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DOMESTIC VIOLENCE AND COURT MANDATED BATTERER INTERVENTION: A COMMUNITY MODEL

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Many communities in the United States are responding to domestic violence by developing a coordinated community response, which typically involves key stakeholders such as domestic violence shelters, prosecutors, judges, police departments, mental health professionals, as well as other service providers. Court mandated batterer intervention programs have emerged as a key element in the coordinated community response. There has not been, however, a general consensus about whether these programs work. This has taken on an increased urgency as there are now more programs in the community, but the level of domestic violence has remained unchanged. One explanation has been that batterer intervention programs are ineffective because they do not hold abusers accountable. This has led many states to implement minimum standards for batterer intervention programs. This paper presents a system dynamics model of the problem of batterer intervention program capacity expanding while there being no observable impact on the overall level of domestic violence. The model is at the community level, and includes a number of effects, including deterrence from police arrest and batterer intervention program effectiveness. The results indicate that the problem is best explained as a resource allocation problem in police arrests and not as problem with batterer intervention programs' standards. Specifically, the single largest effect came from allocating resources across the full spectrum of domestic violence crimes.

Domestic violence is a major social problem in the United States. In a telephone survey of 8,000 women and 8,000 men in the United States, Tjaden and Thoennes (1998) found that 25% of women reported having been raped or physically assaulted by an intimate partner during their lifetime (versus 7.6% for men). Domestic violence involves a constellation of tactics, including emotional abuse, isolating the victim from resources, preventing her from getting or keeping a job, coercion and threats of violence, rape, and murder. While the tangible consequences are significant, "Battering is far more than a single event, even for the woman who is hit once, because it teaches a profound lesson about who controls a relationship and how that control will be exercised" (Schechter, 1982, p. 17).

While women do leave abusive relationships, many stay or delay in their separation from the assailant because of the economic, social, or institutional barriers such as no alternative housing, lack of support from friends or family, risk of losing custody of their children, and so forth. Feminists pioneered the battered women shelters as a way to provide immediate remedies such as housing, legal advocacy, and emotional support. As part of that effort, shelter staff and

advocates identified policies and practices that contributed to the problem and began developing or participating in inter-agency collaborations such as domestic violence coordinating councils. "At their best, they can identify and tackle the organizational obstacles to confronting male power and empowering women, forge alliances for change, and highlight practices that need to improve and points at which responses fall down between agencies" (Mullender, 1996, p. 250). Participants might include agencies or individuals that deal with some aspect of domestic violence: local battered women's shelters, law enforcement, judges, probation officers, prosecutors, religious leaders, health care professionals, and batterer intervention programs, among others.

While much work has been done on the victim side of the response, there are major questions about how to respond to the assailants. There have always been some "therapeutic" interventions with men who batter, but the 1980's represented a period of rapid growth for batterer intervention programs. Policy changes like pro or mandatory arrest increased the referrals and demand for court mandated batterer intervention services (Sonkin, 1988).[1] Healey *et al.* (1998) estimated that 80% of programs' referrals were court mandated.

Despite this increase, there is currently no overall demonstrated effectiveness in batterer interventions programs (Gondolf, 1999) and there has not been an observable decrease in levels of domestic violence. Much work has been done to identify effective interventions, typologies of batterers that might help target interventions more specifically, and factors that affect such things as dropout rates and recidivism. Most of these research efforts have looked into the specifics of either the program or the batterer, and not examined how programs interact with other agencies and policies in a community.

Related to the increase in the number of programs providing services to assailants have been concerns about maintaining standards. Increasing the number of batterer intervention programs in a community increases the competition for court mandated referrals. As customers of batterer intervention services, assailants seek to find the easiest program, while programs are faced with challenges in dealing with a fluctuating referral rate and the high overhead associated with persons who routinely try to manipulate others. This pressures programs to lower their standards to meet assailants' expectations, which decreases complaints to probation officers, decreases the administrative overhead, and thereby increases the number of participants in a group. When groups are large, facilitators can afford to have high expectations of group members and hold them accountable to those standards. As groups get smaller, facilitators come under increasing pressure to lower their expectations. This problem is seen as getting more acute as the number of programs in a community increases. Consequently, many states have moved to implementing some form of minimum standards, specifying such things as the minimum duration of the program, qualifications of the facilitators and program directors, group composition, and so forth.

Researchers have also raised concerns about implementing interventions without a thorough evaluation of the consequences. For example, Sherman (1992) cautioned against the universal implementation of arrest policies pending a better understanding of the consequences. Debates about the effectiveness of batterer intervention policies are now longstanding and remain unresolved. Responding to some of these issues, Fagan (1996) argued for development of research tools that help conceptualize research designs and integrate findings. Dobash *et al.* (1999) advocated for a holistic understanding of the problem. System dynamics is an excellent method for analyzing the behavior of complex systems. This paper presents a model of the

problem of batterer intervention program capacity expanding while there being no observable impact on the overall level of domestic violence.

Men who batter

A number of efforts have attempted to construct a typology of batterers (Bersani *et al.*, 1992; Gondolf, 1988; Hamberger and Hastings, 1988; Saunders, 1992; and Shields *et al.*, 1988). Initial efforts have tried to identify underlying personality disorders (see Hamberger and Hastings, 1988) with the hope of tapping into existing understandings and treatment approaches for mental disorders. However, Faulkner *et al.* (1992) found that decreases in violence were unrelated to "changes in assertiveness, self-esteem, locus of control orientation, hostility, anxiety, depression, expressivity, or sexual behaviors associated with permissiveness, communion, and/or instrumentality" (p. 53). In short, Faulkner *et al.* disputed the claims by researchers such as Hamberger and Hastings that individual psychological characteristics of abusers played a critical function in the onset and maintenance of abusive behaviors. A subsequent approach was to develop a typology from behavioral clusters. Saunders (1992) found that convicted batterers tended to fall into one of three categories: (1) generally violent, (2) emotionally volatile, and (3) family-only aggressor. However, few of these studies compared batters with non-batterers. And when examined more closely, the qualities utilized to form typologies for male batterers could in fact be used to describe men in general (Sonkin, 1988). If one accepts this assumption, then domestic abuse occurs for sociopolitical reasons. On the other hand, if one assumes that men who batter are psychologically different from men in general, then the main explanation for domestic abuse is psychological.

In reviewing the literature, Carden (1994) found that most explanatory theories for domestic abuse fall somewhere between sociopolitical and psychological theories. Sociopolitical (also referred to as feminist or pro-feminist) understandings maintain that patriarchal political, cultural, and social relations sanction woman abuse. Factors that prevent women from leaving abusive men include political, economic, and social independence (Carden). At the other end of the continuum are psychological explanations that focus on the batterer's developmental experience, namely social learning theory and attachment theory (Carden).

Batterer intervention groups

A group approach for men who batter is preferred over individual, couples, or family treatment (Tolman, 1989). Therapeutic neutrality in couples and family therapy tends to communicate victim blaming and silence the victim as the batterer makes threats outside the sessions (Kaufman, 1992; Tolman, 1989). In addition, Tolman points out that many batterers will seek treatment only when the woman is about to leave. When he is reassured she is not leaving, the violence continues. This deepens the cycle of abuse, leaving the victim feeling betrayed by the therapists and professionals, and making subsequent efforts to leave even more difficult. Nevertheless, many couples and family therapists feel successful in treating family violence.

From a national survey, Gondolf (1990) identified three different treatment theories or modalities for court-mandated batterer programs: therapeutic, psycho-educational, and didactic-confrontational. Therapeutic approaches focus on treating emotional pain and problems. Psycho-educational approaches stress cognitive restructuring and development of social skills. Didactic-confrontational modalities emphasize consciousness-raising and taking responsibility for abuse. No current theory can explain batterers and no studies have indicated a superior

modality or approach (Jacobson, 1994; Sonkin, 1988). Problems with methodology in evaluating batterer intervention programs hinder any firm conclusions from being made (Eisikovits and Edleson, 1989; Fagan, 1996; Petrik, *et al.* 1994). But, the literature does support that some batterer interventions programs make some contribution to cessation in some men (Gondolf, 1995; Gondolf, 1999).

