Health and Knowledge Gaps

Some Lessons From the Minnesota Heart Health Program

K. VISWANATH
Ohio State University
JOHN R. FINNEGAN, Jr.
PETER J. HANNAN
RUSSELL V. LUEPKER
University of Minnesota

Information and control of it is the basis of social power (Galbraith, 1983; Tichenor, Donohue, & Olien, 1980). This has crucial implications in the information age. More than ever, people depend on the mass media and specialized sources for information. Social scientists, policymakers, and leaders historically have used mass media information campaigns to provide the public with knowledge on various topics in the belief that dissemination of information by itself will suffice in promoting social change or in encouraging the adoption of "prosocial" behaviors. From the famous Cincinnati experiment, a campaign to promote awareness of the United Nations (Star & Hughes, 1950), to numerous projects in the developed and developing world, public education programs have been found, in general, to result in unequal acquisition of information between those who are well-off and those not-so-well-off (Olien, Donohue, & Tichenor, 1982). Results of these studies are

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clear: Availability of information by itself does not necessarily result in "universal self-exposure or uniform perception of what is viewed" (Tichenor, Rodenkirchen, Olien, & Donohue, 1973).

The "failure" of these programs was originally attributed to individuals, who were labeled as "traditionals," "chronic know-nothings," "obstinate audience," and "laggards," resulting in what some critics have called "blaming the victim" (Ryan, 1971).

Later research within the "knowledge gap" framework, directed the focus toward the social environment of the individual. The hypothesis argued: "As the infusion of mass media information into a social system increases, segments of the population with higher socioeconomic status tend to acquire the information at a faster rate than the lower status segments, so that the gap between these segments tends to increase rather than decrease" (Tichenor, Donohue, & Olien, 1970, pp. 159-160).

The hypothesis was supported from data on topics of public affairs, science, space research, and health. Since its first articulation, the gap hypothesis has generated tremendous interest among communication theorists as well as practitioners because of the immediate implications for guided social change programs, where media have been expected to play a critical role.

Not all programs to encourage innovative behavior nor all information campaigns reinforce information inequities. The structure of communities in which programs or campaigns are carried out plays a crucial role in the distribution of knowledge. For example, programs on diffusion of agricultural innovations in India (Shinghi & Mody, 1976) and Australia (Galloway, 1977), programs on nutritional information to school-aged children (Olien, Tichenor, & Donohue, 1976), and reports on heart health campaigns (Ettema, Brown, & Luepker, 1983), suggest that the existence and magnitude of knowledge gaps depend on social structure. Shinghi and Mody (1976) found that in a smaller community in which the agencies promoting the adoption of innovation concentrated extensive resources to maintain target audience attention, inequities in knowledge were minimal. Similarly, Ettema et al. (1983), reported on the success of heart disease campaigns in a smaller city. The study by Olien et al. (1976) on nutrition programs for schoolchildren reported that the degree of organizational support was a better predictor of knowledge than the socioeconomic status (SES) of students' families.

Scholars have identified the contingent conditions under which knowledge gaps may or may not widen. A review of the literature suggests that gaps are less likely to widen when (a) the topics appeal to lower SES groups, (b) conflict is very high and the issue is of basic concern to the community, (c) the community structure is homogeneous (Tichenor et al., 1980; Gaziano,

1983; Viswanath, 1990), and (d) the sponsoring agencies are able to exercise a greater degree of control over the environment (Viswanath, 1990). Gaps are less likely to occur in the case of startling events that attract sustained media coverage. In these situations, awareness knowledge may spread uniformly, but differences in in-depth knowledge may still occur. Gaps were found to occur when topics were more appealing to higher SES persons than to lower SES respondents and when the topics were national in scope (see Viswanath, 1990).

Despite 2 decades of active research on knowledge gaps, a number of questions remain to be answered:

1. Are knowledge gaps inevitable? If not, how long do they last? What about long-term campaigns? Will long-term, sustained campaigns equalize knowledge both within and across communities?
2. Are media likely to have more pronounced impact if one can temporarily "monopolize" channels and messages in the absence of countermessages (Lazarsfeld & Merton, 1948/1960)? This is crucial to evaluating campaign effects and depends on the degree of "control" exercised by campaign planners over community information environment (Viswanath, 1990).
3. To what extent do knowledge gaps result from community campaigns affected by structural elements such as socioeconomic status and pluralism?

