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The Knowledge-Behavior Gap in Public Information Campaigns: A Development Communication View

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[1]This chapter presents an intellectual framework and a series of studies undertaken by students and colleagues of the author over the past decade, including Jeremiah O'Sullivan-Ryan, Eduardo Contreras-Budge, Jane Gould Torous, Judy McDivitt, Sikandra Spain, Jeff McDowell, Chien Lei, Nina Ferencic, and Karin Wilkins. They are thanked both for their research and their rather substantial effect on the underlying conceptual approach. In addition, P. Stanley Yoder, Susan Zimicki, and Nancy Morris, as well as McDivitt and Wilkins made insightful comments on a previous draft of this chapter.

Introduction

The central theoretical problem in the field of purposive communication is explaining the gap between knowledge and behavior. There are practical problems in achieving widespread knowledge: it may be difficult to structure a message so it can be understood; it may be expensive to reach the intended audience as frequently as required. However, by and large, a skilled communication professional with sufficient resources can help a mass audience to have *knowledge* about a new practice. And saying that problems are mainly practical is not to underestimate the talent and work required to realize that possibility, or to deny that there are many theoretically interesting issues associated with developing efficient strategies for achieving attention and knowledge retention. But the fundamental theoretical problem is at the next stage in the communication process, turning knowledge into behavior.

In this chapter the knowledge-behavior gap issue is developed from the perspective of purposive communication programs in the Third World. This perspective provides more than a useful store of examples which may be fresh for some readers of this volume. Less-developed-country experience demands attention to different explanations for the gap than have been current in parallel studies in more developed countries, in particular with respect to U.S. domestic campaigns.

In the U.S. domestic literature, psychological explanations feature strongly, with social network explanations a secondary but still common focus. In contrast, many scholars concerned with development communication look first to "system" (or structural) explanations, secondarily to social network explanations and only reluctantly at individual psychological explanations.

In the United States the archetypal example of the knowledge-behavior gap is smoking. Smokers know they shouldn't, but they do it anyway. How is the gap explained? While there is a common reference to physical addiction, there is much emphasis on psychological needs, including describing smoking as habitual behavior responding to environmental cues. Some note the strong

association of social class with smoking and suggest that social reference groups may play some role. However many of the essential intervention strategies such as behavior modification or smoking education programs reflect an assumption that the decision to give up smoking must be made by an individual and, implicitly, that the decision is substantially within the control of the smoker.

In the developing country context the archetypal example is the adoption of agricultural innovations, notably use of fertilizer. Explanations for the failure to employ fertilizers point first to structural variables: do the farmers have the money or credit needed to purchase fertilizers; is there a market for increased yields; is the risk associated with borrowing funds greater than farmers can afford? Secondary explanations point to the influence of social networks, that is the practices of neighbors, demonstrated, for example, by the geographic concentration of adopters. Only as a residual, and unfavored, explanation, will current scholarship admit to the possibility of a major influence of individual psychological characteristics such as innovativeness or fatalism, although those were favored explanations of an earlier generation of scholars.

The contrasting tendency to rely on systemic/structural rather than individual/psychological causes to explain knowledge-behavior gaps may reflect the different real circumstances of the First versus Third Worlds. The relative poverty of the Third World may place greater limits on individual choices with lives more affected by economic and other constraints beyond individual control.

The contrast may also reflect the particular intellectual traditions which have come to dominate scholarship in each field. Psychologists and some sociologists have been in the forefront of domestic scholarship. Developing country scholarship has reflected the strong presence of economists and anthropologists with a tendency to seek explanations in economic or cultural systems, respectively. Also there is a substantial presence of critical scholars for whom themes of class conflict are central.

Much of the rest of this volume focuses on the U.S. case; in this chapter the focus will be on purposive communication in less developed countries. In the

following pages a perspective derived from research in that environment is developed. It may be relevant in other arenas, also.

A Perspective from Development Communication

Historically, many advocated a significant role for communication programs in bringing about rapid development. Some attributed slow development to lack of knowledge and skills among developing country populations. At the same time they recognized that there was a shortage of trained educators and field extension agents to remedy knowledge deficits. They often turned optimistically to mass media as a promising alternative channel to reach mass audiences. However, in retrospect, communication should, perhaps, have been regarded as an odd intervention. The next paragraphs consider this oddness incorporating some material slightly edited from a recently published book, Development Communication (Hornik, 1988).

Communication programs traffic in information. They throw words --ways of understanding, behaving and organizing -- at development problems, problems that are substantially and contrarily defined by a lack of resources: low agricultural productivity, poor health or nutritional status, or unequal shares of society's goods.

An argument that information provision alone can resolve development problems makes the assumption that available resources are being inefficiently used. It says that substantially more benefit can be derived from what is already in place, if only individuals or groups knew better how to organize the use of those resources: enhanced agricultural yield can result from improved farming practices without the introduction of expensive fertilizers; infants' nutritional status can be improved with better feeding and health practices, although there is no additional income to permit the purchase of more calories and no new medical facilities are available in the community. In both of these examples, the assumption is that current behavior is poorly adapted to the existing environment: that is it does not produce the maximum benefit from available resources. People do not know, so they do not act optimally. Historically this assumption of human ignorance was central to much of the practice of communication for development.