The batterer intervention community model

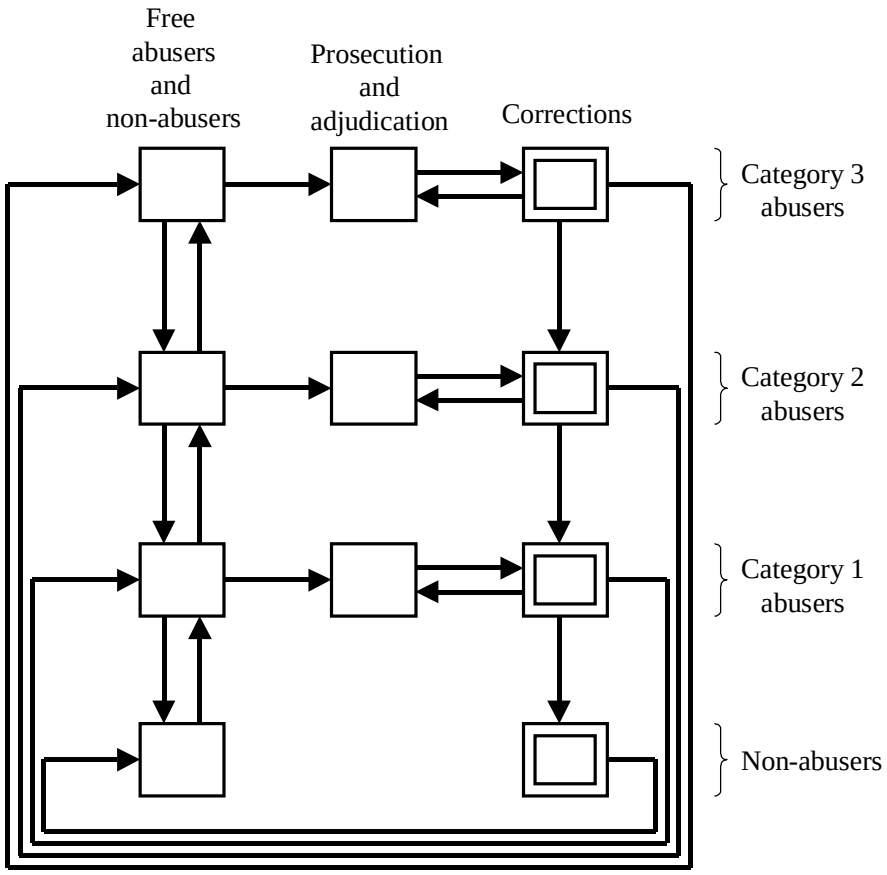
A critical first step in system dynamics modeling is specifying the problem that is going to be modeled, which is often called the reference mode. Many misunderstand the reference mode as something that depends on the modeler having good quantitative time-series data, but the reference mode is really an abstract understanding of the problem (Saeed, 1998). The basic problem for this model is that the level of men abusing women in intimate relationships appears to be in equilibrium despite a growth in the number of batterer intervention programs. There are really two parts to this problem. First, the increase in the number of batterer intervention programs has led to more competition for referrals, which has resulted in a deterioration of standards and effectiveness. Second, levels of domestic violence have been unaffected by the increase in the number of batterer intervention programs. This problem is modeled by simulating a community of ten thousand men.

The model focuses exclusively on men as abusers because (1) men are responsible for most of the domestic violence and (2) including women involves modeling women as both victims and potential abusers. The batterer intervention community model is based on a filtration metaphor: men circulating through various institutions like units of air, abusiveness being a contaminant that is filtered out by intervention programs.

The model was developed using a software package called Powersim Constructor (version 2.51) and based on the domestic violence literature as well as conversations with professionals familiar with or working in batterer intervention programs. The model assumes an initial equilibrium where (1) the highest priority for making an arrest is placed on calls reporting the most severe forms of abuse and (2) there is one established batterer intervention program in the community.

Throughout the model, men are separated into four categories of abusiveness: ranging from not abusive to extremely abusive (see Figure 1). How one classifies the continuum of abuse into these four categories is somewhat flexible. One might consider category 1 to correspond to violation of personal protection orders and misdemeanors. Category 2 would represent physical and sexual assaults and category 3 cover attempted and completed murder.

Figure 1. Flow of men through community

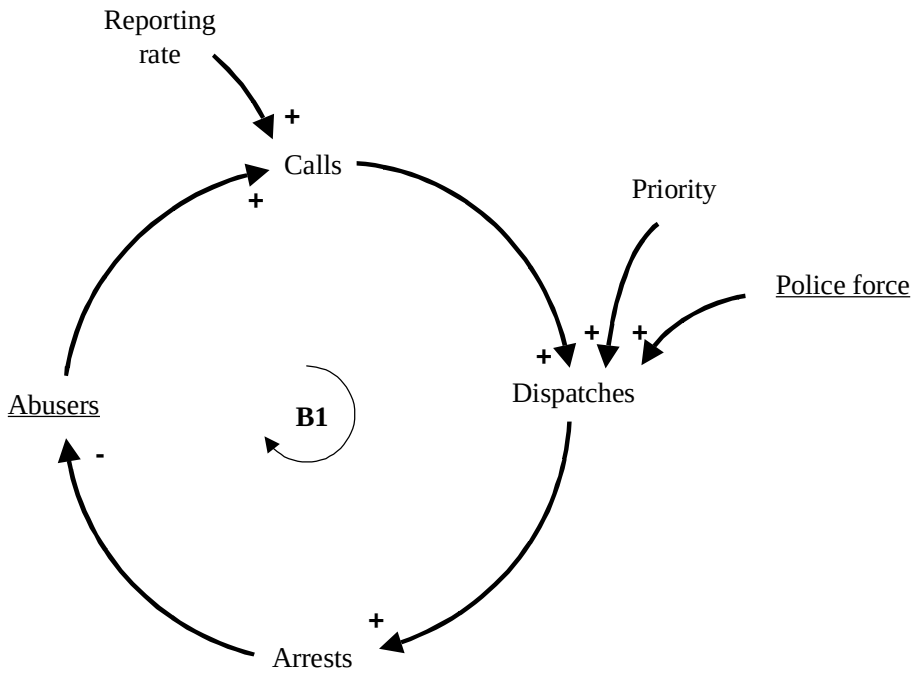


The first sector contains the free abusers and non-abusers in the community, which has two internal processes: escalation of abuse and general deterrence (left side of Figure 1). The escalation process assumes that in a society that privileges men over women and condones domestic violence, some men will become abusive or more abusive. The constant regulating the rate that men escalate corresponds to the factors that inhibit or encourage men to become abusive. The general deterrence process assumes that arresting men for a given category of abusive behaviors will deter other free men from committing similar behaviors and they will move down into a less abusive category. A general deterrence constant has been included as a hypothetical model parameter in order to study the overall impact that deterrence might have on the dynamic behavior of the system.

Abusive men move into the court system via arrests. The arrest rate for each category is seen as a function of a resource allocation process where police officers (as a limited resource) are allocated by the dispatcher in response to reports of domestic violence. Figure 2 illustrates the model of dispatching police officers using a causal loop diagram (rate variables are in normal type, state variables are underlined, arrows show the direction of the causal relationship, and plus and minus signs indicate the direction of influence). The number of abusers and the reporting rate determine the number of calls received by the dispatcher. The dispatcher sends a police unit in response to the number of calls. In turn, the police unit arrests the assailant, removing him

from the free sector, which decreases the number of abusers and hence the number of calls reporting an incident of domestic violence.