This article attempts to answer some of these questions, in light of the foregoing discussion, by drawing on some of the lessons learned from the Minnesota Heart Health program, as well as from the literature on campaigns or guided social change programs.

THE MINNESOTA HEART HEALTH PROGRAM

The Minnesota Heart Health Program (MHHP) is a 10-year controllable research and demonstration project aimed at reducing cardiovascular disease (CVD) in pairs of midwestern communities (Blackburn et al., 1984; Finnegan, Bracht, & Viswanath, 1989; Mittelmark et al., 1986).

The rationale for a community-based strategy to prevent CVD stems from a well-accepted proposition that mass diseases such as CVD are probably the result of social and cultural factors that are characteristic of societies. The evidence for such a proposition comes from a close analysis of epidemiological observations, laboratory and clinical studies, and risk-factor reduction studies among high-risk groups (Keys, 1970). Support for such a macrolevel strategy also comes from two populationwide studies in Finland (Puska et al., 1981) and the United States (Farquhar et al., 1977). The argument is

that individuals at high risk are unlikely to change their risky behavior unless the environment is supportive and conducive to change. Such positive behaviors can be sustained by the creation of a supportive social environment, and prevention requires changes across entire populations (Blackburn et al., 1984).

The overall objective of the MHHP was to reduce the morbidity and mortality of CVD. The expectation was that the MHHP would accelerate an already perceptible national trend in the reduction of CVD in communities where campaigns have occurred.

The study design involved 5 years of public health campaigns mounted in three communities in Minnesota and North Dakota: a small city (Mankato, MN, population = 39,283); a regional city (Fargo, ND and Moorhead, MN, combined population = 107,640); and a metropolitan suburb (Bloomington, MN, population = 88,328). Results of the campaigns were compared over time to three communities of approximately similar size and characteristics (Winona, MN: Sioux Falls, SD; and Roseville, MN). In brief, outcome analyses entailed consecutive cross-sectional samples and several panels in all six communities surveyed before, during, and after educational intervention periods. Each cross-sectional sample was about equal size ($N = 500$) and included cognitive, demographic, behavioral, and risk-factor measures. Three of the six communities, one of each pair, received intensive and extensive education over a period of 5 years.

MHHP EDUCATION

For education purposes, the MHHP adopted a staged entry design, facilitating usage of resources and experiences from one community to the next. The MHHP emphasized multiple strategies to influence different risk-factor areas. For example, the community members were encouraged to avoid taking up the smoking habit or to quit if they were already smokers. To reduce dietary fat and cholesterol, they were encouraged to eat more vegetables and consume less dairy products. Reduction in salt intake, regular checkups with physicians, and control of obesity were encouraged to prevent high blood pressure. People were urged to avoid a sedentary life-style by becoming physically more active.

Education was delivered through the following channels: mass media; direct education and adult education classes; professional education workshops for physicians, dentists, nutritionists, nurses, and other health professionals; youth education; environmental programs including grocery stores, restaurants, medical centers, and work sites; risk-factor screening and edu-

cation; and community leaders and community organizations (Blackburn et al., 1984; Mittelmark et al., 1986).

Mass media used in the campaign included local radio, television, and newspapers. "Small media" included videos, slide-tape programs, brochures, posters, and billboards. At least 60% of the eligible population in each education community was screened for risk factors. The heart health centers systematically recruited citizens by contacting households in the community. At the centers, they were screened for risk factors such as hypertension, cholesterol, physical activity or lack of it, and smoking. They were also exposed to videotape presentations and counseling by professional staff.

VARIABLES

The contextual variable, pluralism, is a characteristic closely related to other dimensions such as complexity, differentiation, and interdependence among the subsystems. The dependent variable, knowledge, was defined as respondents' ability to name risk factors of CVD and preventive actions and was measured through open-ended questions. Knowledge was categorized into two types: campaign-emphasized knowledge, which refers to messages and topics given attention in the communication campaigns (e.g., knowledge about smoking, physical activity, diet, and so on), secular or nonemphasized knowledge about topics that have not been promoted by the MHHP but which nevertheless may constitute some form of relevant knowledge (e.g., information on stress and heredity).