Yet most scholars who have looked closely at agricultural or nutritional practices, for example, claim that the assumption of poor adaptation is often inappropriate. ... Theodore Schultz(1964) argued that farmers were highly responsive to economic rewards and that they refused to adopt an innovation when the potential rewards did not counterbalance the risks. Jeremiah O'Sullivan(1980) found that farmers in the Guatemalan highlands who rejected no- or low-cost innovations (like compost piles and seed spacing recommendations) did so reasonably. He could find no evidence that farmers who did adopt such agronomist-recommended innovations were more productive than those who did not. Carlos Benito(1976) found that farmers in Mexico who rejected a recommended planting package did so with good economic justification. While the package did produce greater yields and profits, it also required more labor. And that labor, it turned out, could be sold elsewhere at a higher return than if it had been used for farming.

Many more such examples could be supplied. Together they would point to the care one must take before assuming that the audiences of a communication program do not know what they are doing, before readily deciding that experts behind radio microphones know more about what is best for their audiences than do those audiences. Indeed there are those who would take these results and reject use of communication altogether, at least for purposes of diffusing pro-development information. This position suggests that 'failure' to make use of knowledge reflects system failure rather than individual failure; if farmers use less fertilizer than is ideal, it is to be explained by their poor access to credit, or other explanation beyond their individual control. Communication programs which seek to provide knowledge to individuals under the assumption that they are free to change practices are bound to fail, from this perspective.

If individual change is impossible because resource constraints permit only trivial improvements, the favored role for communication is one which enables the mass of the population to organize politically. Then they can demand their fair share of society's resources, so that government funds go to increasing farm credit availability rather than to military expansion.

Yet, while it is tempting to say that access to resources is everything and the only role for communication is the furthering of political ends, that has difficult

policy implications. It also may not be true, or at least it may be untrue often enough to justify consideration of serious communication efforts.

Surely economic and other structural factors set upper limits on how much change is possible. But, knowing that failure to innovate is *sometimes* structurally explained is not evidence that it can *always* be explained structurally. There is counter-evidence that supports the notion that worthwhile change is possible, given fixed economic resources. The Amish in Pennsylvania, Japanese farmers in Brazil and kibbutz farmers in Israel have all been able to make more of their farms than others around them, and those differences cannot be explained by access to capital, alone.

Lockheed, Jamison and Lau (1980) bring together studies supporting the effects of farmer schooling on productivity. When newer technologies were available, farmers with more than four years of schooling produced about 10 percent more than their neighbors with no education but equal resources. These studies only reinforce what any informal or formal study of farming communities suggests: that some farmers outperform others consistently, regardless of resources.

In practice, having seen evidence on both sides of the issue, one can decide that purposive communication (excluding that which serves as stimulus to political organization) is irrelevant and move to another field. Or one can accept that not all knowledge gets turned into behavior, but assume that some does, and then ask, when? Under what circumstances will an information intervention affect practice? Or, asking the same question from the point of view of the audience, when are individuals and their communities susceptible to the influence of communication programs?

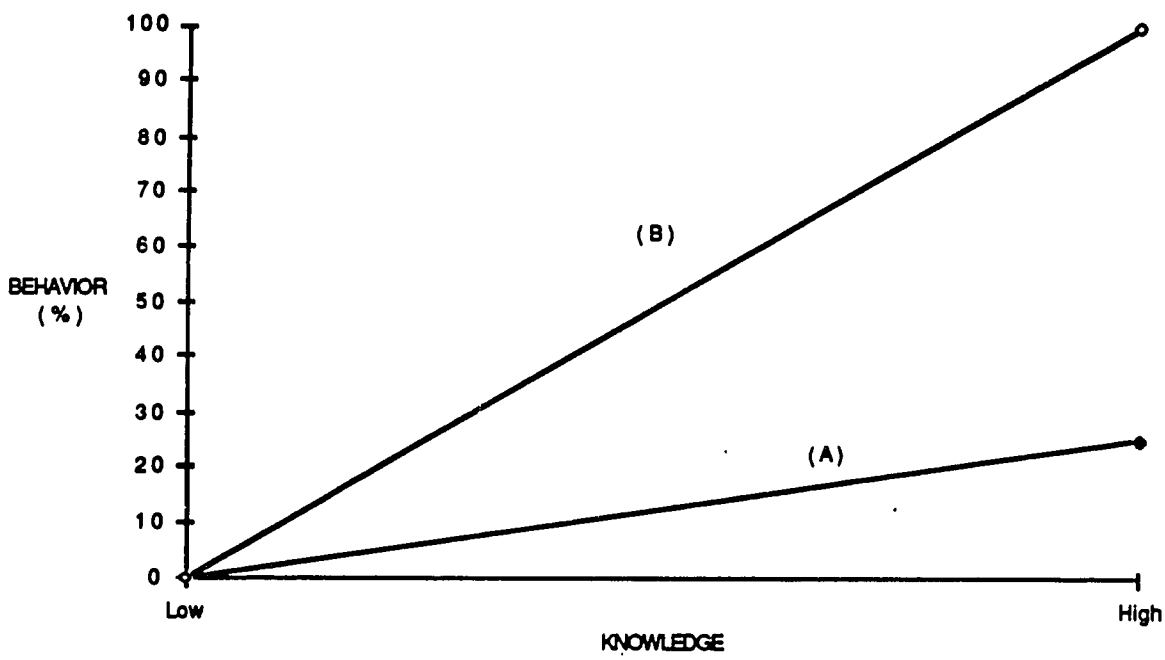
As Yoder(1988) suggests, "the issue is not so much a question of choosing between saying that systemic or individual factors explain the differential adoption of innovations, and thus choosing between trying to use purposive communication or not, but rather, trying to differentiate between situations in which these factors appear largely systemic and other situations."