Figure 2. Dispatch sector



Prioritizing police response (and hence arrests) is a resource allocation problem. With a 30-year time horizon for the model, simulating individual incidents at the level of minutes or hours is impractical. Instead, general patterns of responses and arrests are modeled. The model allows the user to set the priority for officers responding to incidents of abuse using a zero (low) to one (high) scale for each category. The value for each category is stored in a vector, ArrestFracVec(j), where j corresponds to the category of abusers (i.e. 1, 2, or 3). The number of dispatches in response to category j abusers is then essentially calculated using the formula:

Dispatches(j) = NormArrestFracVec(j)*MIN(PoliceForce*aveCallsPerOfficer, Calls)

Where

NormArrestFracVec(j) = ArrestFracVec(j) DIVZ0 ARRSUM(ArrestFracVec).

This approach calculates the priority for each category relative to the other priorities and with all resources being used to respond to incidents of domestic violence. Aside from the relative priority of dispatching officers to categories of domestic violence calls, allocation is affected by the number of abusers in each category (if there are no abusers, there should be no calls, and hence no allocation of resources) and the number of law enforcement officers. The number of law enforcement officers is seen as a level without any inflows or outflows since in

principle, one can increase or decrease the size of the police force as well as determine the exact number of officers in any given department.

After arrest, men move into the prosecution and adjudication sector (middle of Figure 1). This model assumes (rather generously) that all arrests related to domestic violence result in a sentence or probation. In reality, charges are often dropped. The model also assumes that men do not change while in the court system. This is a simplifying assumption. Allowing men to change categories while in the court system would require comparing the effects of being in a court system only versus court system and intervention as well as a more detailed way of tracking individuals who drop out or are released without intervention.

Men move from the court system into the intervention sector through sentences and sanctions. The first decision is deciding whether or not someone is going to jail/prison. The more severe the category of abuser, the more likely the abuser will receive jail/prison time. By default, the model assumes that (1) jail/prison is always available as a sanction and (2) the rate that cases can be transferred to prison/jail is constant. In some respects, this is a reasonable assumption and reflects the resource limitations of the court system. However, it does not capture the resource allocation dynamics involved with balancing limited court resources and a prison/jail capacity, both of which are major policy issues in the United States.

The second decision is determine where to refer men who are not going to jail/prison. This is often influenced or determined by the probation officers. This model assumes that probation officers make sentencing recommendations based on their relative satisfaction with a given batterer intervention program. When there is only one program in a community, all referrals from the probation officers are to that one program. With two or more programs, probation officers refer participants in proportion to their satisfaction with an active program relative to all other active programs (excluding jail/prison). The higher the relative satisfaction with a given program, the more referrals the probation officers will make to that program. The referral fraction for each intervention j (prison, program 1, program 2, and program 3) is calculated as NormSentFrac.

For j equal to Prison,
NormSentFrac = Jail_vector.

For j equal to a batterer intervention program,
NormSentFrac = Probation_vector*Norm_BIS_referral_frac(j)

Where
Norm_BIS_referral_frac(j) =
weighted_PO_satisfaction(j) DIVZ0
ARRSUM(weighted_PO_satisfaction),

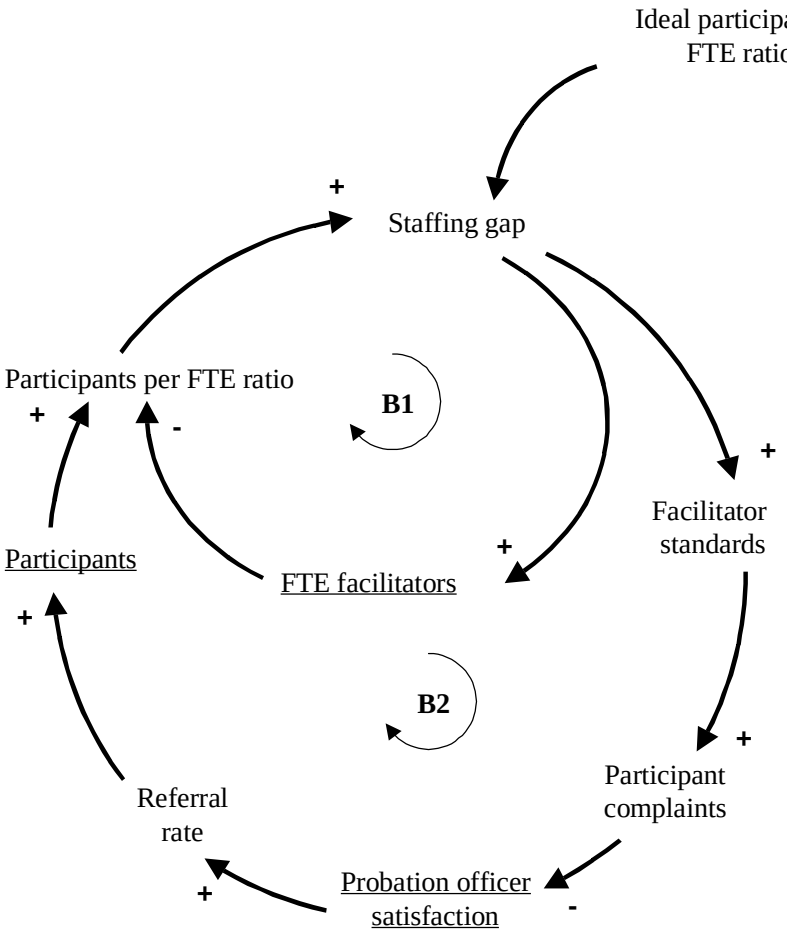
And

weighted_PO_satisfaction(j) = PO_satisfaction(j)*Sw_IntrvOn(j).

Figure 3 illustrates the basic relationships between facilitator expectations of participants, probation officers satisfaction with intervention programs, and the number of facilitators for each

program. The model assumes that the ideal is to have seven participants for each full time equivalent (FTE) facilitator. The staffing gap is the difference between the ideal participant-facilitator ratio and the actual ratio. When the staffing gap is positive (too many participants per facilitator), there is a pressure to increase the number of FTE facilitators. There is a simultaneous incentive for facilitators to raise their expectations, which increases participants' complaints, and decreases probation officers' satisfaction with the program. This slows the referral rate, leading to fewer participants in the program, which restores the participant-to-facilitator ratio. Both are balancing loops. Loop B1 acts more slowly because it takes time to hire facilitators or let them go. Loop B2 acts quickly since facilitators can change their standards from group to group.

Figure 3. Probation, referrals, and batterer intervention programs



In addition to the basic mechanisms of B1 and B2, satisfaction grows as program facilitators contact probation officers, present workshops, meet them at community meetings, and in general maintain positive program-probation officer relationships. Satisfaction declines with time as probation officers are primarily influenced by interactions during the previous twelve months.

When there is only one active program, the complaints have no effect on the number of referrals because the probation officers do not have an alternative. But when there are two or more programs, probation officers are likely to consider the assailants' complaints in the evaluation of the batterer intervention program, their own satisfaction with each program, and consequently in their referral decisions.

The corrections sector contains the jail/prison intervention and intervention programs (the right side of Figure 1). The correction sector has one basic production process, which moves men vertically from high to low categories of abuse. Upon completion of the jail/prison time or intervention, men move horizontally back into the free men sector. The duration T of prison/jail or intervention is modeled as a logarithmic draining function with 90% of the participants having completed the intervention by time T, which means that most leave the intervention prior to T and 10% are still in the program at time T.

The rate that an individual moves vertically from high to low categories corresponds to the strength of an intervention. The overall effectiveness of a particular program therefore depends on how long individuals remain in the program and program's effectiveness: effect size per unit time.

