation changes randomly with every tick: it (expectedly) increases by up to 40 %, but might also decrease by up to 10 %. This negative progress expresses a possible 'dead end' in which an investigation branch might enter.

If finally 100 % progress is reached, members of the criminal network are known to the police so that measures can be decided and finally taken by arresting a randomly selected criminal. An arrested criminal does no longer take part in any business of the criminal network.

11.4.8 Run on the Bank

Starting point for the effect of a 'run on the bank' is another kind of panic, the fear to lose invested money. This is modelled in the CCD as shown in Fig. 11.19. Three possible pre-conditions for this panic are envisaged: the arresting of a member of the network due to a police intervention, the knowledge about intimidating activities against the White Collar Criminal and the conjuncture that the network became public. In the implementation a slight variation is realised as the latter of these three

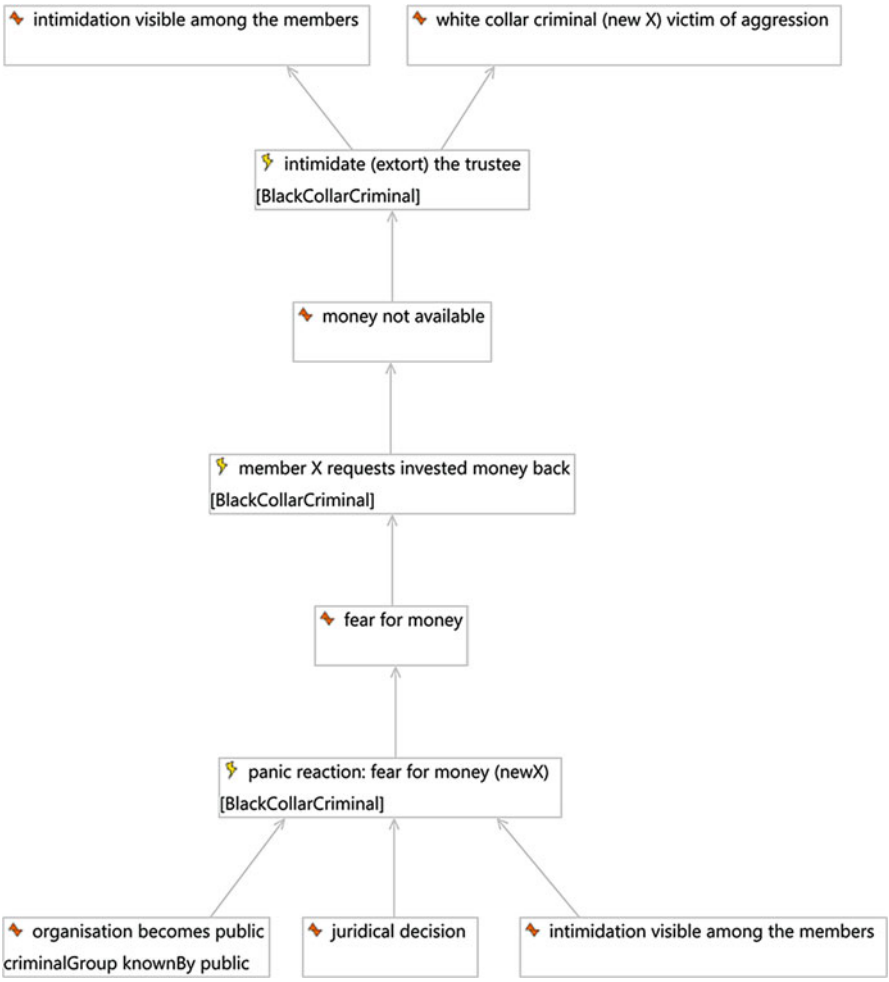

Fig. 11.19 CCD actions for 'panic reaction: fear for money (new X)' and intimidation of White Collar Criminal

conditions is not taken into account. This simplification is justifiable because the uncovered network triggers police investigations that ultimately lead to arresting of criminals, which then cause panic reactions anyway.

The panic might cause an intimidation of the White Collar criminal—in this context called the 'trustee'. This is a two-stage process, where a (Black Collar) criminal in panic to lose the invested money starts an approach to get the money back. If the White Collar is unable to return the money, the actual intimidation—often in shape of an extortion attempt—takes place. This extortion on the one hand results in aggressive actions against the trustee but on the other hand might be observed or become known by other members of the criminal network. The latter leads to an escalating number of approaches to get hold of invested capital.

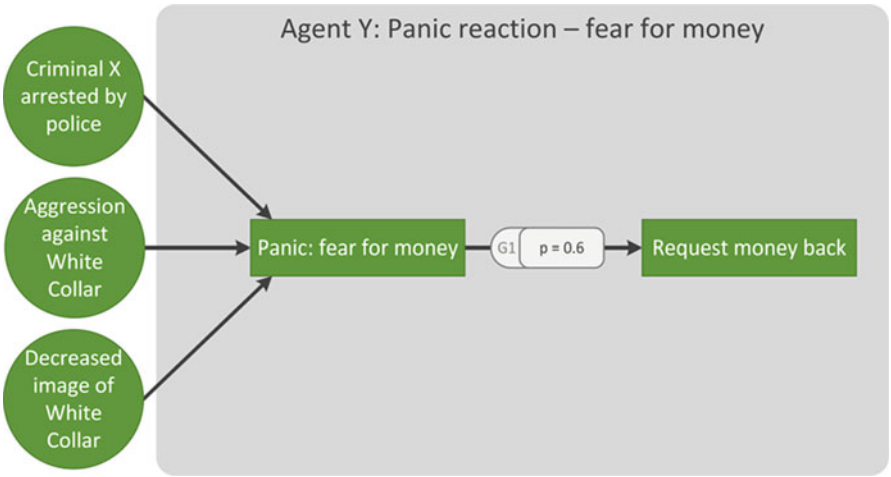

Fig. 11.20 Decision tree for panic reaction: fear for money

The entering of the panic mode is implemented as drawn by the decision tree in Fig. 11.20. The request to get the money back from the White Collar criminal as result of the panic sets in with a probability of 0.6 (G1), if one of the following conditions holds:

the state of a fellow criminal changes to 'arrested',
an aggression against the White Collar criminal is observed, or
the image of the White Collar criminal decreases to a modest or worse level. This case is not explicitly modelled in the CCD, but becomes important for the dynamics when the White Collar is involved in a conflict, and the opposite party of the conflict at some time responds with requesting the invested money back.