It is this stance that is taken here. The remainder of this chapter elaborates this question, differentiates categories of explanation for rates at which knowledge turns into behavior, and presents some methods for studying the issue. The discussion incorporates presentation of selected results from studies undertaken in the past 10-12 years which illustrate both the conceptual approach and empirical methods.

Five types of hypotheses

When will the knowledge-behavior link be tight and when will it be loose? When will the knowledge-behavior relation look like line (A) in Figure 1 and when will it look like line (B)?

Figure I
Basic Susceptibility Model



There are five classes of "susceptibility" hypotheses to be considered. Each class includes a set of propositions which suggest that individuals or communities which have more or less of a particular resource or characteristic are, therefore, more or less likely to adopt a behavior once they have knowledge of it. Each hypothesis suggests that some characteristic interacts with knowledge in affecting behavior. Many of the hypotheses will be familiar. The classes of hypotheses follow:

1. **Structural characteristics of communities.**
2. **Structural characteristics of individuals.**
3. **Community social influences.**
4. **Learned characteristics of individuals.**
5. **Enduring characteristics of individuals.**

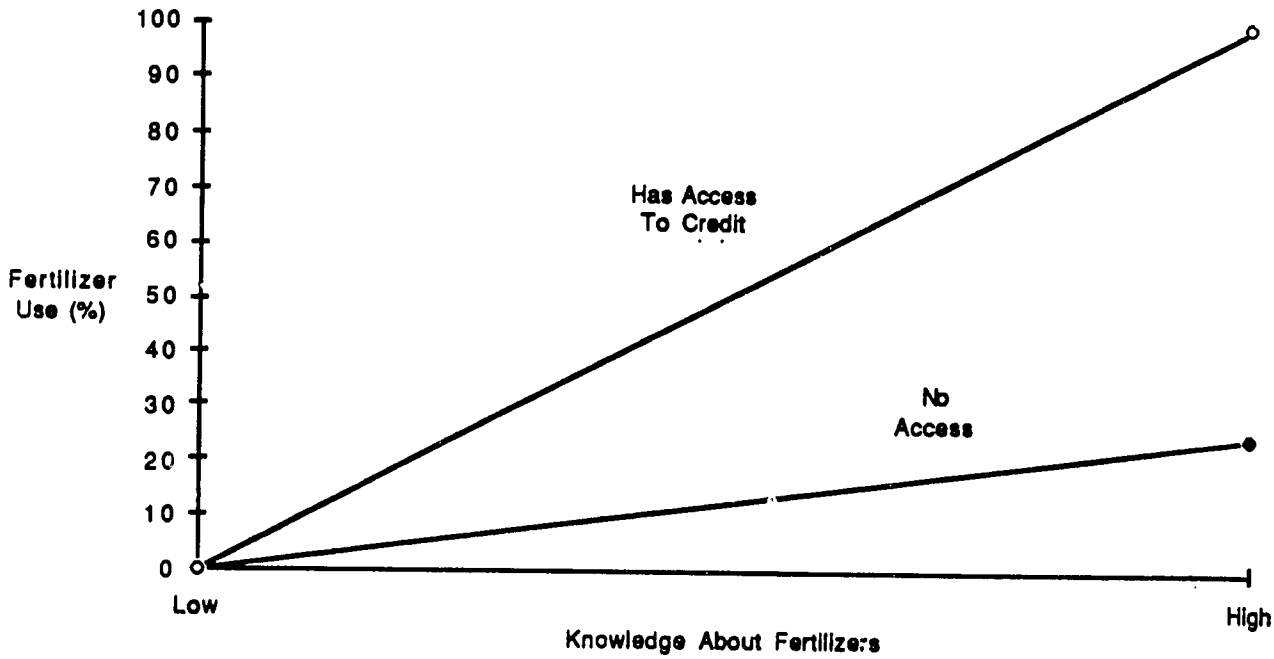
The rest of the chapter elaborates each of these classes of hypothesis one by one. However before beginning with the first, a note on methodology is appropriate.

Testing explanations for the knowledge-behavior gap.

All of the hypotheses posit that change in practice results from an interaction between knowledge and some characteristic of an individual or a community. To take an example, one might hypothesize that knowledge about fertilizers would only turn into practice if an individual had access to credit. Assume that knowledge about fertilizers is measured on a ten point interval scale, and that practice is measured as a percent of the ideal actually applied per acre. Access to credit is a dichotomy -- indicating whether there is a local credit agency which would have provided credit to purchase the ideal amount of fertilizer to a particular farmer if he/she had applied.

It is useful to begin with a graphic presentation of the hypothesis:

Figure II
Hypothetical Model: Credit Access, Knowledge and Fertilizer Use



The hypothesis suggests that the slopes of the relationship between knowledge and practice are different for each access subgroup. For those without access to credit, the gap between knowledge and behavior is large; increased knowledge is slow to turn into increased practice. In contrast, among those who have access to credit, the knowledge-behavior gap is much less. Increased knowledge is much more readily turned into practice.[1]

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[1]The graphic display of the interaction can be presented in equation form, which also permits a straightforward statistical test of the presence of an interaction. If one can assume linearity in the relationships among the variables, and satisfaction of other assumptions of multiple regression procedures, the interaction can be tested in the comparison of the power of two equations.

1) $P = b_1 K + b_2 A + a_1$

2) $P = b'_1 K + b'_2 A + b'_3 K*A + a'_1$

where P: Practice; K: knowledge; A: Access
and K*A is a multiplicative interaction term.