One challenge with building a batterer intervention program model was conceptualizing the intervention. Many practitioners speak of accountability, for example, whether or not a program holds the batterer accountable for his actions, whether or not a facilitator is holding a group member accountable, and so forth. Early efforts included accountability as a state variable because that reflected the language of professionals working in the domestic violence movement. But without more specification, processes that increased and decreased accountability were written with arbitrary conversions. Subsequent efforts led to the thinking of accountability as perception that is the result of a response to another action. I know, for example, that a batterer is being held accountable when a facilitator confronts a batterer who has just obfuscated (tried to conceal, minimize, or distort the perceptions of his actions). One can think of each confrontation as a micro-intervention, with the units of services being the number of micro-interventions delivered. What batterer intervention programs do then is deliver micro-interventions, and by doing that, they can hold assailants accountable for their actions.

This approach revealed some nice characteristics that have been observed in batterer intervention groups. For example, when a batterer is initially confronted on his obfuscating behavior, his reaction is to obfuscate, resulting in more micro-interventions, i.e. a positive loop that is limited by the duration of a particular session. Indeed, one batterer can quickly become the focus for an entire group session. Another is that being able to deliver a micro-intervention depends on the facilitator's ability to identify when the group member is obfuscating and whether or not the facilitator decides to confront the group member. Both relate back to the idea of facilitators confronting members when they fail to meet the facilitator's expectations. Finally, participants' reactions to the group can be calculated in terms of the average number of micro-interventions per participant. This corresponds to the observation that a batterer's "satisfaction" with a group depends on the likelihood that he will be held accountable. The more likely he is to be held accountable the more dissatisfied he is going to be with the group, the more he is going to complain to his probation officer, and the more likely he is to drop out of the program.

There is currently no provision for tracking or increasing the consequences for dropping out. Part of this is based on the fact that many assailants do drop out, and for a period of time,

face no consequences. When they are re-arrested, they are often returned to either the original program or another batterer intervention program.

This model also includes a measurement sector. Results from this sector do not feedback into the main model, but they provide a number of observable variables that are or might be used in public policy decision making. The total number of free abusers is a simple sum of each category of abuser in the free men sector, excluding (of course) the non-abusers. The total number of free men who are not abusers is simply the value of the level representing the non-abusers in the free sector.

Model calibration and validation

Initial conditions for the status quo situation were found by running several simulations where the values of state variables at the end of one simulation were used as the input vector for the next simulation. The process was repeated until the system reached steady state. Without good general measures of abuse, model validation was largely based on structural tests as outlined by Levine *et al.*:

1. Structural verification: Are the feedback mechanisms hypothesized in the model actually present in the system?
2. Parameter verification test: Are the variables in the model meaningful to organizational decision-makers, and are the values of these parameters realistic?
3. Extreme conditions: Do the equations represent reality when extreme, as well as normal values of the parameters are used?
4. Dimensional consistency: Do the dimensions of variables on both sides of each equation match without resorting to a "fudge factor"?
5. Boundary adequacy: Are all the variables that affect the problem behaviors included in the feedback mechanism of the model? (1992, p. 217)

All five of these tests led to refinements in the model. For example, structural verification identified problems with the feedback mechanisms between probation officers' level of satisfaction, referrals to batterer intervention programs, and accountability. Parameter verification tests identified problems with the use of absolute (versus relative) priorities. The extreme condition tests found problems with (1) the court system not draining when there were no arrests and no batterer intervention programs and (2) police officers making arrests when there were no abusers. Examining the dimensional consistency found problems with the relationship between the number of micro-interventions per group and the decrease in probation officers' satisfaction. Boundary adequacy issues ultimately drove the inclusion of arrest policy and different levels of abusers as initial modeling efforts were unable to reproduce the second part of the reference mode: even the weakest intervention led to dramatic decreases in the number of abusers in a community. The result was a model that allowed for different arrest policies for each category of abuser. Subsequent simulations showed that this boundary was adequate for reproducing the reference mode.

In addition to these tests, the model was also run using both Euler fixed step integration and Runge-Kutta fourth order variable step integration. The cumulative integration error associated with Euler fixed step methods can lead to oscillations in the numerical solution of some systems. By running the calibrated model using Euler integration and then re-running the same model using Runge-Kutta integration, one can test the model's sensitivity to local

approximation errors. This test indicated that the system was indeed sensitive to local approximation errors.

Changing program standards

The first scenario is a community with one established batterer intervention program that stubbornly maintains its minimum standards and the entry of a program that allows its facilitators' expectations of participants to vary in response to staffing and referrals. A new program might have low expectations or allow expectations to vary for a number of reasons. First, assailants constantly challenge facilitator expectations. Experienced and committed facilitators are able to see through these challenges and confront assailants, but inexperience is likely to allow assailants to get away with more behaviors. Second, holding batterers accountable in court mandated groups is difficult work. Successful programs contend with not only the assailants' pressure to "ease up" but concerns from therapists, probation officers, judges, and other professionals about such things as ethics, cost of services, and insensitivity to client needs. When new programs are established in direct response to the number of complaints about another program, their success is essentially defined in terms of participants' satisfaction relative to the existing program, and they will accordingly modify expectations of participants. Third, lowering standards is an easy way to undercut an established program's grip on the referrals and increase market share.

Figure 4. Scenario one, a new program with model program maintaing standards

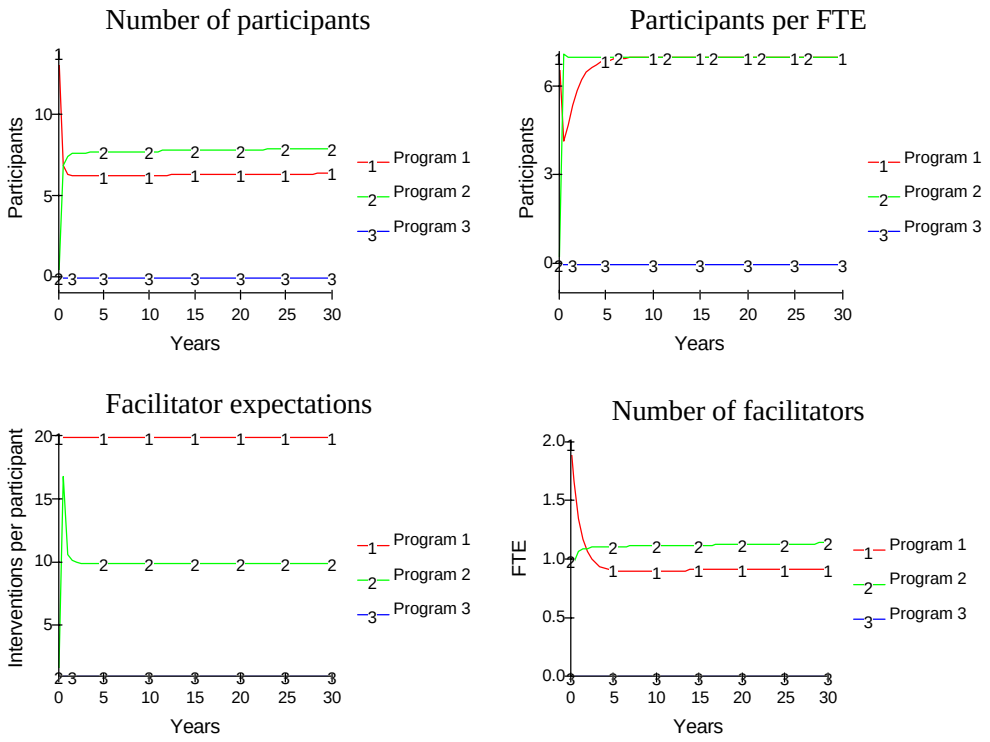
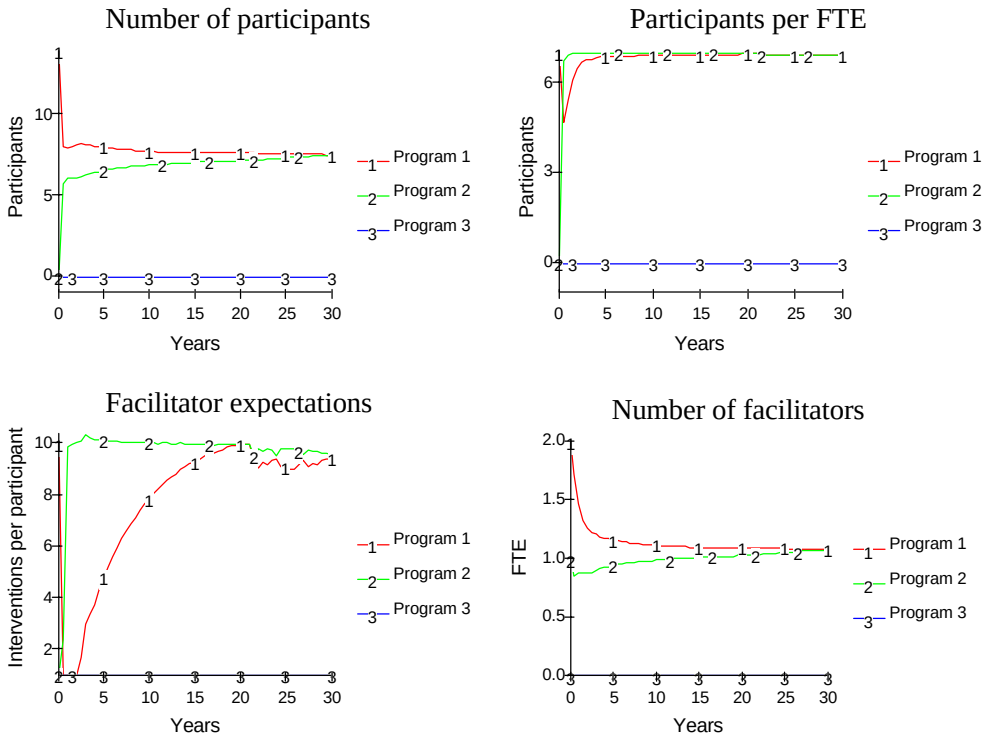