Knowledge gaps were operationalized in two ways: as the difference in means scores between college-educated and non-college-educated groups and as the degree of association between number of years of formal education and knowledge, measured by standardized regression coefficients (beta weights).

SOME LESSONS

In our analyses, we found that knowledge gaps did emerge and existed in some of our communities at different times. This was more often the case on knowledge about topics that have not been actively promoted in the campaigns. Most important, these minimal gaps in knowledge on campaign-emphasized knowledge were found in not only our two education communities but in one of our reference communities. Only in one reference community did gaps close.

The type of information that was communicated to the members of campaign communities has long been publicized by a number of legitimizing groups, including the federal government, cardiologists, public health experts, and health educators. In fact, there has been so much information that it has become a cultural norm to stay trim, eat healthy foods, and exercise regularly. To eat "lite" and "work out" is now a part of middle- and upper-class vocabulary.

It is therefore not surprising that extremely strong secular trends have been partially able to mitigate knowledge gaps on topics emphasized and promoted as a part of the MHHP campaigns.

Gaps, however, were found in secular or nonemphasized knowledge, which was strongly associated with education in all communities. This has some clear implications. This knowledge has generally dealt with such factors as stress and caffeine and nonmodifiable factors, such as age, heredity, and family history. The ability of the more educated to recognize them as risk factors is crucial and instructive.

Family history, as an example, is a nonmodifiable factor for an individual. However, the recognition that one's family has had a history of cardiovascular disease will enable an individual to take requisite steps to minimize his or her risk of heart attack or stroke. One can conceivably minimize such a threat by regulating one's diet, being physically more active, or undergoing regular check-ups to monitor one's risk factors. It is precisely in this ability to recognize the utility of incoming information and to apply it to one's individual or class situation that the more powerful differ from the less powerful. The fact that education continued to play a significant role in possession of knowledge is important for future campaigns.

There are two broad policy implications that can be derived from this discussion. First, knowledge gaps are not inevitable. Campaigns do lead to a wider distribution and often equalization of knowledge when accompanied by other concomitants such as legitimization and redefinition of the issues by those in power. Once the powerful groups in a social system identify a threat and take action to minimize the threat, the consequent dissemination of information on the factors and on the actions may lead to more equitable distribution of knowledge. This does not mean that there are no knowledge gaps, but the inequities are less pronounced.

A second implication is that when some issues have not been definitely identified as a threat and are subject to a disagreement, or at least a lack of consensus among elites, knowledge gaps on that topic are more likely to emerge. One consequence of this is that the educated elite of a system enjoy more complete knowledge (in our case, emphasized and nonemphasized) than the less educated.

So, the action by groups may vary based on the extent of knowledge and may make the crucial difference in the outcome. Despite the widespread availability of information on CVD, and continuing decline in CVD rates, the lower SES groups are more likely to be victims of CVD than the high SES groups. The ability to act on complete or partial knowledge varies.

It is also clear that the more the information moves out of the realm of the specialized groups to the general public, the less likely the magnitude of the knowledge gaps.

This leads us to another generalization. Gaps may not open, or may close, because of "complementarity" of efforts by other organizations. We recall the idea of "supplementation" discussed by Lazarsfeld and Merton (1948/1960), who argued that media effects are likely to be larger when information dissemination is accompanied by any of the three conditions: "monopolization, canalization and supplementation." In this case, it is being argued that the effects are likely to result in a decrease of gaps. The role played by various special interest organizations such as the American Heart Association and the National Cholesterol Education Program, among others, may fall under this notion of supplementation. Absent such complementary efforts and national prioritization, knowledge gaps will endure and may even widen.

What are the consequences for public policy? What information on a topic – for example, CVD – can be disseminated, and how much can be sent, given certain finite resources and constraints? These are questions of national policy and value systems.

KNOWLEDGE GAPS: DO THEY ENDURE OVER TIME?

A long-standing question is how long do these gaps last? The assumption is that given time gaps will close (Moore, 1987). This idea is widely shared among scholars and policymakers alike. In communication research, the "two-step flow" hypothesis argued that information will first reach the opinion leaders, from whom it will reach the rest of the people. This hypothesis, in fact, accepts temporary gaps as inevitable (Donohue, Olien, & Tichenor, 1990; Viswanath, 1990). The two-step flow is a variant of the trickle-down theory known not only in communication but in economics.

