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# Defining and Measuring Success for Online Crime-Prevention Communities

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## **ABSTRACT**

This paper is a preliminary theoretical effort to define and operationalize success for a network of online crime prevention communities called Nation of Neighbors. We situate member communities with respect to traditional crime watch initiatives and online communities of practice. We determine five activities – reports, posts, replies, invitations sent, and invitation accepted – that directly or indirectly support the communities' crime-prevention efforts. We conclude by considering future avenues of inferential analysis facilitated by the development of a health metric.

## **Keywords**

Communities of Practice, Crime Prevention, Measurement, Online Communities

## **INTRODUCTION**

Nation of Neighbors is an online resource for communicating about local crime issues. Its original incarnation, the Watch Jefferson County project, was started in 2004 after founder Art Hansen's house was burglarized. After communicating with some neighbors, Hansen discovered that the burglary was not an isolated incident. Eventually, the community was able to work together and collect enough information to assist law enforcement in apprehending the burglar. However, it also became clear that, had there initially been better communication between community members, many of the neighbors could have taken precautions to avoid the burglaries in the first place.

After re-launching as Nation of Neighbors in 2009, the platform has spread to over a hundred active communities, in many cases, with the encouragement and participation of local law enforcement. Its stated goal is to "revolutionize the way community members and law enforcement interact to prevent crime and strengthen communities by facilitating real-time Neighborhood Watch via citizen reporting and fostering social participation within communities" (Hansen & Shneiderman, 2009).

Nation of Neighbors accepts and scores anonymous reports. The report system sends real-time email or text message alerts to members whose alert criteria match the incoming report. Reports can also be aggregated by community or law enforcement jurisdiction. Members can also use the website to (non-anonymously) discuss reports within the community; participate in community discussion; share news, photos, or documents; and manage upcoming events.

Anyone can use the platform to start an online counterpart to their community. Users define the geographic boundaries of their neighborhoods, then report and geo-tag crime-related activities that they witness in their area. These reports are automatically compiled into a Google Map. Communities sometimes overlap, so for example, it is possible to have one group for a neighborhood that is entirely encompassed by another group for the whole city. Alerts are distributed to all communities that encompass the location of the event.

In 2010, Nation of Neighbors began a multi-disciplinary collaboration between Computer Science, HCIL, and Sociology at the University of Maryland. The goals were twofold: to design and develop visualization and analytic tools that aid the study of social networks and to increase Nation of Neighbors' effectiveness in facilitating community engagement and reducing crime. A range of data were collected, including user surveys (n=157), exhaustive network data recording user interaction, a set of ego network data collected in the user surveys that bridges the survey data and network data, report and conversation

content formatted for content analysis, and a set of experimental data on user recruitment. Before this data can be used to compare and evaluate the various communities within the Nation of Neighbors platform, the team needed to establish a set of criteria that enabled the health and success of these communities to be measured. This paper is an account of theoretical development of these criteria.

We first review the history of traditional crime watch programs and, importantly, their perceived failure to produce meaningful crime reduction. We then consider how an online crime-prevention platform may mitigate some of the difficulties experienced by conventional, face-to-face crime watch programs. This leads us to make an important assumption: In order for Nation of Neighbors to succeed in its mission of crime prevention, it must, simultaneously, succeed as an online social network. In fact, because causal inferences are very difficult to make between crime rates and the introduction of crime prevention programs, we determine that the best approach to evaluation is to focus on capacity building. As such, we turn to the recent literature on evaluating online social networks to develop criteria for evaluating each Nation of Neighbors community qua online communities, on the assumption that the health of a community will correlate with its effectiveness as a crime-prevention instrument. We come to define community health as “communications activity that is appropriate, both in kind and degree, to the needs of a community in its particular stage of development.” and present a series of proximate measures derivable from the available Nation of Neighbors data.