Figure 4 shows the results from simulating the first thirty years after the entry of a new program. The new program starts out with low expectations. The first referrals do not complain

to their probation officers. Probation officers notice this difference and quickly begin making more referrals to the new program, which causes a brief shortage of facilitators in the new program. During this shortage, the new program increases facilitator expectations to adjust the participant-facilitator ratio. But as soon as the facilitators are hired in the new program, facilitator expectations in the new program drop to a steady-state value. Meanwhile, the number of men in the established program drops as the referral rate decreases. The model program keeps their standards high and is forced to reduce the number of facilitators to less than one FTE.

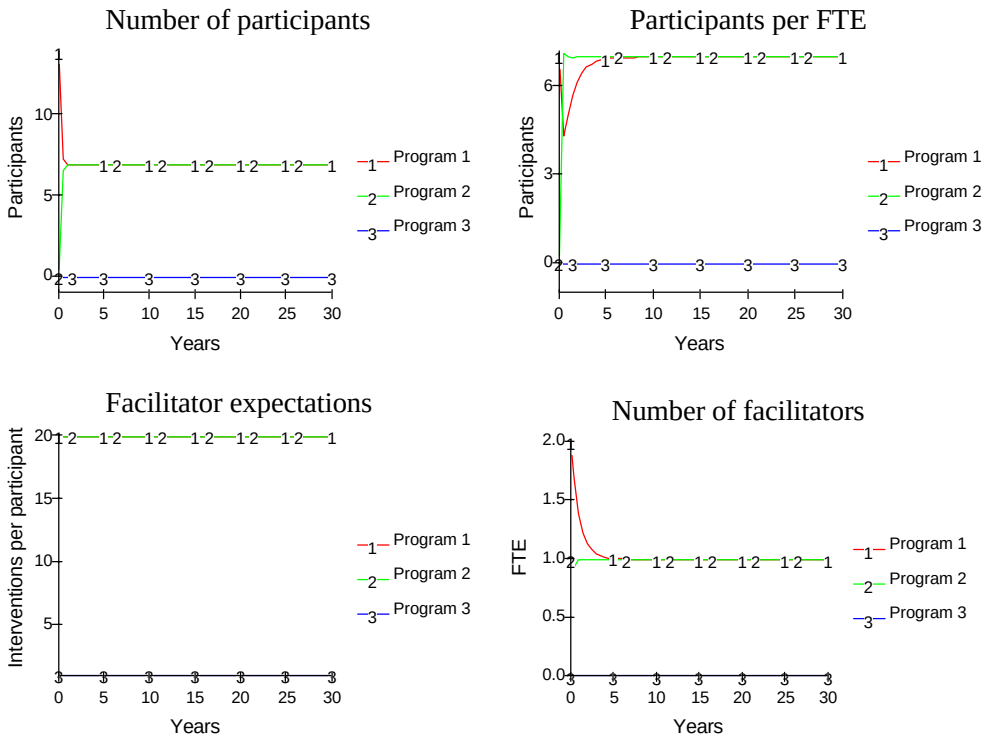
The second scenario is a similar to the first with one important exception: the established program decides to adjust the facilitator expectations. By no longer maintaining minimum standards for participants, the model program is able to adjust to the new environment and improve its competitiveness (see Figure 5). Initially, the program loses participants to the new program. Unlike the first scenario, the established program can vary its expectations for participants. It immediately decreases facilitator expectations to the lowest possible level. While this halts the declining referrals, staffing ratios are still out of balance. The established program resorts to reducing its staff size, bringing the participant-to-facilitator ratio into balance. The established program's expectations are still lower than the new program, so expectations can be raised without causing a major imbalance in the size of the staff. After twenty years, the two programs have about the same number of participants, staff size, and facilitator expectations. Small difference now lead to an oscillation in facilitator expectations as each program makes adjustments that affect the other program. The community now has two programs that appear essentially the same. This last scenario reproduces the first part of the reference mode where program standards decline in response to competition for referrals.

Figure 5. Scenario two, a new program, both with no minimum standards



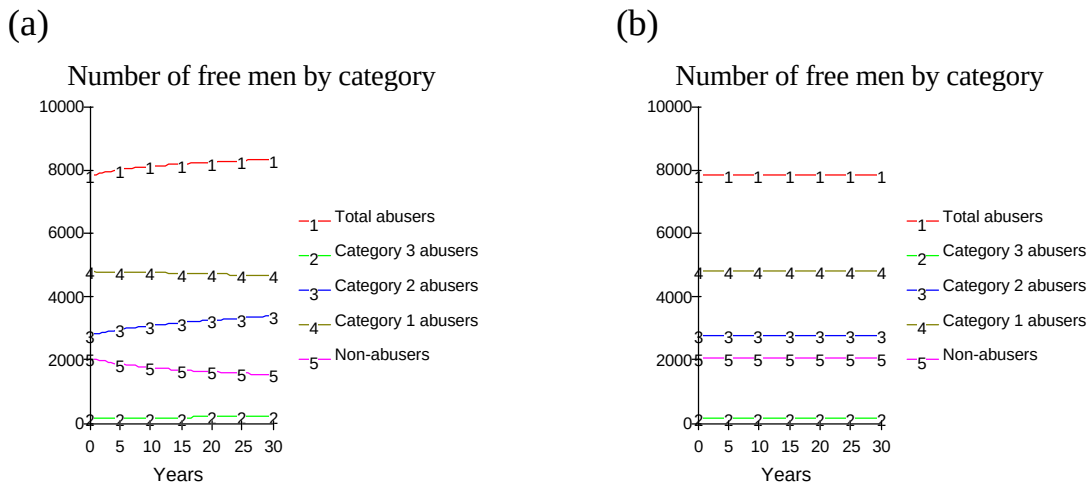
Many communities have implemented minimum standards or guidelines for batterer intervention programs in response to concerns about low standards. The third scenario is a community that enforces minimum standards or guidelines for court mandated batterer intervention programs. By having both programs maintain the same minimum facilitator expectations, programs change their staffing in response to changes in the participant-facilitator ratio instead of modifying their expectations (see Figure 6).