A more innocuous variant is the "ceiling effects" suggestion. While there are methodological aspects to the suggestion of ceiling effects (Donohue et al., 1990; Viswanath, 1990), theoretically, it implies that while gaps may open initially, over time the less informed will "catch up" because those who are well-informed already know enough and cease to learn any more.

In both the tickle-down and the two-step flow approach, the theorists implicitly recognize and even validate class differences between groups.

They seem to argue that the plebeians will have to wait their turn, while patricians will enjoy the fruits of the discovery. Knowledge gaps, like gaps in education and wealth, are taken as inevitable but controllable in the long-term. Whether this is acceptable is a question for the value systems of the polity itself.

In the literature on the ceiling effect and the trickle-down versions, one assumption is arguable. It is assumed that the "haves" remain stationary, while the "have nots" are "catching up." This need not always be the case for a number of reasons. Briefly, the information-rich can continue to move up and acquire new information, even while the lower classes are catching up. After all, new dimensions of knowledge and new technologies are a constant in the present-day world. So, to a large extent, it depends on the criterion one chooses for knowledge. Gaps may narrow on that criterion but may still be open on the others.

Validation of the argument that gaps may close over time requires that we have longitudinal data, which are difficult to obtain for reasons of time and expense. In the present case, we have data comparing changes in gaps over a period of 5 years. It was assumed that because of the somewhat sustained and long-standing nature of the MHHP campaigns, gaps may close between groups differing on some indicator of SES. We also speculated that community structure — more precisely, pluralism of the community — may influence the long-term gaps.

Our data show a complex relationship. Intervention was effective in the smaller city. Comparison from baseline to data after 5 years of campaigns showed no widening of knowledge gaps. But in one of the larger, more complex cities, knowledge gaps narrowed initially but started to widen after 5 years. This has happened despite intensive campaigns over the 5-year period. In the other small city, which served as the reference city, knowledge gaps did not close even after 5 years' time. The only exception to this trend was a large, pluralistic reference city, where gaps narrowed.

This leads to two generalizations: Knowledge gaps may not necessarily close, even after long-term campaigns; and the impact of the campaigns, in the long-term, is subject to the influence of the community structure. If the community is relatively less heterogeneous, the possibilities of closure of gaps, or at least absence of widening, are greater. However, if the community is large and pluralistic, gaps which may possibly close in the short term may start widening again.

The implication for campaign planners is that information campaigns in highly pluralistic communities may require higher commitment and that expectations of impact of campaigns in pluralistic systems even after 5 years' time have to be tempered. The resources that are required to have a major

impact have to be necessarily very high. The issue may have to become a national priority like the campaign on AIDS or cholesterol.

A concomitant of interventions and other guided social change programs is that structural adjustments have to be made to be effective. These adjustments may take various forms: legal or judicial actions, taxation policies, strategic implementation of programs (say, focusing specifically on the less well-to-do population), and provision of necessary resources. One example for CVD is to raise taxes on cigarettes to strictly regulate smoking. Structural changes, when accompanied by media campaigns that may publicize and legitimize the changes, may lead to lesser knowledge gaps.

TYPE OF KNOWLEDGE

Scholars who have critiqued the knowledge gap also argued that much of the literature on the knowledge gap studied public affairs knowledge, the relevance of which may not be recognized by the less educated (Ettema & Kline, 1977). They further suggested that knowledge gaps may not be found if one were to conduct a study on a different topic. We found that knowledge gaps do emerge in both publicized and unpublicized topics of health (Viswanath, 1990). The only time when gaps are not found is when the topic has been redefined as important and relevant to all social classes. Hence one generalization is that gaps in knowledge are not limited to any subject area.

A second area of discussion is the depth of understanding. That is, even though knowledge gaps can possibly narrow on general or awareness knowledge, because of saturation in coverage, some evidence indicates that gaps in depth knowledge may possibly widen. This has particular significance in topics such as health and science. Knowledge in these areas is built incrementally, and one's understanding of increasingly complex subjects is partly based on what is already known. In CVD, unless one knows what actually causes the so-called "bad cholesterol" in the body, one cannot take necessary action. Consumer groups can easily be deceived on such issues. The number of products that advertise "no cholesterol" fail to tell the public that it is the saturated fats in a particular product that are the prime culprits in the build-up of the "bad" type of cholesterol in the blood vessels and that it does not really matter whether the product has cholesterol or not.