The mechanism with which the intimidation is implemented is deterministic. The approached White Collar criminal processes this request by trying to fulfil as many as possible of the requests appearing at the same tick. A capital stock of 20 million units is available initially, which is refilled by another 20 million units each tick after some amount was requested and paid back. The decision to pay or not to pay is communicated to the requesting criminal. For Black Collar Criminals that got their money back the crisis is resolved for the moment, and no reaction is to be expected. In the other case, the refusal to return the money is interpreted as a norm violation. Hence, a request for a normative event is issued, containing the message that the norm of trust is violated by the White Collar Criminal. This normative event triggers the mechanism of revenge or sanctioning again, as described in the beginning of the chapter.

11.5 Conclusions on the Simulation Model Description

The previous sections are intended to present the simulation model in a way to enable interested readers to comprehend the formalisations done on base of the conceptual model as well as the simulation experiments elaborated in the following sections. However, all the technical details that are inevitable for executable software systems can obviously not be presented in the frame of a book chapter. These are aspects like the configuration of parameter settings, the control of simulation runs and the generating and visualisation of simulation outcomes. In the following, a few remarks are given to each of these aspects.

Simulation parameters are implemented in three different ways:

- Parameters interesting for experimentation and typically without relation to the evidence base can be put on the Repast user interface. This is done for the number and relation of reputable and ordinary Black Collar Criminals.
- Parameters that have a close relation to the evidence base are typically modelled in the conceptual model and annotated with phrases from the evidence. Hence, these parameters have to be changed in the CCD, and a following code transformation updates the parameters in the simulation model. For example, the types and probabilities of the aggressive actions are modelled in this way.
- All other parameters are coded in the rules, in most cases as probabilities, with comments in the source code.

To run a simulation, the procedure typical for RepastJ 3.1 simulation models has to be followed. Since DRAMS is just a software framework used from within the Repast/Java code, it is basically transparent to the user.

During simulation runs outputs are generated which are presented and stored in different ways. The DRAMS rules produce text statements, written to a console window and stored in a log file. Per run there is also a sequence diagram generated and stored in an UMLet[2] file, showing all the interactions that appeared in the run. Finally, a graphical visualisation of the agents with animations of the events happening in each tick is presented while running a simulation. All these different representations are base for the results presented in the following section.

[2] http://www.umlet.com/.

11.6 Simulation Results

11.6.1 Narrative of the Scenarios: A Virtual Context for Real Possible Courses of Action

Simulation models typically generate an output such as times series or histograms. Here the output is different: A simulation run generates a story which describes a scenario. In the following some of these scenarios generated by model runs will be described. The objective of the scenarios is exploring the fact that the development of the behavioural rules of the agents is based on a qualitative analysis of textual data. The rules that are fired during the simulation runs can be traced back to annotations in the original textual documents. Examples of these 'open codings' have been shown in Chap. 10 describing the analysis of the textual data. In the description of the scenarios the rules are now traced back to the original annotations in order to develop a narrative of the simulation runs, i.e. the scenarios are a kind of *collage* of the empirical basis of the agent rules. Thus the reader will find text elements that had already been used to illustrate the conceptual model. However, a different composition of single pieces of evidence (generated by the execution of the program code) generates different stories. Firing of certain rules makes certain follow-up actions more likely whereas others are excluded. By exploring the behavioural space of the model the scenarios attempt to explore counterfactual situations of a complex configuration in which many decisions are involved that make different outcomes likely. This can be described as 'virtual experience'. For this reason the scenarios develop a storyline of a virtual case. (See Corbin & Strauss, 2008 for the notion of a storyline that provides a coherent picture of a case. They treat the storyline as the theoretical insight of a qualitative analysis.) In sum, the scenarios close the cycle of qualitative simulation, beginning with a qualitative analysis of the data as basis for the development of a simulation model and ending with analysing simulation results by means of an interpretative methodology in the development of a narrative of the simulation results.

For this reason, the description suggests to be a story of human actors for exploring the plausibility of the simulated scenarios. The plausibility check consists of an investigation whether the counterfactual composition of single pieces of empirical evidence remains plausible, i.e. if they tell a story. Nevertheless, the reader should be aware that the story is about software entities which execute rules programmed in the code. Italics in the text indicate that the description paraphrases annotations of the empirical text basis of the fired rules. The scenarios explore the path dependency of the simulation runs generated by probabilistic decisions rules. The only variation of the parameters is the number of so-called 'reputable' and 'ordinary' criminals (see description of the model). RC stands for reputable criminal, C for ordinary criminal and WC for white collar criminal, who is responsible for money laundering. The scenarios presented here do not represent the full behaviour space of the model but only those that are of interest for examining modes of conflict regulation and outbreak of violence in a group with properties comparable to the empirical case, namely a group with no managerial authority assigned to certain positions such

as a 'boss' or 'godfather' in a professional, mafia type organisation. Nevertheless individuals differ in their reputation. We show cases that are representative for certain typical classes of the course of simulation runs. First a scenario is presented that resembles central features of the data. Second, this is contrasted by a simple example of how escalation of violence could have been avoided. The third scenario represents a case in which the group managed to overcome a severe escalation of violence. Finally the fourth scenario shows a case of successful police intervention.

Scenario: Eroding of a Criminal Group by Increasing Violence

The scenario consist of 7 RC, 3 C and 1 WC.

Tick 2–Tick 15: Initial Violence

The drama starts with an external event. For unknown reasons C0, who never was very reputable, became susceptible. It might be due to an unspecified norm violation, but it may not be so and just some bad talk behind his back. Eventually he stole drugs or they got lost. However, at least RC 1 and RC4 decided to react and agreed that C0 deserves to be severely threatened. The next day RC1 approached C0 and told him that *he will be killed* if he is not loyal to the group. C0 was really scared as he could not find a reason for this offence. He was convinced that the only way to gain reputation was to demonstrate that he is a real man. So *threw the head of RC1 against a lamp pole and kicked him* further on more when he sank down to the ground. RC1 did not know what was happening to him that such a freak as C0 was beating him down; RC1 is one of the most respectable men of the group. There could only be one reaction: He pulled his gun and shot. However, while shooting from the ground the bullet missed the body of C0.[3] So he was an easy target for CO. He had no other choice than pulling out his gun as well and shot RC 1. Figure 11.21 shows this initial sequence of escalating violence as it is displayed in the visualisation of the simulation model.