Figure 6. Scenario three, a new program with minimum standards



Having programs conform to minimum standards does not dramatically change the number of abusers in the community. When both programs decrease facilitator expectations, there is a slight increase in the total number of abusers (see Figure 7a), reproducing the second part of the reference mode. Decreasing expectations slows the rate that men move from categories of severe abuse toward not abusing. When standards are high, more men move into the non-abusing category and return to the community as non-abusers. With lower standards, men move more slowly, and fewer men complete the intervention as non-abusers and more men return as abusers, increasing the total number of abusers. In Figure 7a, the increase in the total abusers rises at nearly the same rate as category 2 abusers. Implementing uniform minimum standards simply keeps the system in equilibrium (see Figure 7b) and does not explain why batterer intervention programs do not appear to be working.

Figure 7. The impact of mimum standards on number of abusers in the community



Arrest policy turns out to have an overarching effect on batterer intervention programs and level of abuse in a community (see Figure 8). When the highest priority is placed on the least severe categories of abuse, more men move into the intervention while also being closer to the ideal condition of non-abusing. Consequently, they have a much greater chance of returning to the non-abusing category. Figure 8 shows a dramatic reduction in the total number of abusers as well as the number of abusers in each category and a dramatic increase in the number of men not abusing.

Figure 8. Impact of a new arrest policy

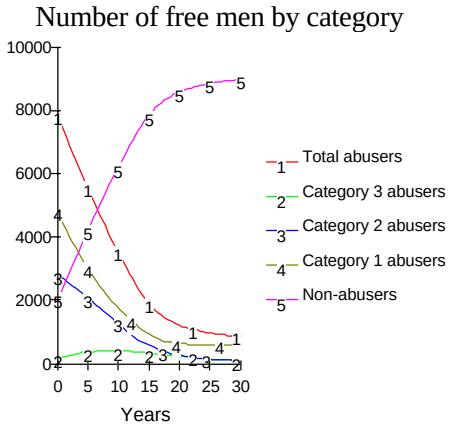
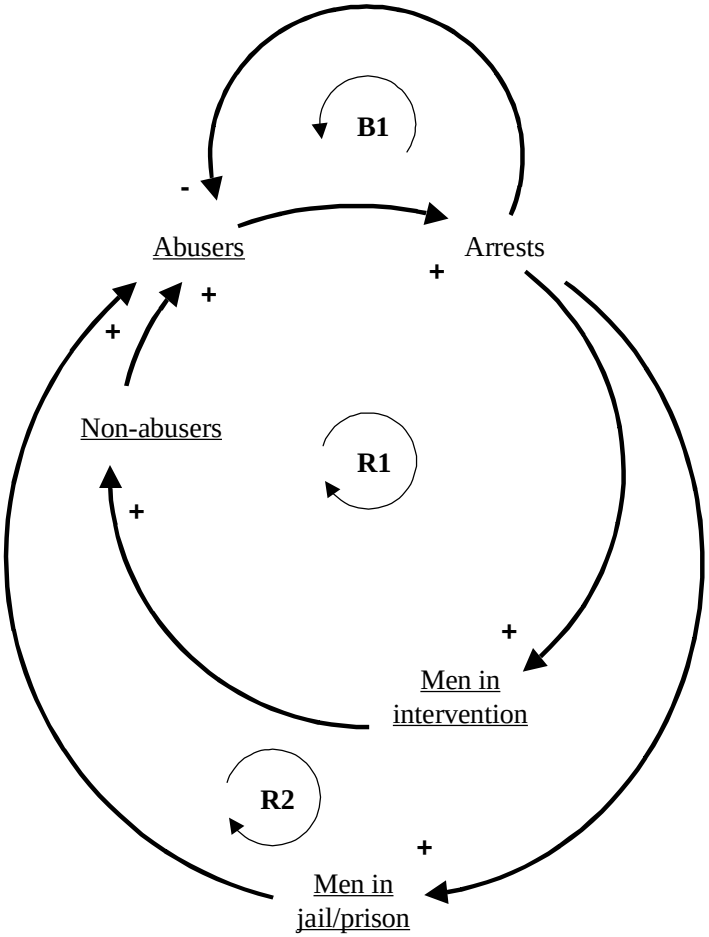


Figure 9 illustrates some of the critical feedback loops. First, arrests have the immediate effect of removing someone from the abuser category (loop B1). The arrest policy determines the split between jail/prison sentences and sanctions involving batterer intervention programs. The more severe the arrest, the more likely a man will be given a jail/prison sentence. So arrest policy determines whether men move into the intervention loop R1 or the prison/jail loop R2. Men in an intervention group become non-abusers, while men in prison/jail are released into the

community, usually as an abuser. With escalation rates being relatively slow, moving into the non-abusing group acts a delay, increasing the proportion of non-abusers. In contrast, when men move through the R2 loop, they are eventually returning back into the abuser category. Arrest policy as an allocation problem determines which loop is dominating the behavior of the system with respect to the number of abusers and non-abusers in the community. However, the innumerable combinations make it difficult to compare different policies without a baseline.

Figure 9. Impacts of arrest policies



Analyzing social policies using optimization methods

Optimization has typically been associated with finding the best solution to a problem according to some specific criterion. Optimization methods have often been used to solve problems such as how to allocate resources most efficiently or finding the shortest time required for completing a set of interrelated tasks. Sterman (1988) warns that one must be careful when considering the objective function. Different functions can lead to different results. This feature can be exploited as a way to evaluate the suitability of using different indicator variables to measure a problem. This becomes especially helpful when one is working with models of problems that are difficult to calibrate in terms of real world observations.

Powersim Solver's incremental search algorithm was to sweep through the parameter space and find the best and worst policies using two different indicator variables: number of non-abusers and number of abusers. The search results led to similar arrest policies but different lengths in prison/jail sentences (see Table 1a). When the number of non-abusers was used as the indicator variable, the maximum prison/jail sentence was 10 years. When the number of abusers was used as the indicator variable, the maximum prison/jail sentence was 30 years. The search for the worst policy led to the same parameter values for both indicator variables.

Table 1a. Best and worst policy using incremental search algorithm

			Arrest priority (0=low, 1=high)				
	Variable	**Criterion**	Category 1	Category 2	Category 3	Prison/jail duration	Minimum standards
Best	Non-abusers	>=10000	1.000	0.667	0.333	10	100
	Abusers	<=0	1.000	0.667	0.333	30	100
Worst	Non-abusers	<=0	0.000	0.000	0.000	.10	0
	Abusers	>=10000	0.000	0.000	0.000	.10	0

Table 1b. Results from simulating best/worst policies

		Thirty-year outcome	
	Variable	Non-abusers	Abusers
Best	Non-abusers	8970	940
	Abusers	8842	923
Worst	Non-abusers	853	9146
	Abusers	853	9146

The incremental search algorithm simply steps through the parameter space and ranks the results, but it will miss solutions that involve parameter values between the steps. Powersim Solver's genetic search algorithm refines the search by randomly varying parameters and using the best results from one round as the starting points for the next round. The results are shown in Tables 2a and 2b. The difference between the policies suggested by the two different indicator variables is 0.14% of total population for the number of abusers and 1.2% of the total population for the number of non-abusing men.