Depending on the assumptions a particular data set allows (e.g. linearity, interval character of variables, dependent variable a dichotomy or not, need to eliminate the effects of other variables to avoid spurious inference, availability of time series or panel data, etc.) the particular procedures to be employed will vary, but the logic doesn't. One always wants to know whether the joint effects of knowledge and the 'susceptibility' variable explain variation in the practice variable better than the main effects of the two variables in isolation.

This basic method for displaying and testing the significance of explanations for specific knowledge-behavior gaps will be repeatedly used as the chapter turns to substantive results. The next section presents hypotheses relating to structural characteristics of communities.

Structural Characteristics of Communities

Hypotheses which involve structural characteristics of communities are of two types. One group points to specific aspects of community structure which must be present if knowledge is to be turned into behavior. An example in agriculture is access to credit; without it few will be able to turn knowledge of better practices into innovation. A parallel example for health communication would be immunization programs. Even if a parents held quite sophisticated knowledge about the vaccinations required by a child they will rarely obtain vaccination if there is no local clinic or other source for them.

A second group of hypotheses within this category focuses on the general pro-development situation in a community. If a community is advantaged in its development (it has a school, a paved road to a city, a health clinic, etc.) it may be a place where opportunity is greater and therefore knowledge is more readily

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If the variation in P accounted for when only the main effects of knowledge and access are present (equation 1) is significantly less than the variation accounted for when the interaction term is added (equation 2), there is a significant interaction. Standard statistical programs provide tests of this interaction through examination of the change in R-squared between steps of regression equations. If the b'_3 coefficient is positive, the interaction is positive, such that (in this case) those with greater access to credit are more likely to turn increased knowledge into practice.

turned into behavior. This may be true even though the specific behavior to be adopted doesn't require the presence of the particular institutions that allow a community to be classified as advantaged.

A useful example of this latter category comes from McDivitt (1985) and a study she completed in The Gambia. The Gambia was the site for a major intervention in health communication, in which over several years radio and other communication channels were used to encourage the use of a home-mixed rehydration formula (W-S-S, so called because it contains specific amounts of water, sugar and salt) to treat diarrheal disease. Diarrheal disease is a major cause of child mortality in The Gambia (as in many parts of the Third World). While there are no simple interventions available to reduce the incidence of diarrhea, in most cases deaths result not from the diarrhea per se but from the rapid dehydration that often accompanies it. The home mixed W-S-S, if properly administered, is likely either to prevent such dehydration or to remedy at least milder forms of dehydration.

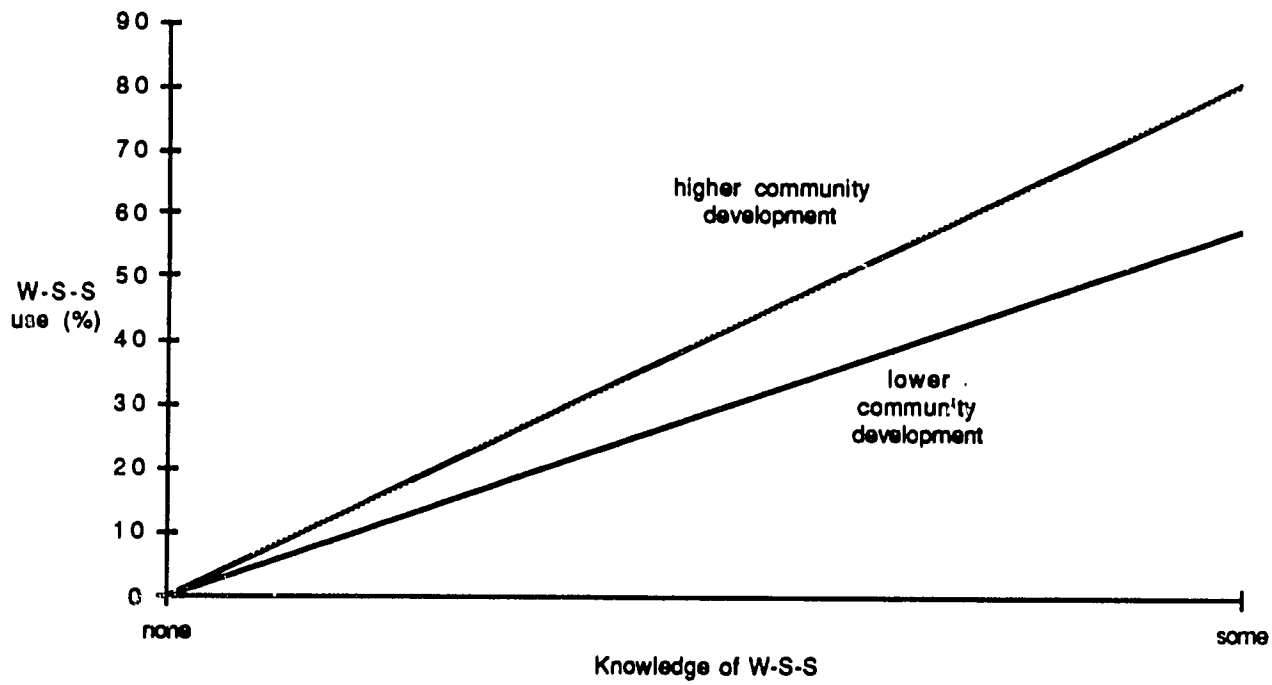
The evaluators of the program (Foote, et al, 1987) had interviewed mothers regularly over a two year period in 16 villages around the country. They found the program produced widespread knowledge and substantial use of the solution. McDivitt undertook additional analyses examining a large number of hypotheses considering which factors conditioned the relation between knowledge and practice. Among her analyses was one which asked whether the level of general community development was such a factor. She used survey data collected two-thirds of the way through the program implementation.