Tick 16–Tick 17: Spreading of Mistrust

However, this gunfight decisively shaped the fate of the gang. When the news circulated in the group hectic activities broke out: WC *bought a bulletproof car* and C1 thought about a *new life on the other side of the world, in Australia.* In panic RC6 wanted to severely beat off the offender. While no clear information could be

[3] Note that the following description slightly deviates from the story developed in the simulation: In the simulation the agents reason about the aggression. In contrast here, there is immediate shooting, which might be regarded as 'ad-hoc' reasoning. Similar events can be found in descriptions of other cases of fight between criminals as for instance the Sicilian Cosa Nostra (Arlacchi, 1993).

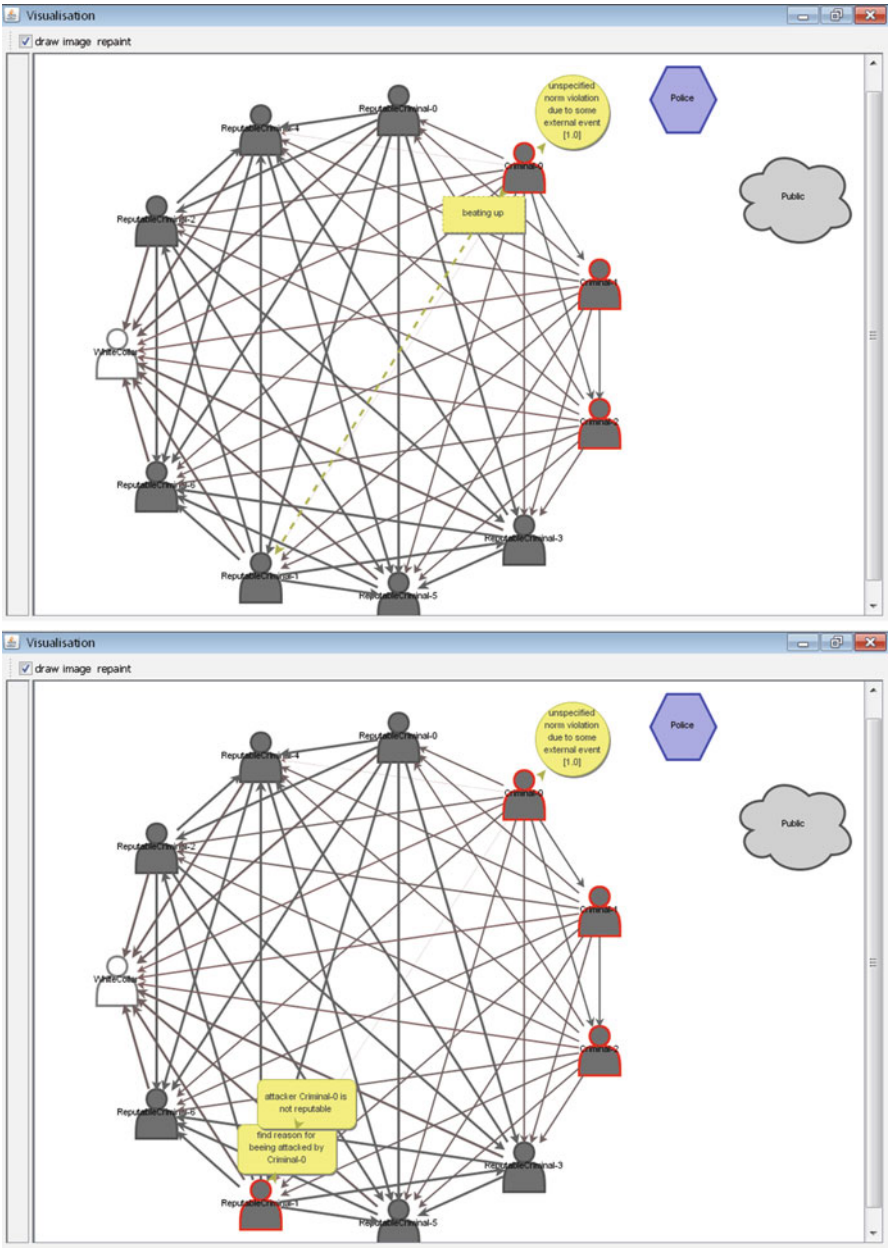

Fig. 11.21 The initial gun fight

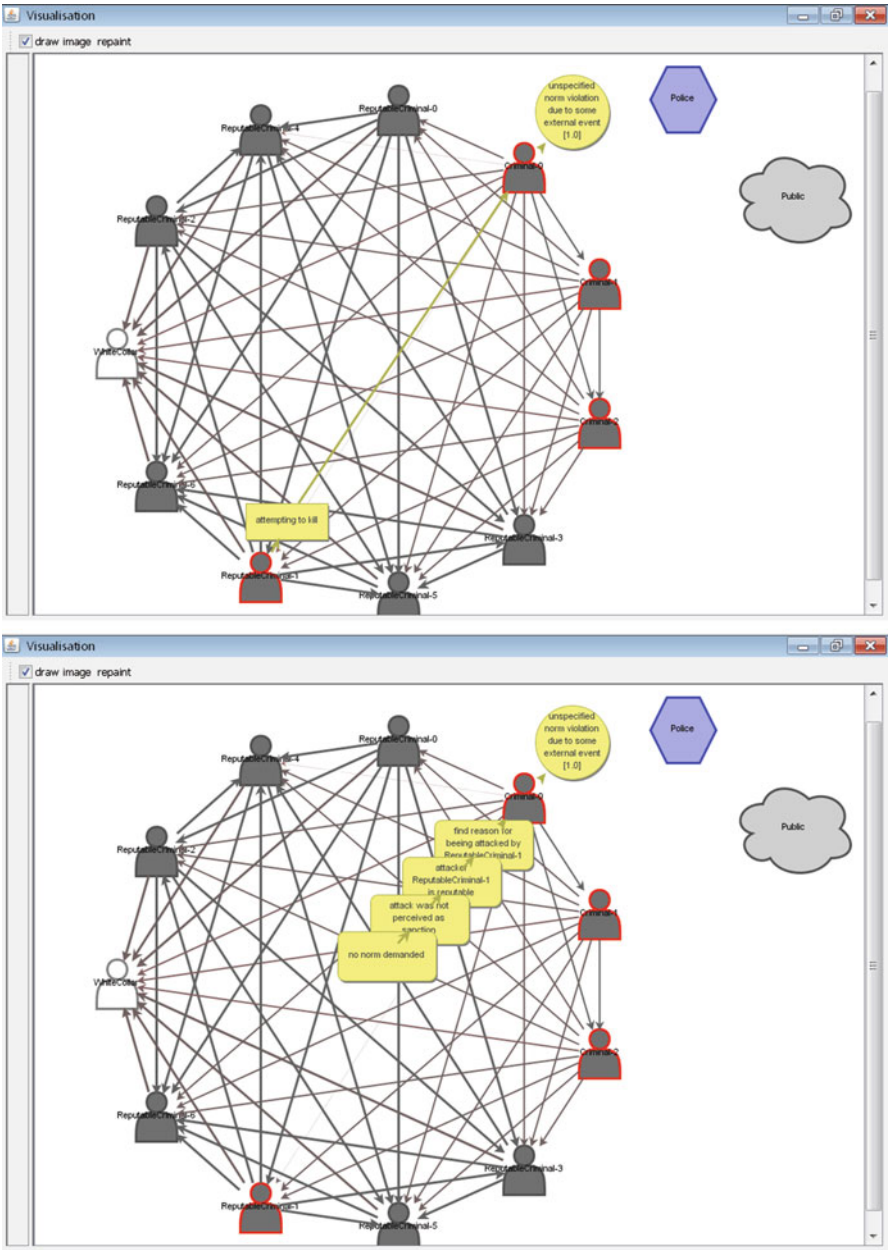

Fig. 11.21 (continued)