Nation of Neighbors shares characteristics of both traditional community crime watch programs and more recent social networking sites. By locating Nation of Neighbors in the literatures surrounding both these topics, this paper presents a preliminary attempt to theorize how Nation of Neighbors might contribute to community crime prevention efforts. Particularly, we seek to establish a set of criteria for comparing between and judging the impact of various Nation of Neighbors communities.

## **A BRIEF HISTORY OF NEIGHBORHOOD WATCH PROGRAMS**

While local communities have invariably had various informal information-sharing arrangements, the first formal and nationally-recognized neighborhood watch networks emerged in the 1960s, purportedly in response to the highly publicized murder of Kitty Genovese. Genovese, a New York City bar manager, was assaulted while walking from work on March 13, 1964. The attacker, Winston Moseley, stabbed her several times while in plain sight of her neighbors. Her screams were largely ignored, except by one man, who yelled back from across the street. This prompted Moseley to flee. However, seeing that there was no further response by neighbors or police, he returned to the scene, found Genovese in a doorway, stabbed her several more times, and, then, raped her. Receiving heavy coverage by the New York Times, the murder quickly led to public outrage at inaction by both neighbors and police alike. Moreover, panic spread over the thought that seemingly safe neighborhoods might be vulnerable to similarly heinous attacks. In the wake of this fear and anger, communities began to organize community programs to promote collective safety.

Starting in 1972, these largely disparate efforts to develop crime-prevention communities became increasingly formalized and centralized through a concerted effort by the National Sheriff's Association and were united under the umbrella of the National Neighborhood Watch Program. State and Federal funding bolstered these efforts throughout much of the 1970s and 1980s (Hope, 1995, p. 43). In fact, by 1986, 1 in 5 families lived in neighborhoods with watch programs and, in those communities, 38% of families participated (Garofalo & McLeod, 1988). By this period, most of these programs shared a common organization—one that was quite distinct from the bottom-up movements of the 1960s. In fact, most were initiated by law enforcement officials who recruited community volunteers. Thus, the watch's territory was coextensive with the jurisdiction of the initiating police department. This territory was then usually subdivided into “blocks,” which were each assigned a block captain. This arrangement formed a hierarchical network with police on top, block captains in the middle, and community members on the bottom. Block captains acted as gatekeepers accountable for finding and transmitting relevant information between community members and law enforcement. This arrangement was believed to be symbiotic insofar as community members provide more effective surveillance than law enforcement officials, while law enforcement imbues the crime watch program with “an aura of authority” (Garofalo & McLeod, 1988).

During the “heyday of community crime prevention” (Rosenbaum, 1987) when sizable streams of state and federal funding were being poured into the promotion of local crime watch programs, public policy experts and law enforcement officials began inquiring into the effectiveness of such programs and attempting to develop evaluative criteria. Garofalo & McLeod (1988) observe several interrelated goals of neighborhood crime programs: “decreasing opportunities for offenders to act undetected, improving citizen-police relationships, overcoming people's feelings of powerlessness about crime, enhancing a ‘sense of community,’ among neighbors, and raising the level of informal social control that people exercise over their environments.” Other proponents argued that such programs serve to enhance “natural surveillance,” which refers to observation by

community members going about their everyday activities (Clarke, 1995). Neighborhood watch routinizes and hierarchicalizes surveillance in an attempt to make it more systematic. This process includes the identification and amelioration of local blind spots that evade the grid of natural surveillance, such as unlit street corners or empty lots obscured by hedges. The goal of systematized surveillance is, as Foucault (1975/1995) observed in his famous discussion of the Panopticon, to prevent deviance by coercing self-regulation.

Ultimately, however, few studies found a significant reduction of crime after crime watch programs were introduced (Lindsay & McGillis, 1986; Rosenbaum, Lewis, & Grant, 1986; Skogan, 1990; Bennet, 1990), and those that did observed that the positive effects dissipated rapidly (Cirel et al., 1997; Lindsay & McGillis, 1986). In light of this evidence, many watch programs were defunded. Research also raised a range of other concerns. Moreover, drawing a causal relationship between the introduction of a crime watch program and a reduction in crime is quite difficult, insofar as there may be several extrinsic factors at play. For example, a crime watch program may be introduced or become popular because a neighborhood is gentrifying, and the same gentrification mechanism that is driving participation in the crime watch program may also be driving a reduction in crime.