Knowledge of W-S-S was coded as a dichotomy; respondents were classified as either knowing something about W-S-S preparation as well as having heard about it, or not knowing anything about how to prepare it. (About 85% of 549 interviewed mothers knew something). W-S-S practice reflected a woman's report as to whether she had used W-S-S for the last case she treated or not. (About 61% used W-S-S the last time they treated a case of diarrhea.) General community development was a reliable scale (alpha=.71) which reflected the presence or absence in a community of a health center, a paved road, a school, and foreign-sponsored development projects. The community development

scale was used in dichotomous form, with about 50% of respondents classified as high and 50% as low.

The essential result appears in Figure 3.

Figure 3
Community Development, Knowledge
And Behavior in The Gambia



Among those who lived in communities with lower levels of community development and who had some knowledge of W-S-S, about 58% used it for the last case they treated. In higher development communities, more than 80% of those who had some knowledge used W-S-S. This interaction was statistically significant at $p<.02$[1]. While the exact causal mechanism isn't clear, this is a case

[1] McDivitt used analysis of variance to examine this effect, with a modified form of the practice variable (a residual version with the effects of certain control variables eliminated) predicted from community development, knowledge and their interaction.

where the evidence supports the hypothesis that community level structural variables condition the transition from knowledge to behavior. It appears as though it was easier to use W-S-S if one lived in a community where there was complementary pro-development activity, than if one lived elsewhere.

Structural Characteristics of Individuals

The McDivitt analyses are evidence about how community level structural variables interact with knowledge in affecting behavior. An analogous set of hypotheses can be generated at the individual level. These hypotheses suggest that for some people turning knowledge into behavior is impossible because they lack the personal resources to undertake the practice.

A mother may not have the time required to provide a child the large quantity of fluids required to replace the fluids lost during diarrhea. Her workday is already too long, and unless the child appears quite ill, she simply cannot give up other tasks to undertake this new one. Implementing new health practices may be constrained by time available, by facilities in the home, like clean water supplies or adequate sanitary facilities, and by disposable income available to purchase the prescribed medicines or the extra food needed by a malnourished child.

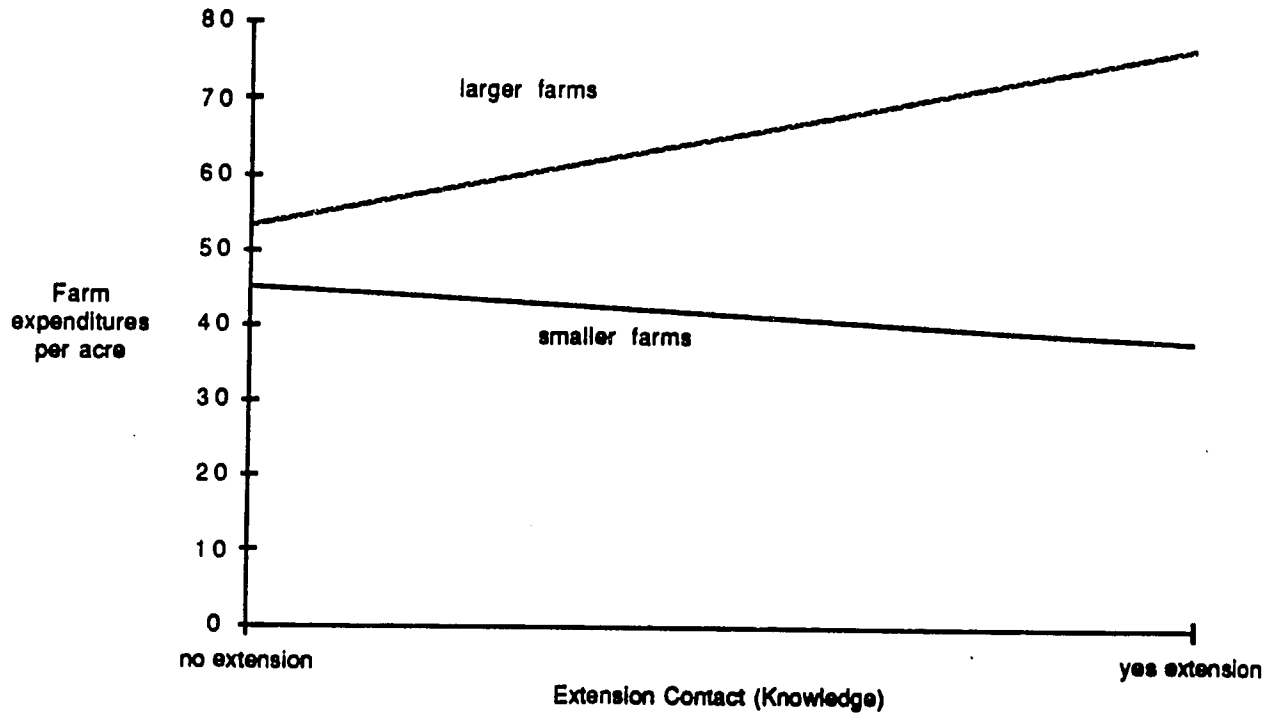
In agriculture the issues are quite similar. New planting practices may demand more time from the farmer; they may demand more resources than can be mustered; or they may demand that the farmer take more financial risk than is tolerable, if the terms of a credit arrangement mean that a bad year entails the loss of income required to subsist or the loss of one's landholding. If a farmer is but a tenant, the terms of his agreement with a landlord may allow him only a partial return on an increase in crop yield. All of these are individual structural characteristics which limit the utility of knowledge and thus its likelihood of being turned into behavior.