Preliminary analyses of the data indicate that gaps existed in specific or depth knowledge in three of the four communities (Viswanath, 1990). Community pluralism to some extent was influential. We found knowledge gaps in specific or in-depth knowledge in both of the pluralistic communities, while gaps were found in only one of the less pluralistic communities. Even

though these gaps disappeared in the short term, long-term observation showed that they have not only reappeared but even increased over time. This increase in gaps was more pronounced in the large, pluralistic campaign community, as well as in the smaller reference community.

It shows that, even while knowledge gaps may narrow, the better educated know more in a particular area of knowledge than do the less educated. The implications for social classes is very clear. If the lower classes' ability to acquire and maintain social power depends, to an extent, on acquiring knowledge, especially specialized, they are likely to be at a disadvantage.

ACTIVATION, CONCERN, AND THE KNOWLEDGE GAP

Social conflict can be both functional and dysfunctional (Coser, 1956). Particularly relevant for us is the fact that conflict can lead to a heightened salience by stimulating interest among various subsystems. This depends, to a degree, on the nature of the issue as well as the structure of the community. If an issue is defined as affecting the community, say, in the form of a threat, intense interpersonal interest is generated. The issue becomes salient. Actions taken in the interest of community stability and minimizing the threat receive attention among community subsystems, including mass and interpersonal channels.

However, if the issue is not defined as a threat, or if the structure of a community is heterogeneous, there are likely to be differences among the subsystems in the way they perceive an issue and in knowledge gaps. This is more likely in a heterogeneous community, which, by its very nature, enjoys specialized sources of information. We found that members of larger pluralistic cities are more likely to perceive the availability of advice on cardiovascular disease than are members of relatively smaller, less heterogeneous communities (Viswanath, 1990).

It is possible for information campaigns to minimize or compensate for this lack of specialized sources by making information available to the community members. Thus we found that the percentage of people who perceived an increase in information availability increased, over time, in the smaller, relatively homogeneous community. We found that mere availability of information, or even a perception of availability, has minimal impact on general knowledge gaps. Only in the case of the smaller, homogeneous community did this have some impact on the reduction of knowledge gaps.

Activation, especially by organized interest groups in a particular community, can serve to transform the definition of an issue as a general concern of the community as a whole. If this happens, it is possible that members of

a social system may attend to information channels for that information. In our case, we asked if an issue such as heart disease, which is now treated as a personal issue by the public, may have been translated into a community concern because of secular trends. If that is the case, it is possible that communities with increasing concern should show decreasing gaps.

We did not find support for this proposition. As we reported, at times the gaps in knowledge actually increased when there was an increase in concern. This finding points to a crucial difference between concern at the level of individuals and concern at the level of the community. But, in this case, heart disease is seen as a problem of the individual.

As a hypothetical case, if a community were to be informed by a federal agency that the CVD rates in that community were high, it might become a community issue rather than an individual issue. Officials and other agencies might take actions, including media campaigns, to reduce the prevalence of CVD. Then, it is possible that gaps in knowledge could be reduced. When it was found in North Karelia, Finland, that heart attack rates were one of the highest in the world, the entire county as well as the nation galvanized to reduce CVD through massive intervention programs.

This kind of activation, however, appears not to have happened in our communities. CVD may have been treated as affecting only individual members in the system and not endangering the entire community. As long as it is treated as such, concern at the individual level is unlikely to be translated to concern at the community level and hence less likely to reduce knowledge gaps.

INVOLVEMENT AND THE KNOWLEDGE GAPS

Alternative explanations to education-based knowledge gaps came from those who argued that motivational variables, such as involvement, salience, interest, threat, or personal situation, influence the acquisition of knowledge more than education (Dervin, 1980; Ettema & Kline, 1977; Salmon, 1985). In our view, *the issue is over the focus on the levels of analysis.* At a macrosocial level, socioeconomic status, social roles, and pluralism are likely to affect knowledge gaps. At the individual level, motivation, salience, interest, and threat may affect knowledge gaps. Both are useful to look at.