Crime watch programs proliferated in white, affluent suburbs where crime was already relatively low, while they achieve little penetration into non-white, poor urban areas where crime was high (Garofalo & McLeod, 1988; Hope, 1995). Community members in poorer areas reported much high degrees of suspicion vis-à-vis neighbors than residents of more affluent neighborhood. One theory suggests that mutual suspicion inhibits community organization (Hope, 1995). Moreover, class and racial division inevitably generate tensions that infer community organization. Perhaps more problematically, it is possible certain watch groups had racist undertones, making a then common conflation between black and criminal. The neighborhood watch movement did, after all, arise from the same motivations and occur during the most intensive periods of white flight.

Beyond these structural conditions, a rational-choice approach to understanding the motivations of individual volunteers reveals major disincentives to participation by poor individuals. Hope (1995, p. 51) elaborates four dimensions on which participation is discouraged for poor residents:

The first is when the perceived cost or risks of voluntary participation outweighs its apparent benefits – that is, the poor residents of high crime communities have few personal resources to donate to voluntary activity, feel they face considerable danger (Merry, 1981), and may have little personal or (as renters) financial stake in the neighborhood. The second is where neighborhood commitment has opportunity cost – for example, distracting from effort that might otherwise be spent in pursuing opportunities or accumulating resources to be able to move away. The third is where marginal additions of participation are perceived not to produce commensurate reductions in risk—no matter how much effort, neighborhood crime is unlikely to disappear, and the residents still have to pay for the police, in one way or another. The fourth is where “free riding” obtains the benefit of safety at little or no cost to the individual.

So, while the need for effective crime prevention strategies was most pronounced in impoverished urban areas, these were also the locations with most intensive individual and structural constraints on crime watch participation.

Further research demonstrates that the organized community crime-prevention efforts that are most effective and most sustained tend to leverage existing community organizations and add a supplemental crime focus to them (Skogan 1988, p. 54). That is to say, community crime-prevention programs are most effective when they are a secondary goal of a community that is held together by some other primary common purpose.

Given the instability of crime watch organizations and given their inability to demonstrate tangible results to policy makers, the prevalence of such organizations has waned in recent decades. Nevertheless, Nation of Neighbors founder, Art Hansen, and coauthor, Ben Shneiderman, (2009, p. 18), argue that

Our current economic realities are dictating reduced funding for community policing and, at the same time, creating an enhanced concern about criminal activity on the part of community members. We believe these conditions, along with the recent success and large scale acceptance of online social collaboration, make now the right time to revisit Neighborhood Watch and perhaps improve upon it by simultaneously increasing social participation and allowing anonymity via Nation of Neighbors.

Nation of Neighbors resembles traditional crime watch programs in several important ways. First, Nation of Neighbors is fundamentally reliant on natural surveillance. This means that, even though there is a national infrastructure, each Nation of Neighbors community is extremely localized, because members must be in close enough proximity to “watch” the property and person of other members. Second, Nation of Neighbors relies on voluntarism. Users are regular community members and there exists no mechanism to enforce participation or to sanction non-participation. Finally, Nation of Neighbors emphasizes

the importance of information flows between community members and other community members as well as between community members and law enforcement.

However, Nation of Neighbors is distinct from traditional crime watch programs in important ways. First and foremost, as Hansen addresses in the quote above, the technological infrastructure of Nation of Neighbors allows for a degree of anonymity in reporting that was previously inconceivable. Local informants need not fear reprisal from perpetrators. Second, it lacks the hierarchical police-block captain-participant structure that characterized most crime watch programs during and after the 1970s. Instead, all users in a community have essentially the same privileges (even if law enforcement officials still have disproportionate access to crime information). Third, like virtual every facet of the Internet, Nation of Neighbors compresses space and time. Information can travel to every node of the community network instantaneously. This fact is of paramount importance to crime prevention because information is often only actionable for a short window after it is acquired—after this period, the criminal has the opportunity to get away or strike again. Fourth, it lacks the face-to-face component of traditional crime watches. This is important insofar as physical proximity tends to facilitate the kinds of informal interactions that help to promote community-building in the broadest sense.