A convincing example comes from a study by O'Sullivan in Guatemala (1980). O'Sullivan undertook a survey of 600 farmers in the highlands of Guatemala, examining the relationships among farm productivity, innovations adopted, characteristics of the farm and the farmer, and access to extension services. Among the analyses presented was one which examined the effect of access to an extension service (and thus knowledge about appropriate practices) on farming practice, depending on whether the farmer owned a smaller or a larger farm.

The results of the study are of great interest; they bear so strongly on the theme of this subsection that they are presented although the use of involvement with an extension agent as a measure of knowledge is clearly tenuous. Indeed, O'Sullivan doesn't claim that extension contact is a measure of knowledge. However a strong case can be made that the effects described below occur because of the knowledge transmitted by the agent, and thus agent contact is a rough indicator of knowledge.

About 42% of the sample had contact with extension agents; they are classified as higher knowledge farmers. Farming practices adopted are estimated from the expenditures per unit of land. O'Sullivan found a very strong relationship between farm expenditures per unit of land and yield (r=.85); the costs were largely expended on the purchase of agricultural inputs (fertilizer, seed, etc.), so they represent a reasonable measure of effective practices adopted. Farm costs averaged about $52 per acre. The size of farms varied from one half acre to more than 30 acres. Approximately 60% of the farmers worked less than 2 acres of land; their farms are classified as small; the rest are classified as larger farms.

Figure 4
Size of Farm, Extension Contact and Farm Expenditures in Guatemala



Again the results are clear[1]. Among farmers who worked less than two acres, contact with an extension agent (and the presumed knowledge that provided) had little effect on actual practice. In contrast, among those farmers who worked from two to thirty or more acres, the effects of extension agent contact were salutary. O'Sullivan suggests that the information the extension agents had to offer was of minimal value to the farmers with little land. They were already implementing what they could; adding to their information store was of little relevance. In contrast, farmers with more acres were able to take advantage of the information; they seemed less constrained by their individual structural circumstances in making changes and could turn knowledge into behavior.

[1] Figure 2 is a reworking of material found in O'Sullivan-Ryan (1978). The picture in figure 4 is entirely consistent with the intent of Graph 3 in that document, although some numbers could only be approximated.

Community Social Influences

Public information programs often accept, implicitly, an *individual* cognitive and/or affective model of behavior change. They assume that if people learn something that is to their advantage and it is painted with the appropriate emotional colors, that they will decide on their own to change practice in response. The televised ad says "Vaccinations protect, you can get them on the first Friday of the month at your local clinic" and the message is delivered over an image of a child, unprotected by immunization, crippled with the after-effects of a bout of polio. The ad delivers both information and motivation to encourage an individual decision to take action. However there is a contrasting view which may be worth considering and which may lead to a different communication strategy.

A *social* view of the process of behavior change says that behavior doesn't belong only to individuals but also belongs to social groupings. For example, there is evidence that smoking is substantially a social behavior. Smoking is correlated with educational level and class in both the United States and in many Third World countries. But in the United States, better education and less smoking go hand in hand, while the reverse is true in many developing countries, where smoking in university classrooms can be non-stop. Similarly, breast-feeding has been (re)adopted among many better educated, middle-class women in the United States; it is more common among them than among women from working class backgrounds. Again, in developing countries the association is in the opposite direction.

A consistent positive correlation between education and 'good' health behaviors might lead to a conclusion that it is the cognitions associated with education which count: better educated people don't smoke because they know better as individuals as the result of their education. However the reversal of those associations in the Third World suggests that another mechanism is operating in both places. It may be that these behaviors are substantially the result of social pressures within reference networks. That social hypothesis explains the contrasting results in a way that an individual cognitive hypothesis does not.

Social explanations for the response to public information campaigns carry a strong intellectual tradition. However that tradition has been stronger on theory than on evidence.

From the time of the landmark studies by Columbia University's Bureau of Applied Social Research (summarized and extended by Katz and Lazarsfeld in **Personal Influence**), the idea that social networks act as mediator of the effects of mass communicated information has been widely accepted. The best evidence has come from studies of neighborhood influences (e.g. Festinger, et al 1950) and the geographic pattern of innovation diffusion (Brown, 1981). These studies are strong as evidence that social relationships play a major part in diffusion of information and practice. However, they do not show, in any direct way, that those networks mediate the effects of mass communication. The conclusions of Katz and Lazarsfeld are more widely accepted for their sensibleness than for the evidence that supports them.

In order to show that the effects of mass communication are different depending on the social networks in which an individual is embedded, one has to be able to contrast networks that vary in their support of the message transmitted through public information channels. One needs to show that if a network is supportive, knowledge (garnered from a public information campaign) turns into behavior and that if the network is unsupportive, individuals are less likely to turn knowledge into behavior. Wilkins (1987) did such a study in Ecuador based on a methodology introduced by McDivitt (1985) and Ferencic (1985).