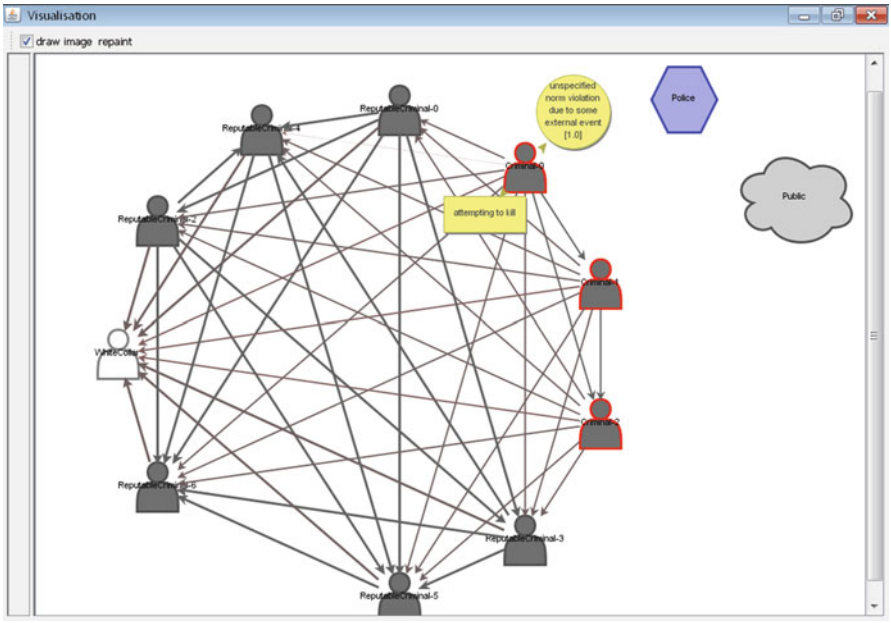

Fig. 11.21 (continued)

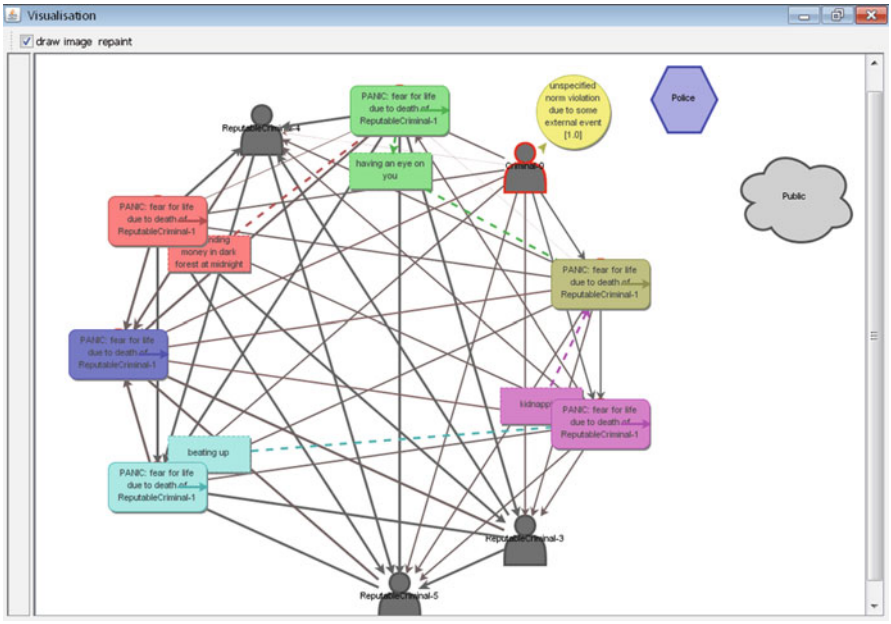

Fig. 11.22 Panic after the gunfight

obtained he presumed that C2 must have been the assassin. So with brute force he beat the hell out of C2 until he was fit for the hospital. *His head was completely deformed, his eyes blue and swollen.* At the same time, RC0 and C2 agreed (wrongly) that it was C1 who killed RC1. While C2 argued that they should kidnap him, the more rational RC0 convinces him that a more modest approach would be wiser. He went to the house of C1 and told him that *his family would have a problem* if he ever will do something similar again. However when he came back RC2 was already waiting for him: with *a gun in his hand he said that in the early morning he should come to the forest* for handing out money. Figure 11.22 is an exemplary screenshot of how this panic is displayed in the model visualisation.