### COMMUNITY AND COMMUNITIES OF PRACTICE

The distinction between community and communities of practice is important in defining success for community crime-prevention programs. Traditionally, communities (which are characterized by strong bonds maintained through regular interaction) are contrasted to societies (which are characterized by weak ties developed through exchange and instrumental interaction [Tonnies, 1897]). Communities of practice seek to unite people in pursuit of a specific, common purpose, but assume that efforts to achieve this purpose are augmented through the intensification of social bonds.

A major problem crime-prevention programs encounter is that “waiting for a random crime to happen can be as boring as watching paint dry” (Clark, 2005). Ironically, interest in crime prevention is at its peak after a crime has already happened. While particularly sensational crimes can provoke intensive interests in community crime prevention, this interest tends to be rather ephemeral and fades long before it promotes significant interaction and bonding between community members. Because strong bonds are what make communities of practice effective and because interest crime prevention is seldom sustained for enough time to form these bonds, crime prevention communities of practice tend to be rather ineffective.

This pattern of failure illustrates the fact that the capabilities that a community of practice develops to fulfill its mission are determined by the nuances of its functioning. This follows Wenger (1998) defining of communities of practice along three dimensions:

1. **What it is about**—its *joint enterprise* as understood and continually renegotiated by its members
2. **How it functions**—the relationships of *mutual engagement* that bind members together into a social entity
3. **What capability it has produced**—the *shared repertoire* of communal resources (routines, sensibilities, artifacts, vocabulary, styles, etc.) that members have developed over time.

The *ideal-typical* Nation of Neighbors community resembles a community of practice with respect to three dimensions discussed above: First, members share a common and express purpose; namely, crime reduction. Moreover, there is no authority that prevents communities from evolving or expanding in scope. Second, Nation of Neighbors is truly a Web 2.0 phenomenon, meaning information is produced through mutual engagement rather than top-down. Third, Nation of Neighbors seeks to build a community’s capacity to respond effectively to major crime events in their neighborhood. In theory, a Nation of Neighbors community that scores highly on all three of these dimensions would qualify as a fully emerged and active community of practice. As such, it would be optimally configured to reduce crime, at least, to the extent that community crime-prevention efforts can be effective.

If mutual engagement is at the crux of a Nation of Neighbors community’s effectiveness, then it is most appropriate to focus on communications activity in our evaluation.

### EVALUATING NATION OF NEIGHBORS

Clearly, the overall goal of Nation of Neighbors is crime prevention and reduction. Yet, as with traditional community crime prevention initiatives, establishing a causal relationship between the establishment of a Nation of Neighbors community and

any change in the crime rate is difficult. So, though crime reduction is the most direct goal of such communities, analyzing changes in crime rates, in and of themselves, is insufficient in measuring success. Even though the tools and impetus for community-building come from without, the ideal-type of an active Nation of Neighbors community has strong similarities to communities of practice. Most importantly, its ability to perform its function (crime prevention) is believed to be positively associated with the intensity of its social ties.

Granovetter (1973, p. 1361) famously defined the “strength” of social ties as “a (probably linear) combination of the amount of time, emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie.” Note that each aspect of tie strength involves some sort of active maintenance. Within a community, tie strength is likely to vary temporally with overall levels of participation and cooperation. As Granovetter (1973, p. 1362) notes, this assumption is reminiscent of “Homans’s [1950, p. 133] idea that ‘the more frequently persons interact with one another, the stronger their sentiments of friendship for one another are apt to be.’” More and stronger ties, in turn, promote increased perceptions of community efficacy, and, while efficacy is perceptual, research has demonstrated that these perceptions are strongly associated with objective performance for communities of practice (Carroll and Reese, 2003).