Wilkins examined the effects of a national public information campaign advocating the use of an oral rehydration solution (ORS) for the treatment of fluid loss during diarrhea.[1] In contrast to The Gambia which recommended a home-mixed solution, Ecuador based its program on the use of a pre-packaged dry mixture which needed only to be added to a liter of water to make the required rehydration solution. Recognition of the solution (the measure of

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[1] Wilkins made use of data gathered for the Ecuadoran government agency INNFA by a social research firm (CEPLAES) as part of an evaluation under the supervision of Eduardo Contreras-Budge. The project was funded by USAID through its Communication for Child Survival Program (Academy for Educational Development) and a subcontract with the Annenberg School of Communications at the University of Pennsylvania.

knowledge used in this study) was estimated through answers to three questions concerning whether a respondent had heard about ORS, could recognize the ORS packet, and could recognize the mixing bag distributed with the packet. About 73% of the respondents were able to recognize all three items. They were classified as high on knowledge, while the remaining 27% were classified as low.

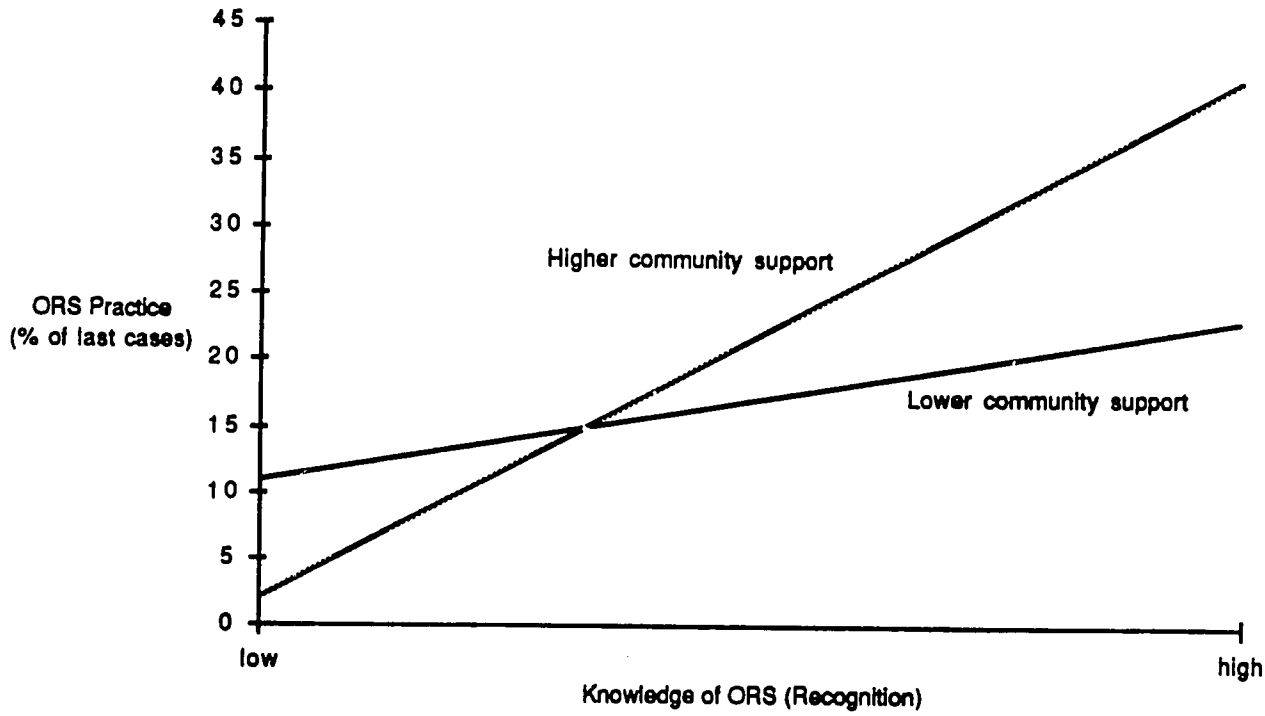
ORS practice was estimated through the self-reported use of the solution to treat a child's case of diarrhea in the two weeks previous to the interview. Of the 580 women whose child had diarrhea in those two weeks, 23% claimed to have used ORS.

Social network support was measured indirectly. The sample had been selected from 60 clusters which were drawn randomly from almost all of Ecuador. Each cluster included about nine or ten women with a child who had a recent case of diarrhea. Since the clusters were defined by geographically concentrated census areas, it was assumed that these women who represented the community also represented the type of social pressures present in the community. It was further assumed that if the women in the community were behaving in a particular way (that is making use of ORS or not), their behavior would be reflected in the social communication about that behavior that was being exchanged in the community. Specifically, the study assumed that a good measure of the messages that a woman was likely to hear from her social network about ORS practice was the actual ORS practice of the other women interviewed in the cluster.

The social support measure was the proportion of other women in the cluster (excluding the respondent in each case) who used ORS for the last case. About 37% of the women lived in clusters where at least 30% of the other mothers reported using ORS. These women were classified as living in communities with higher social support. The remaining women were classified as living in communities providing lower social support.

The interaction between social support and knowledge in their effects on practice is presented in Figure 5.

Figure 5
Social Network Support, Knowledge and ORS Practice in Ecuador



Wilkins performed an analysis of variance with ORS practice as the dependent variable and social support and knowledge as predictors. The analysis established that the main effects of each variable as well as the interaction between them were strongly statistically significant. The hypothesis that social support conditioned the turning of knowledge into behavior was supported. Mothers with high community support were more likely to turn knowledge into behavior than those with low community support.