Table 2a. Best policy using genetic search algorithm

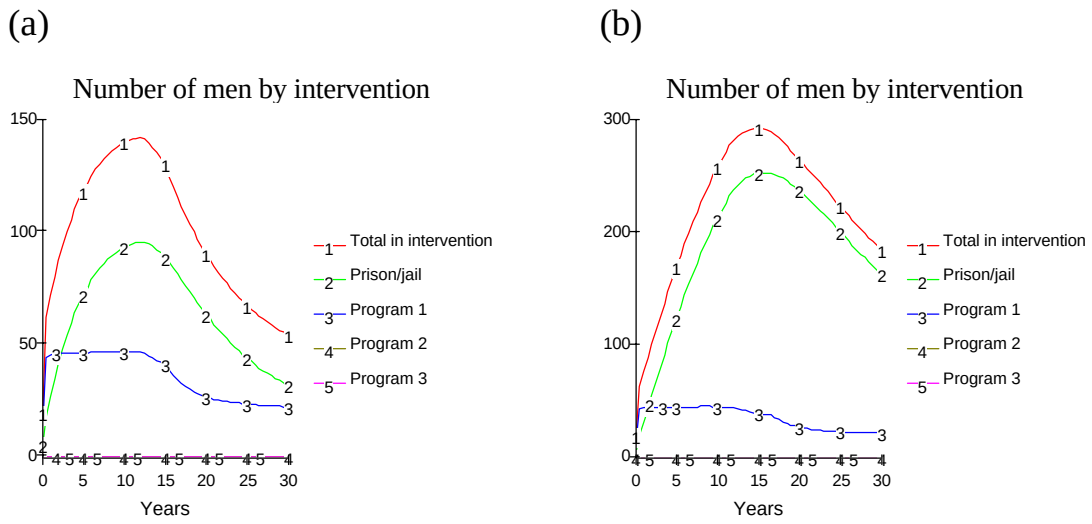
			Arrest priority (0=low, 1=high)				
	Indicator variable	**Criterion**	Category 1	Category 2	Category 3	Prison/jail duration	Minimum standards
Best	Non-abusers	>=10000	0.797	0.377	0.191	7	100
	Abusers	<=0	0.995	0.531	0.285	25	100

Table 2b. Results from simulating best policies

		Thirty-year outcome	
	Indicator variable	Non-abusers	Abusers
Best	Non-abusers	9018	906
	Abusers	8902	892

The results from the genetic search algorithm suggest that the two indicator variables might be equivalent. This would be an interesting result because one could then substitute measures of abusers for non-abusers and vice versa. To test this, we need to consider some of the possible unintended consequences. The major difference between the two policies is the duration of prison/jail sentences: 7 years when using the number of non-abusers as an indicator versus 25 years when using the number of abusers as the indicator. So it is reasonable to suspect that the two policies might affect the number of men in the court system as well as the number of men in jail, both of which would have serious policy implications. Figures 10a and 10b show the results of this comparison. While both appear to have the same number of men in the court system, using the number of abusers as an indicator variable more than doubles the number of men in prison! This suggests that designing a policy around the number of abusers in a community will lead communities to develop policies that dramatically increase the number of incarcerated men with no apparent benefit in the number of abusers or non-abusers free in the community. For the remainder of the paper, I will use the results from the genetic search algorithm based the number of non-abusers as the indicator variable (see Table 2a).

Figure 10. (a) non-abusers as the indicator variable (b) total abusers as the indicator variable



Interaction of arrest policy and minimum standards

Having considered minimum standards for batterer intervention programs and arrest policy separately, the next question is to see how the two policies perform when a new batterer intervention program begins providing services in a community. Figures 11 and 12 show the simulation results for the scenario where a new program begins providing services and neither the established program nor the new program adhere to minimum standards. The immediate impact on facilitator expectations is a dramatic decrease, but the eventual decline in the number of participants after twenty years is related to the decreased levels of abusers in the free

community. After thirty years, the number of non-abusers is at 7445 (82% of the maximum possible value), while the number of abusers is at 2395, *more than two-and-half times the lowest possible value*. When the same scenario is run with uniform standards at their highest level, the results are the same as the best policy using the genetic search algorithm. Minimum standards have a large impact on the number of abusers in a community with the new arrest policy.

Figure 11. Impact of new arrest policy, new program and no minimum standards on batterer intervention programs

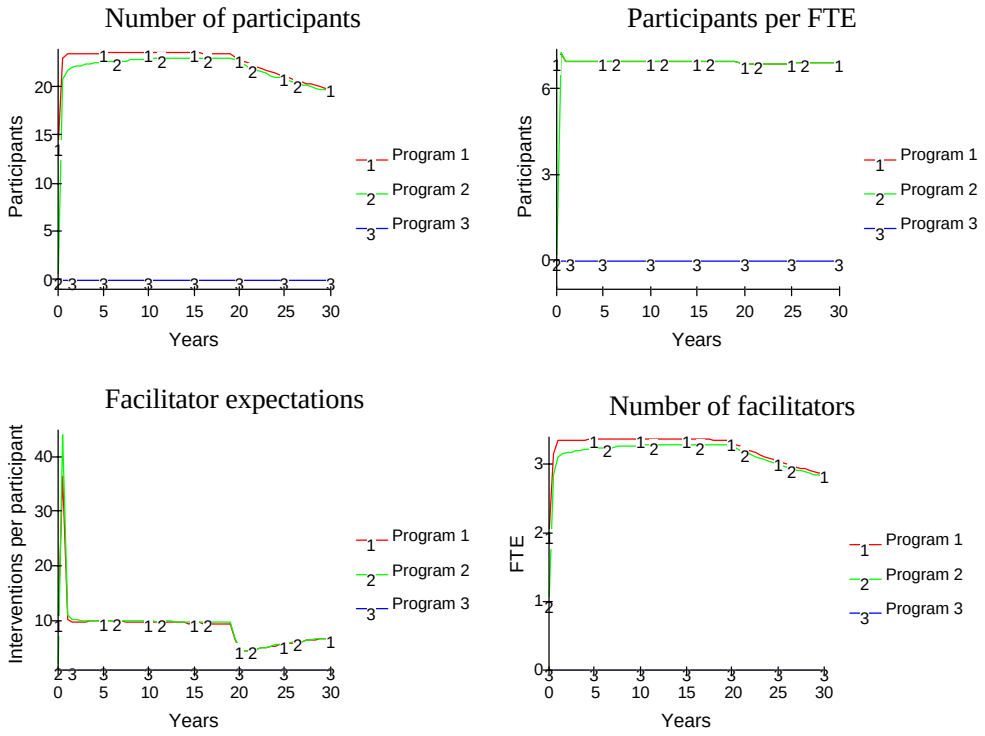
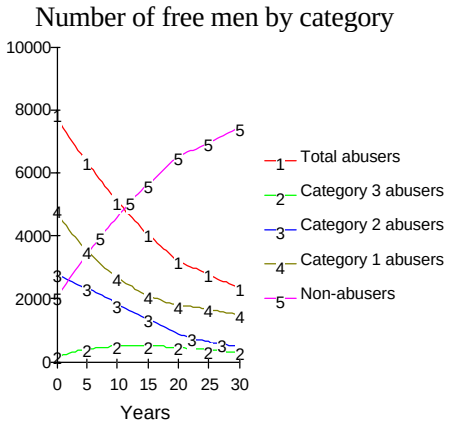


Figure 12. Impact of new arrest policy, new program and no minimum standards on the number of non-abusing men in the community



Sensitivity and uncertainty of model parameters

One of the critical questions in assessing a model is determining the sensitivity to variations in the model parameters. Policy variables that generate large variations in the indicator variable should be considered more carefully as they represent the biggest policy levers. Likewise, differences in the initial value of constants that lead to large variations in the indicator variable suggest important processes for future models.