Tick 18–Tick 35: Increasing Panic

But now all the victims are scared: RC0 and C1 and C2 thought about the aggression but find no norm demanded by their offenders. RC0 was fed up with being attacked by his *old friend* RC2 and invoked the general public as audience to articulate his disappointment: *in an interview with a major newspaper he betrayed his role in the network.* However, also C1 learned quickly. When he read the interview he *contacted the newspaper and told them about the role of RC0*. Meanwhile C2 planed his revenge: He *contacted a contract killer* to murder RC6, but the alleged professional turned out to be an amateur: the assassination was a failure. However,

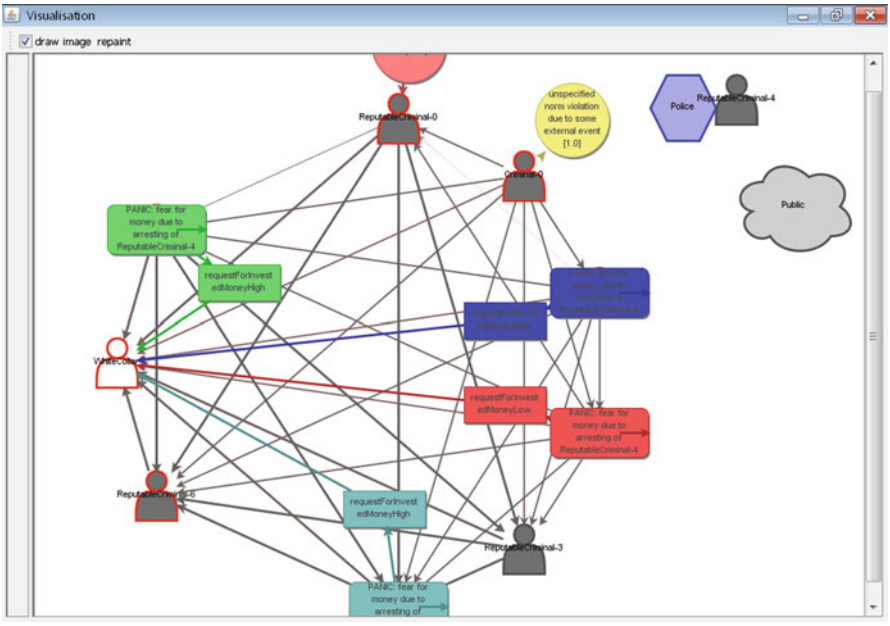

Fig. 11.23 Panic after arresting of RC4

at least RC6 could not identify C2 as purchaser of the killer and was unable to counteract. At the same time RC2 was wondering why his old friend RC0 betrayed him in the news and thought that he deserves a severe beating. At the next occasion he slammed his face. Now *remarkable tensions in the relation between RC0 and RC2 broke out.* RC2 was *really in fear*. Secretly *he wrote an anonymous letter to the police* and the police started an investigation of the case. However, it took a while until they were able to collect sufficient evidence for action. For quite a long time nothing seemed to happen. The group went back to its usual business and it seemed that peaceful relation had been restored.

Tick 36–Tick 41: Beginning of Extortion

But the silence was only an illusion. Unexpected by the criminals at one day the police arrested RC4. Figure 11.23 displays the panic after the arresting of RC4. This put the final nail in the coffin: Retrospectively one can say that in this moment *a corrupt chaos* broke out. As they realised that their secret had been disclosed all criminals were in fear for their money. In panic RC2, C1, C2 and RC5 attempted to get their money back. However, after WC paid back RC5 *he had serious problems with his liquidity* and was not able to fulfil the demands of the others. They debated what to do and decided that RC2 was best suited to enforce their claim: he went to the office of WC and *told him that he should repay his debt, because otherwise he will be killed*. However, rumours spread in the group that WC is about to be killed. This had a serious side effect. Now the others got in panic and started *extorting WC*. Indeed WC obeyed. *He arranged a deal in an offshore financial centre to get a credit* and paid most of the demands. *He paid but at least he survived.* Nevertheless, RC3 and C2 came away empty-handed and enforced their claims. *WC was now in a completely despaired situation and tried to counteract. He hired an outlaw gang for murdering RC3* because he knew that *in the gang many hated RC3*. However, the gang did a bad job and he survived. Nevertheless RC3 was shocked as he thought that his standing in the group would make him untouchable. As WC realised that the assassination failed he obeyed the demand for money. Nevertheless RC3 retaliated, but also his attempted assassination remained unsuccessful. This caused RC6, RC2, RC0, C1, and C2 to try to get their money back as long as WC is still living. Indeed, WC made a deal with C1 and RC2 by *selling them a building far below the true value.* When C2 and RC0 heard that they got outraged and decided for a plan made by RC0: He arranged an appointment between WC and his lawyer. *However, when WC entered the office, RC0 was waiting for him instead of the lawyer, accompanied by two seemingly Russian guys. One of them ordered him on his knees and pressed a machine gun at his head. … Then they forced him to sign a contract that he is no longer the owner of his investment company …. WC was in great fear for life. From that moment on, when he has appointments with RC0 he was wearing a bulletproof jacket.* And still the extortion of WC went on for longer. RC2 ordered him to *come in the night to the forest near the town and still wanted more money.* WC *was so*

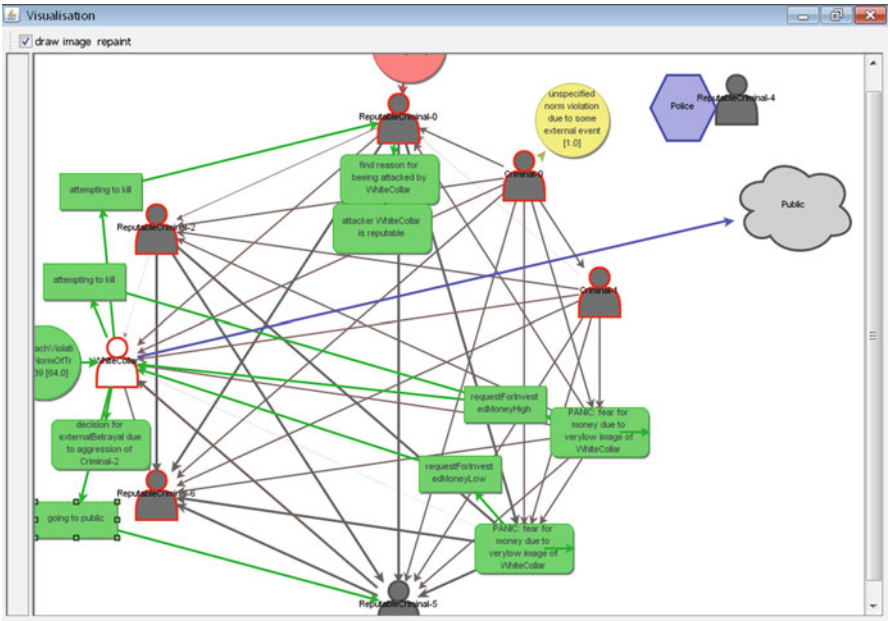

Fig. 11.24 WC going mad

much in stress that *he looked like years older.* He wondered why RC2 threatened him because usually RC2 was a reliable guy and he paid him already.[4]