Involvement can also be at the community level. When a community is highly involved on an issue, it is possibly because it has been identified as a priority or a threat by the powerful segments in the social system. Reinforcement through interpersonal discussion and coverage in the mass media may result in wider distribution of knowledge. Pluralism may affect this distribu-

tion, as it depends on the groups that are affected by the issue. In a larger system, a narrower group of people is affected by it than in smaller, relatively homogeneous systems, where it is possible that the entire system may be involved on an issue. This is where we are likely to see an impact of involvement on knowledge gaps.

Our index on involvement included elements of participation in CVD health-related activities, perception of learning, and utility (Viswanath, 1990). In such a specialized area as CVD, it is possible that involvement may be higher in the larger heterogeneous systems. That is precisely what we found: that involvement is higher in larger systems, which are characterized by specialization, even in medical systems. But then, is it likely to affect the entire community, or only those few specialized groups interested in it? The latter is more likely, in which case, knowledge gaps are less likely to be affected by involvement in larger heterogeneous systems. This proposition received support in our study. In general, we found that involvement in disease reduction can indeed reduce the magnitude of knowledge gaps. As posited, this general involvement can be effective more often in smaller, relatively homogeneous cities. We also found that involvement is not a substitute for education or status. More often, it was a covariate. This finding about involvement is useful to future campaign planners in the sense that one can reduce the knowledge gaps by raising the involvement on the issue. But planners have to be conscious of the effects of socioeconomic status and the structure of the community.

STRUCTURE AND DEGREE OF CONTROL

Success of the campaigns depends, to a large extent, on the structure of the community, which in turn influences another vital factor: the degree of control enjoyed by the sponsoring agency. For example, larger complex systems are specialized and often have interest groups focused on narrower issues. In a larger system, agencies seeking to promote change may attract the attention of a few of the groups that are interested in the issue. Further, because of pluralism and competing interests, sponsors may enjoy limited control on the media environment as well as other community groups.

On the other hand, in smaller homogeneous systems, it is possible to engage the attention of the community as a whole because of fewer groups. It is relatively easy to contact the local mayor and city council members and enlist their help. Help of other agencies is also relatively easy to come by.

Similarly, in a large city, the medical community is so specialized that CVD may not be as important as AIDS or some other disease. That is, no one

disease or one issue is likely to be dominant for a long period of time. Likewise, media attention is difficult in a larger city because of competition for attention in a larger community. On the other hand, the degree of control is facilitated in the smaller city because of a narrow power base, whose help will be generally enough to redefine an issue for the community's attention. Fewer individuals play multiple roles. Hence it is relatively less difficult to convince such a smaller group. An idea once endorsed or accepted by this group can be more easily legitimized in the eyes of the general community members. Cooperation from other subsystems, which are fewer anyway, is more forthcoming.

In summary, the probability of success of campaigns is likely to be influenced by the structure. It is therefore vital to take community structure into consideration.

LESSONS FOR FUTURE CAMPAIGNS: A SUMMARY

Our results have implications for future campaign planners. It is clear that because of the ubiquity of the mass media and the accelerating developments in media technology, planners and policymakers will come to depend more and more on mass media for promoting strategic social change. Further, because of increasing complexity and differentiation, the general populace is more likely than ever to depend on newer technologies for information and advice. Under the circumstances, how can we minimize the possibility of gaps that are likely to emerge between different groups?

Gaps in knowledge and information are likely to emerge more often than not. Such gaps may endure and continue on deeper levels. Sometimes, however, gaps may not emerge or may not widen after initial emergence. This is more likely to happen if an issue is identified as a priority by powerful groups in the social system. The identification of an issue as a national priority will not provide increasing funds and research but heighten salience by coverage in the mass media and reinforcement through interpersonal and group sources.

This is crucial to the success of a campaign. Because concern and activation at the individual level may not translate to concern at the community level, the issue has to be redefined as one of interest to the *entire community*. Further, one needs to promote involvement among members of the community by promoting participation in specific topical areas. This will also enable various interest groups to take up the issue and complement and supplement the efforts of campaign sponsors.

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