Powersim Solver was used to conduct a sensitivity analysis to estimate the variation in the impact on the number of non-abusing men after thirty years. Monte Carlo simulations generated random values (n = 100) from a user-specified normal distribution. Policy variables used the optimum values from the genetic search algorithm as the mean, while model constants used their initial value for the mean. For both sets of variables, the standard deviation was set to 10% of the mean so that 66% of the sampled values should fall within plus-or-minus 10% of the mean.

Table 3 shows the impact on the number of non-abusers for each individual policy parameter in descending order of effect. The model was most sensitive to variations in the priority for responding to and arresting category 1 abusers, with jail or prison time have the smallest impact. However, the interaction of the five policy parameters was twice as large as the impact of the category 1 abusers.

Table 3. Model's sensitivity to variations in policies

			Non-abusers	
Model variable	M	SD	M	SD
Priority for responding to and arresting category 1 abusers	0.796	0.0796	8210	130
Priority for responding to and arresting category 2 abusers	0.377	0.0377	8254	86.5
Priority for responding to and arresting category 3 abusers	0.191	0.0191	8282	31.4
Minimum standards for batterer intervention programs	100	10.0	8295	8.66
Duration of prison or jail time	7.05	0.705	8295	3.32
Interaction			8079	268

Table 4 shows the impact of varying selected model constants on the number of non-abusers after thirty years. All four constants generated variations that were large compared to the policy variables. The escalation constant had the largest effect, nearly as large as the interaction of the five policy parameters combined. The escalation constant corresponds to the rate that men escalate from non-abusers to abusers, which includes factors such as cultural attitudes toward women. The general deterrence constant also had a large effect, more than the highest policy variable, followed by the change rate constant. While the reporting constant had the smallest

impact among the model constants, it still had an impact that was larger four out the five policy variables. These results indicate a need for developing a more detailed picture of the processes that correspond to model constants.

Table 4 . Model's sentitivity to variations in constants

			Non-abusers	
Model variable	M	SD	M	SD
Escalation constant	0.030	0.003	8240	217
General deterrence constant	0.500	0.050	8252	151
Change rate constant	1.00	0.100	8230	102
Reporting constant	0.500	0.050	8250	98.8

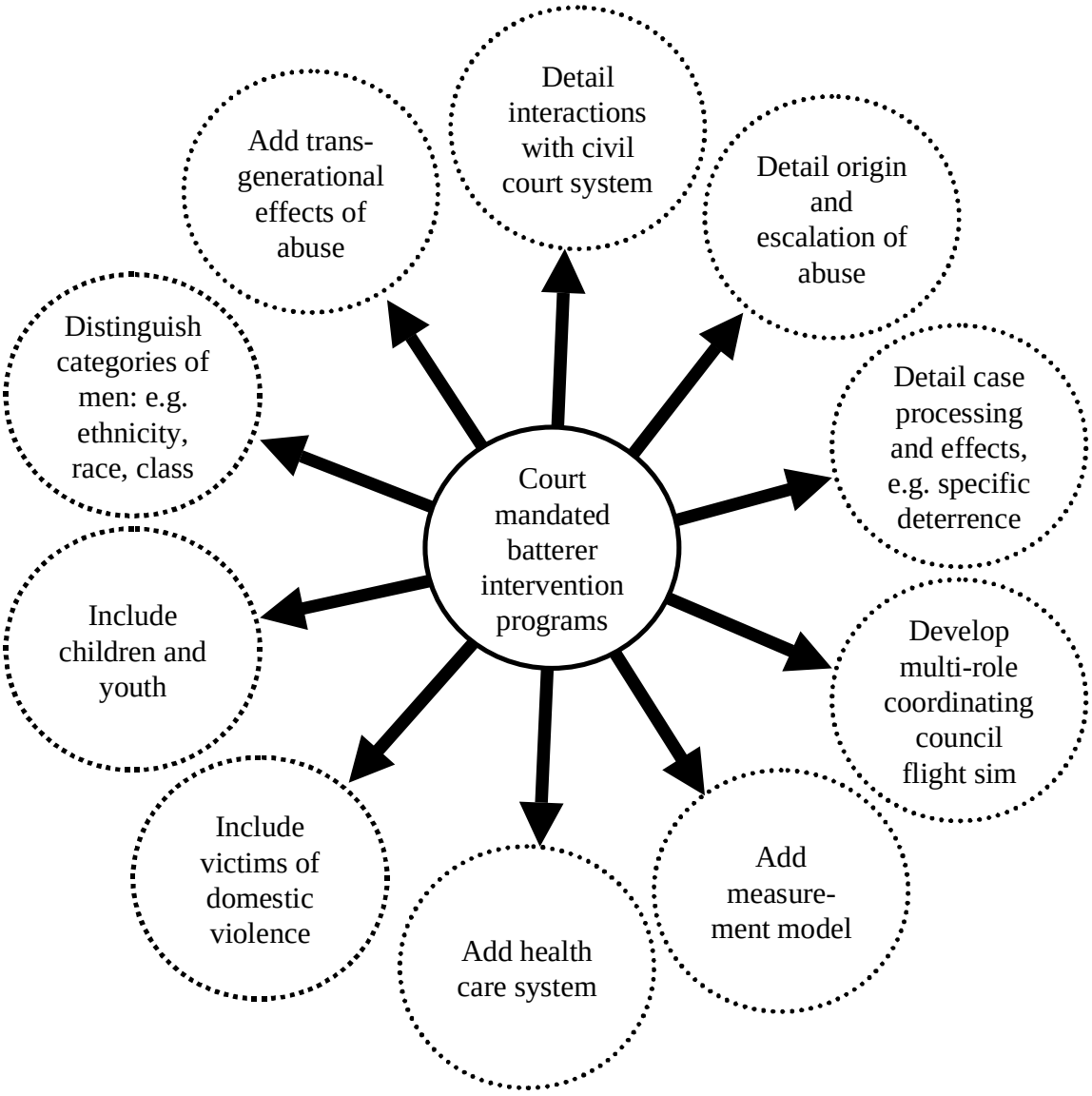
Conclusion

The batterer intervention community model is a first step toward describing the complex problem of responding to domestic violence at the community level. Even so, the model has provided a number of insights. First, the level of accountability in an intervention group might be conceptualized as ratio of micro-interventions to obfuscating behaviors. Micro-interventions can be counted using direction observation methods of batterer intervention groups, and possibly serve as an indicator for accountability. Second, determining the number of men who are not abusing might be a better indicator of domestic violence than trying to count the number of men who are abusing. Third, evaluation of batterer intervention programs should consider the details of arrest policies as control variables.

The model excludes a number of issues that must eventually be considered. First, any change in arrest policies in the United States must be evaluated in terms of terms of race, class, and gender. Increasing the arrests for lower levels of domestic violence is akin to many of the zero-tolerance campaigns, which can exacerbate social injustices within the United States criminal justice system and issues of culturally inappropriate programs (Oliver and Becker, 1994). Second, the model does not include any measures of actual violence or the impact on victims, including the dynamics of reporting an incident to police. Future work should respond to these issues, as well as trying to link the model to other research efforts. Figure 13 illustrates some of the possibilities for future model developments.

Domestic violence and the abuse of women continue to be major social problems. To the extent that we fail to address these issues, we destroy human potential and resources. We can discuss the future economic and environmental challenges ahead, but our ability to identify and implement solutions will ultimately limited by our own restrictions on human creativity and political spirit. We must, therefore, seek to understand and solve our social problems like domestic violence as an integral part of developing a sustainable future.

Figure 13. Future directions for model development



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[1] Pro-arrest policies encourage police officers responding to a domestic violence call to make an arrest without having to directly witness the assault while mandatory arrest policies *require* police officers to make an arrest.