Tick 41–Tick 73: Rampage of WC

It was a vicious cycle: The more he got extorted, the more urgently did all others demand their money back. It was like a run on the bank. After rumours arose of RC2 threatening WC, also RC0, C1, RC3, and RC5 made claims. WC *borrowed some money from a friend* for RC5 but refused the claims of the others. Now *he was like a hunted cat…. Isolated from the rest of the group* he *became completely hysteric.* This situation is shown in Fig. 11.24.

WC wondered if he should kidnap RC6 but then he made a different plan. *He called to meet RC2 at the construction site for a discussion. However, in fact he came with two weapons. With one weapon he wanted to shoot down RC2 and put the other weapon in the hand of RC2 to claim that he shot only in self-defense.* When RC2 saw him with the gun he *pulled out a machine gun and tried to hold it in his stomach* but WC was faster and shot him to death. Still outraged he wanted to go on and also kill C2 but this time he failed. But still his feelings of vengeance were not satisfied. He arranged *an interview in a newspaper* in which he made severe accusa-

[4] The space characters ('…') indicate that two different in vivo codes (at different parts of the original text) had been used.

tions against RC5. RC5 was shocked because he thought that WC was a trustworthy guy. Still WC had to handle extortion. Several plans for squeezing him out had been made. C2 and RC 3 now completely lost any trust in WC. While being in fear for his life, their fear for money was even stronger and they requested money back. Indeed, WC found a way to give money to RC3 but refused the claims of C2. Instead he *told the newspaper also the crimes* of C2. Now all were in panic and the fate of the group was governed by a *rule of terror*. It was RC3 who finally *killed WC in the middle of the street* in front of his office. After the assassination the police captured C0 and several haphazard plans had been made. Still many wanted revenge for the WC's rampage and tried to find a way to get their money. For instance RC3 did not give up a plan for kidnapping. But after a while the group faded away. Only RC2 remained silent. Eventually he still enjoys the fruits of his criminal activities somewhere in the South Seas.

Decisive Critical Junctures

Initial gun fight: That the bilateral conflict escalated in murder caused outbreak of panic in the overall network and therefore diffusion of the conflict in the group.
Wrong assignment of perpetration of offence caused spreading of violence in the group.
Arresting of RC4 leading to fear for money: this started the cycle of extortion whereas initially WC was not involved in the conflict.
Rampage of WC: turned the panic from fear for money to fear for life.
Killing of WC blocked restoration of the group.

Scenario: A Small Irritation

The scenario consists of 3RC, 7C, and 1 WC.

Tick 1–Tick 4: Initial Loss and Restoration of Trust

At the beginning of this story RC5 began to mistrust WC. Eventually, WC embezzled his money as RC5 *had invested a significant amount of black money in WC's company structure*. However, it remains ambiguous what exactly happened. Anyway, RC5 wanted his money back. *They had a meeting at the office of their lawyer to appraise the value* and WC obeyed the request. So trust was restored and

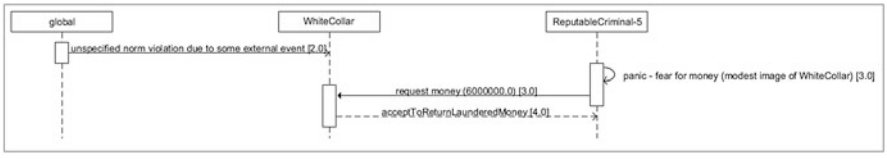

Fig. 11.25 Sequence diagram of the scenario

the groups continued their criminal activities. The sequence of actions is displayed in Fig. 11.25.

Decisive Critical Junctures

Initial loss of trust against WC (and not another criminal) provided the chance for conflict resolution (by paying) and to avoid escalation of the conflict.
WC obeyed the request for money.

Scenario: The Group Overcomes Severe Escalation of Violence

The scenario consists of 7RC, 3C, and 1 WC. In order to make the description of the scenarios more compact we abstain from presenting further graphical illustrations in the following.

Tick 2–Tick 7: Brute Force

At the beginning of the story C1 had been accused by RC1, RC2 and RC5 of having violated their trust. It remained unclear what exactly happened. However, they agreed that C1 should be under observation and RC5 *installed concealed microphones and even a camera in his apartment.* But C1 realised that they mistrusted him and *was in fear of being monitored.* He had a strong ego and even though he knew that RC5 was a respectable man he could not endure such an affront. Without hesitation he *shot RC5 to death in the middle of a busy avenue.*

Tick 8–Tick 19: Spreading Mistrust

This sudden excessive violence completely out of proportion was a shock. RC0 and C2 got in panic. RC0 *bought a bulletproof car.* C2 attempted retaliation of the murder of *his longtime ally*. He was convinced that such an exorbitant murder, much like an execution, could only be mandated by RC1, the *arch-enemy* of C1. He knew that RC1 would come to a big party at the next weekend. There he waited for him with some of his comrades. What followed was *like a mafia movie: they approached him and slammed his head when he wanted to enter the party room. In panic RC1 ran out of the building. One of the guys threw him against a street lamp but he could escape in the dunes directly behind the building. There he wanted to hide but the goons were behind him. He ran to the street and jumped in a taxi. The taxi driver brought him to a hospital.* In fact C2's suspicion was simply wrong. So RC1 had no idea what was happening to him, but he swore that C2 will be sorry for his offence. However, his revenge was more sophisticated. He knew that C2 was responsible for a major drug transport and he stole a considerable amount of the commodity. Nevertheless, as C2 realised that he was betrayed he suspected that RC1 was behind it. As he was more a goon he decided to ultimately solve the problem by shooting

him to death. *He called to meet RC1 at the construction site for a discussion. However, in fact he came with two weapons. With one weapon he wanted to shoot him down and put the other weapon in his hand to claim that he shot only in self-defense.* However, RC1 anticipated that the meeting would be a trap. Instead of coming to the meeting *he gave an interview with a major newspaper in which he provided detailed insights in C2's criminal activities.* So the conflict between C2 and RC2 finally resulted in a disclosure of the secrecy of the group. In fact, the police started a criminal investigation.