We are, thus, able to infer that, for communities of practice, outcomes (in this case, crime prevention) are likely to be influenced by community participation and cooperation. Stated simply, the mere existence of activity in a community—even if it is not immediately relevant to the stated purpose of the community—builds response capacity within the community. It is on the basis of this supposition that we turn to communications activity (something for which we have ample data) as a proximate measure for a community’s ability to contribute to its intended goal of crime prevention. Of course, this is not to imply that there is a direct causal relation between communications activity and crime prevention (i.e., communications activity is not assumed to be a *sufficient condition* for crime prevention); instead, we merely assume that communications activity is a *necessary condition* for crime prevention, and, therefore, we use this criterion to compare communities which are potentially effective to those which are likely to be ineffective, in order to observe any other characteristics that might distinguish these two groups.

We can imagine activity associated with online communications taking a variety of forms (cf. Plaisant et al., 2000). Jenny Preece (2001) established a basic inventory of such measures, explaining that “[d]eterminants of sociability include obvious measures such as the number of participants in a community, the number of messages per unit of time, members’ satisfaction, and some less obvious measures such as amount of reciprocity, the number of on-topic messages, trustworthiness [...]” She explains that such metrics generally describe one of three categories (viz. purpose, people, or policies) which become a community’s defining features.

The data gathered by Nation of Neighbors allows us measure sociability in a number of ways. During any period in each community, we can calculate the number of reports, post, replies, invites sent, and invites accepted.

Certain activities, while useful in evaluating mature communities, are less appropriate for analyzing communities in the early stages of development. Young communities tend to behave differently than their larger and more complex counterparts (Butler, 2001). In the case of Nation of Neighbors, communication in younger communities is likely to be oriented toward recruitment instead of reporting, especially if the community is initiated by a law enforcement agency because, without members, officers would have no one but themselves to report to. Thus, we propose to use examine posting and invitation separately and together to seem if they tell different stories for developing and developed communities.

Given the importance of activity to the functioning of communities of practice and given that activity tend to vary between young and mature communities, we propose to define *health as communications activity that is appropriate, both in kind and degree, to the needs of a community in its particular stage of development.*

The one remaining task, before we are ready to compare and evaluate Nation of Neighbors communities, is the operationalization of health, given the constraints of our actual data.

*Activity Measures* – Nation of Neighbors users, primarily, communicate through reports (describing and geo-tagging a specific crime incidence), posts (used to discuss issues of general concern to the community), replies (which can be made to posts, but not reports), and invitation emails (generated through the site to recruit new members). The network data available through the Nations of Neighbors database provides a seemingly direct means of analyzing communication frequency for each of these categories. However, unlike many forums, users seldom respond to posts, or responses are made in the form of new posts. Moreover, messages are pushed to most users (in the form of email digests), so users are only likely to visit the site itself when posting (or, perhaps, to view the map). The result is that measurable communications are rather sparse. Thus, we conclude that the best available measure of interaction intensity is to simply aggregate all activity (i.e., the frequency of reports, posts, and replies).

$$A_C = \text{Communication Activity} = \sum (\text{reports} + \text{posts} + \text{replies})$$

We also produced a separate variable for invite data (i.e., the aggregation invites sent and invites accepted) so that we can examine if the ratio of invite activity to shifts relative to the other types of activity as the community ages.

$$A_I = \text{Invitation Activity} = \sum (\text{invites sent} + \text{invites accepted})$$

We created a third and final variable that aggregates all activity.

$$\sum (A) = \text{Total Activity} = \sum (A_C + A_I)$$

*Normalization* – For comparative purposes between communities, the singular measurement of overall post frequency would be biased by both the number of members and the duration of existence for each community. Therefore, we propose to divide each community's overall frequency of posts by the sum of the total number of months that each participant has been registered for the site. This gives us the average number of post per user per month.

$$\sum (UM) = \text{Total User-Months} = \sum (\text{months since each user registered})$$

By dividing the number of user-months by the total number of months, we get the average number of months that each user has been active.

$$\bar{M} = \text{Mean Months Active Per User} = \sum (UM) / \sum (U)$$

The mean months active per user is a useful indicator of a community's stage of development. A relatively low score would indicate a growing community (likely focused on recruitment), while a relatively high score would indicate an established community (likely more oriented toward forms of communication more directly related to crime prevention). If we calculate the ratio of invitation activity to communication activity in each community, we can then test whether there is a correlation between this ratio and mean months active per user. If a strong correlation is found, then we will be encouraged to treat developing communities separately from developed communities.