Tick 20–Tick 27: WC Becomes Involved

As secrecy is obviously essential for undisturbed drug dealing, RC3 wanted to give him a lesson and *started an affair with his girlfriend.* Indeed RC1 felt cuckolded and was wondering why RC3 betrayed him. At the same time, C2 got outraged when reading the news and retaliated in kind. He contacted the *newspaper and told them about RC1's role in the group.* Immediately when he read it, RC1 went to the home of C2 and *hold a pistol against his head,* shouting '*now you will die!*' Also C0 was fed up. He wanted to kill C2 but something cropped up: The police investigation resulted in arresting R6. As it now became clear that the police was pursuing them, all were in fear of losing their investments and tried to get it back as soon as possible. Now WC was in trouble. RC0, C1, C0 and RC4 *came to his house and ordered that he should come at 10 in the wood near the town. There they asked for money.* In fact, *threatening and intimidation* worked: WC paid as much as he could. *I paid but I'm alive* as he later said. However, it took not long until he got *problems with his liquidity* and he was unable to pay RC0 and RC4.

Tick 28–Tick 37: Police Interferes in Ongoing Violence

The bank refused the monetary transfer because of the negative account balance. RC0 made a phone call to WC. He was really angry. In their favourite club C0, C1 and RC3 saw how he ran out of the café *with lather in his mouth and kicked a bike against a tree.* This made them wondering how save the rest of their money was. They took their *standard approach: threatening and then ask for the money.* However, now WC was curious. What the hell did they want furthermore? He said to them that he *does not know how to pay anymore because his bank account was completely empty.* Not much later *the police received an anonymous letter.* One may wonder who wrote the letter ….

At the same time conflict between RC1 and C2 that occupied the group for a long time already was still not resolved. RC1 *hired an outlaw motor cycling gang to assassinate* C2. However, they did not do a very professional job. C2 survived the attack and *told the newspaper* that he already had contacted previously about the attempt. Meanwhile the individual reactions to the crisis created more and more a *corrupt chaos.* While C0 started making plans to kill WC because he thought that *WC wanted to keep for himself their investment* WC wanted to take on initiative

himself. *He was at a point where he was totally despaired.* He got guns and had a plan to shoot down RC0. *He made an appointment with RC0 at the construction site for a discussion. However, in fact he came with two weapons.* However, in the last moment he didn't dare because *he was afraid of fingerprints at the gun.* Yet as RC0 saw WC approaching him with a weapon he was so much in fear for his life that he did not counteract. However, as rumours spread telling this story RC1, C0, RC2 and RC3 lost trust in WC and demanded their investment back. RC1 told WC that *his family will die if he does not pay.* In fact, WC sold an apartment to C0 but *for a price that was much too low.* However, he did not serve the other demands. They were not amused. However before they could do anything C0 got arrested.

Tick 37–Tick 55: Severe Extortion of WC

In panic all business partners wanted to extort WC ever more now. RC1 arranged an appointment between WC and his lawyer. *However, when WC entered the office, RC0 was waiting for him instead of the lawyer, accompanied by two seemingly Russian guys. One of them ordered him on his knees and pressed a machine gun at his head* to enforce their claims. Furthermore on his way home RC4 laid and waited for WC. He fired a gun to shoot him down but the bullet missed the target. As this news spread, also RC2 threatened him to death and RC3 and C1 took their *standard program: threatening and then ask for the money.* RC3, RC1 and RC0 shared their job and every day when WC came home from work one of them *was already waiting for him at the front of the door of his house.* WC *was like a hunted cat* and in great *fear of his daughter*. However, he had no liquid money. He made deals with C1, RC1 and RC2: *he signed certificates that transferred the ownership of his investment company* to them and *RC1 became its new director.* In consequence the rest of the gang became even more nervous and intensified the pressure on WC. Quite some time the whole group was completely occupied with intimidating and extorting WC. For instance, he was *kidnapped three times* and held in arrest for several hours, *several times he was threatened to death*, and more than once he was beaten until *his head was completely deformed, his eyes blue and swollen.* He was lucky that he survived all the attacks. He undertook several tricks to get money such as *letting apartments owned by his company for half of the price* and *tried to get a mortgage from the offshore market.* He even *asked a friend for money* but could not fulfil all requests. Friends said that *he looked years older.*

Tick 56–60: WC Strikes Back

While WC accepted that the demands were justified finally intimidation was too much. He *secretly contacted the police. … He was shocked when he was told by the police that they knew that he was on a death list.* However, presumably his reaction was not like the police expected. Outraged he *contacted an outlaw gang and gave them the rest of the money he had to kill his enemies.* As many of them *hated some members of the gang* for a long time they undertook a massacre. On their bikes they

drove to the favourite club of the gang and with heavy machine guns they fired haphazardly in the pub until the room was full of blood and impact holes. It lasted only a minute until they drove away with full speed and left back the dead bodies of RC1, RC3 and RC4. This was a shock. Never has such brute violence been observed before and all survivors wondered what actually happened. However, WC smartly erased any traces to him: He remained in *contact with the police for several times* and *gave a public interview* in which he completely laid open the criminal operations of the group. However, at the same time he agreed to a financial deal with RC0 in which he *bought fictitious rights for a major infrastructure construction.* He got a bank loan for that deal. To pretend a prestigious business *the meeting was held at a lake in Switzerland and WC came in his own private jet.* However, the *whole project was just fictitious.* Thereby WC succeeded to preserve his appearance both to the police and the criminal group. But then C2 got arrested by the police and in panic RC0 and RC2 requested their investment back. So his plan failed.

Tick 61–Tick 71: Restoring the Business

RC0 undertook another attempt to kill WC and the spiral of intimidation and extortion seemed to start again. WC was afraid that his plan will be disclosed and obeyed the request. He paid at least to C1 but could not pay RC2, who asserted that *he will kill him if he doesn't pay.* In spite of WC's partial cooperation RC0 *launched intimidating pictures of WC to the media.* However, before anybody could undertake any further action the police intervened and arrested RC0. Now worry about the money was more urgent than personal animosities. After RC2 *placed a machine gun in front of his stomach* WC paid RC2. *The deal was financed by redeeming mortgages on a construction in Curacao* and all agreed that debts have been settled. Nothing happened any more. Even though many had been killed and arrested, the police could not break up the network. Step by step the remaining members of the group restored trust and build up their business model again. Eventually they still sell drugs to the street hawkers until today.

Decisive Critical Junctures

Wrong assignment of perpetration of offence caused spreading of violence in the group.
Police intervention leads to involvement of WC in the conflict.
Double-faced counter-reaction of WC could have restored trust (if no further police interventions would have happened).
WC's final acceptance of requests enabled (possibility of) restoration of trust.

Scenario: Successful Police Operations

The scenario consists of 3 RC, 7C, and 1 WC.

Tick 2–Tick 3: Brute Force

The beginning of the story remains unknown. C4, who never was very reputable, became susceptible to C3 and C6. It might be due to an unspecified norm violation, but it may not be so and just some bad talk behind the back. It must have been a severe offence since C3 and C6 agreed that a severe reaction was in need. While C3 argued for threatening him to death, C6 was convinced that a death penalty would also be a sign to the overall group. He *hired an outlaw gang* for assassinating C4 and *they shot him to death.*

Tick 4–Tick 9: Spreading of Violence and Mistrust

However, the reaction of the group was different than C6 expected. For instance, RC1 *bought a bulletproof car* in panic. However, as it remained unclear who mandated the assassination the reaction remained ambiguous too: C1 who *was for more than 15 years a friend of* C4 presumed that RC2 was guilty and beat the hell out of him until he was fit for the hospital. *His head was completely deformed, his eyes blue and swollen.* On the other hand, C3 suspected that RC0 mandated the assassination. As revenge *he planned to approach him with a weapon but in the last moment he didn't dare.* Now C2 and RC0 were scared as they *didn't know what was happening to them. A witness testified that RC0 said that C3 must be crazy*. While for some time they remained silent, RC0 was so frightened that he *wrote an anonymous letter to the police* nevertheless. Also C2 planned revenge. On the next occasion he paid C1 back in kind: he wanted to kill him, but *the attack was betrayed* and C1 was *able to escape to Italy.*

Tick 10–Tick 17: Police Starts Intervening

For quite some time it seemed that peaceful relation had been restored and the group went back to its ordinary business. They thought *things were going well and finalised some quite successful projects.* But they didn't know that the police was after them and still C1 wanted revenge. Feeling safe abroad *he gave an interview with a major newspaper and betrayed the role of C2 in the criminal group.* Finally, the police arrested C3. As it seemed to be obvious that the arresting of C3 was the fault of C1, C0 *became completely hysterical*. However, it was RC1 who was able to scent out C1's hideout and he shot him to death. Nevertheless, as the police operation made clear to the group that their criminal activities had been detected, all were in fear for their monetary investments and attempted to get their money back as soon as possible. Indeed, WC was able to *pay several millions to RC0* but soon *he got problems with his liquidity.* The others were not satisfied and intimidated him. After some discussion what would be the best strategy: RC1 went to WC and told him that *he will be killed if he does not pay.* Yet, at the same time the news of the killing of C1 shocked the group: But since nobody knew the assassinator, the

reaction was no more than a shot in the dark. C5 and C6 approached RC2 with a weapon, but in the last moment he was able to run for cover and draw his gun himself. It ended up in a gun fight that all survived.

Tick 18–Tick 38: Police Cracks the Group

Police investigations revealed that *a huge amount of black money had been transferred in the company of WC.* The police was able to collect enough evidence to arrest him. Therefore the group kept silent for quite some time. However, the gun fight still occupied the participants. C5 didn't quit his plans for killing RC2. *He paid a huge sum to an outlaw gang in order that they should kill him* but also these guys didn't succeeded. C6 on the other hand *had several talks with the police.* So nothing seemed to happen for a while but *the alliance was deeply shattered.* RC2 took revenge and *launched some compromising pictures of C5 to the media.* However, C2 noticed it. Going to the public was a severe violation of trust. Therefore C2 arranged an appointment between RC2 and his lawyer. *However, when he entered the office, C2 was waiting for him instead of the lawyer, accompanied by two seemingly Russian guys. One of them ordered him on his knees and pressed a machine gun at his head* in order that he should never do this again. However, it was impossible to restore trust in the group. However, soon after his attack C2 was arrested by the police and both C5 and RC5 were too scared by their experience of being threatened to life. Independent of each other they decided to secretly quit the group and thought that their only chance to survive would be to *secretly contact the police.* In fact, their collaboration enabled an arrest of R0 and to break the criminal activities of the group.

Decisive Critical Junctures

Misleading interpretation of sanction (death penalty) generates outbreak of chaotic violence.
Police intervention leads to involvement of WC in the conflict.
Arresting of WC terminated extortion and the business model of the group.
The fact that many contacted the police (i.e. secretly changed sides) cracked the group.

11.7 Conclusion: Central Mechanisms

The following conclusions are drawn from simulation experiments which may not be valid for and easily transferred to a real-life context. The attempt is to highlight central mechanisms that can be found throughout the scenarios. First and foremost the ambiguity of violence stimulates its spreading in the group. Only the case of an initial loss of trust (a random event) against WC provides the chance to preserve the operations of the group before violence gets out of control. Only WC has the

resources to restore trust by generous repaying as compensation for the loss of trust. This enables encapsulation of initial mistrust.

Moreover, bilateral conflicts may be long-lasting without affecting the overall group. However, they become dangerous when others become involved. This need not be the case immediately. However, in this case escalation of violence easily gets out of control. Once violence spreads WC is the most vulnerable criminal. In particular police interventions rope WC in the internal conflicts. This stimulates escalation of conflicts. For this reason, police operations directly against WC are most effective by destroying the business model. If no further extortion of WC is possible internal conflicts get reduced. Police operations are most successful if a significant number of group members change sides and cooperate with the police.

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