*Intensity of Interaction* – Regardless of whether it is valid to make inter-group comparisons between developing and developed communities, we will use the same metric to make intra-group comparisons. This measure will divide overall activity by the total number of user-months associated with a community:

$$I = \text{Interaction Intensity} = \sum (A) / \sum (UM)$$

This measure normalizes activity in communities for number of members and for duration of existence. Yet, one significant obstacle to valid comparison remains: Each Nation of Neighbors community is associated with a bounded geographical location. The real geographical area represented by each online community varies widely. In fact, some communities are associated with more than ten times the area of others. In order to account for these geographical differences, we propose on final measure:

$$I' = \text{Interaction Intensity} = I / \sum (\text{Square Miles})$$

This measure has the serious disadvantage of overlooking difference in actual population density. Ideally, we would divide the users per area score by the actual population density to get a relative density. Unfortunately, this information is also too difficult to obtain to be practical for research purposes. A recent user survey (n = 157) indicates, however, that, like traditional neighborhood watch programs, Nation of Neighbors is largely used by affluent suburban homeowners in relatively low crime areas. Given the relative homogeneity of our communities, our formula is an acceptable, if imperfect, control for density.

We will consider the communities with the greatest interaction intensity to be our most active communities to be our healthiest; however, information production in and of itself is not sufficient to designate a network structure as a community of practice. A community with one person (e.g., a paid law enforcement coordinator) that posts an extraordinary amount of information while others post none would rank highly in interaction intensity, but the quality of the interaction would be very unequal. Wenger (1998) proposes one final measure of communities of practice, equity, (which Preece [2001] later applies to all online communities) that we ought to consider with respect to Nation of Neighbors.

*Equity* – Equity can be measured as a function of reciprocity of communication across ties. Equity is, implicitly, a function of legitimacy insofar as community members are only likely to respond to those who they perceive a legitimate. Thus reciprocity across ties also serves as a reasonable proxy because for legitimacy, because legitimacy is a necessary condition for equity.

The normative practices on Nation of Neighbors make measuring equity quite difficult. Particularly, measurement is hindered by the practice of posting new threads to respond to previous comments and by the fact that new reports (even if precipitated by prior reports) *must* be filed as a new thread. So, for example, if the same burglar is believed to have struck at three different locations, each of those home owners would have to file a separate report, and there would be no indication in the network data that these users were, in fact, directly communicating with each other. For this reason, we are forced to settle for a less precise measurement than the average number of two-way ties between users. Instead we propose to look at the variance in activity per month per user.

$$E = \text{Equity} = s(A_c)^2$$

We justify this measure as a proxy for reciprocity since all users receive posts from all other users. Our measure will capture the difference between communities where everyone posts at similar levels and those where some people post all the time and others never and post. Communities with high equity (i.e., a low E score) would better fit the ideal-type of a community of practice.

## FINAL THOUGHTS

Nation of Neighbors is a unique platform that creates several significant challenges for researchers concerned with improving design and effectiveness. We have presented a set of measures that we believe will allow us to begin to conduct a comparative analysis of the numerous Nation of Neighbors communities. This theoretical work provides the foundation for future inferential analysis that will, ultimately, aim to provide community administrators with insights into the factors which promote healthy communities. For example, future research will attempt to determine whether the law enforcement involvement, perceptions of community safety, impressions of community efficacy, and technological literacy contribute (either positively or negatively) to the health of online crime-prevention communities.

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