Learned Characteristics of Individuals

The two remaining categories involve hypotheses which address intrinsic characteristics of individuals. The boundary between the categories is ill-defined, but the hypotheses in the category of learned characteristics of

individuals is meant to include factors such as prior knowledge and learned skills which may be relatively open to shorter term changes, and contrast with the last category which involves hypotheses about personality or fundamental values which are assumed to reflect more enduring characteristics of individuals.

Within the first category one would include prior beliefs about a problem and its solutions, previous experience trying to solve it, as well as factors like education, language skill, visual literacy, and experience with particular communication channels. These are the types of variables which have most often been used in 'knowledge gap' studies, which seek to explain why the socially advantaged sometimes gain new knowledge more readily that the less advantaged in the presence of an increasing flow of relevant communication (Tichenor, Donohue and Olien, 1970; 1980).

The hypotheses suggest that experience affects the ease with which one handles the concepts transmitted in a public information campaign. If one is more comfortable with the concepts, if one can fit them into pre-existing cognitive schema, one can act on them more readily. An individual who knows that the great risk from diarrheal disease is dehydration, may be ready to make use of information about a rehydration solution which solves that problem. Someone who is concerned about the quantity of diarrhea may be less open to a message emphasizing further intake of liquids.

Conceptually, this category of hypotheses is somewhat different from the previous examples. These 'learned characteristic' hypotheses do address the issue of the conditioning effect of prior skills on the turning of knowledge into behavior. However their underlying causal mechanism assumes that prior skills ease the process of turning exposure to an information source into sophisticated (and actionable) knowledge which in turn leads to practice. The study used to illustrate this, by S. Spain, explores how the relation of access to information with knowledge is conditioned by the prior skills of an individual.

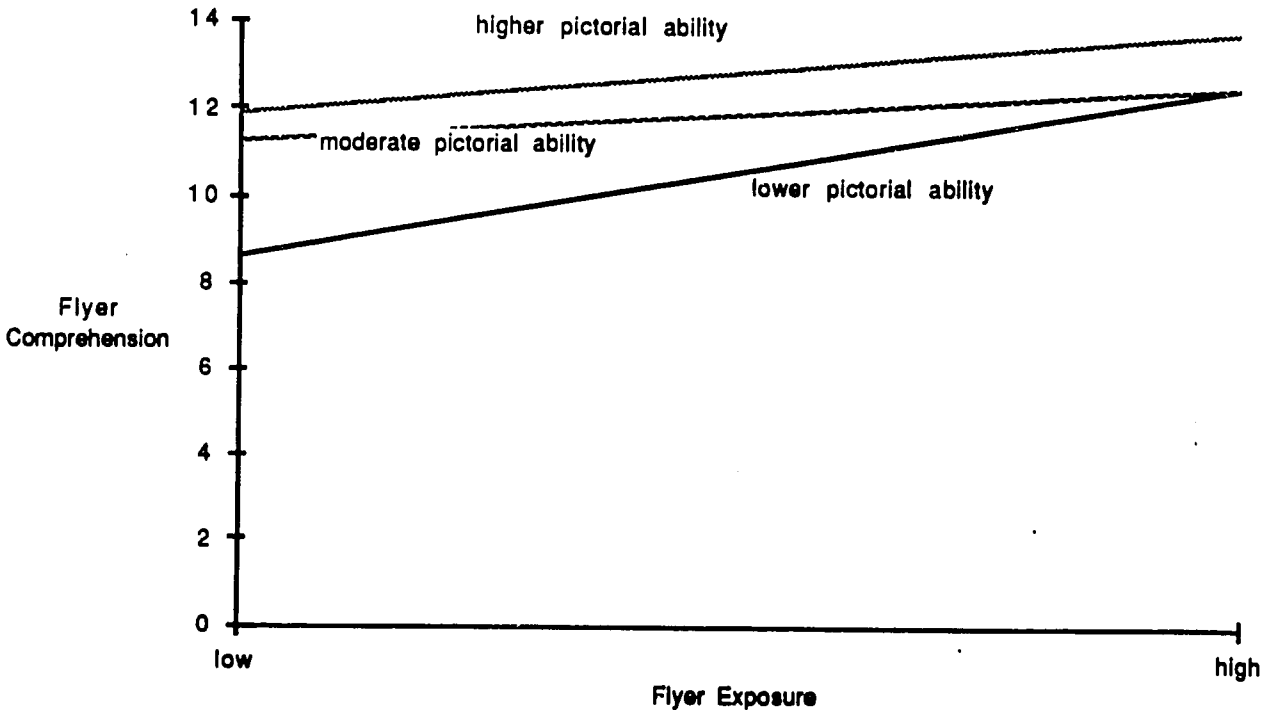
Spain (1983), like McDivitt, gathered data in The Gambia as part of the evaluation of that country's campaign for the use of a water-sugar-salt formula for the treatment of diarrheal disease. She was interested in how visual literacy

interacted with exposure to a flyer in affecting an individual's ability to interpret the flyer. The flyer described how to mix the W-S-S solution and was designed for a non-reading population. It presented the amounts of each ingredient to be mixed and other information through pictures which Spain describes as "representing a moderate level of complexity of interpretation"

Flyer comprehension was measured through an instrument which assessed recognition of objects and details in the flyer and accuracy of interpretations of actions to be taken. Scores varied from 0 to 17 on the highly reliable (alpha=.87) scale, with a mean of 12. Visual ability was measured through an instrument based on the types of recognition and interpretation tasks typical in such tests. It included ability to recognize objects, understand perspective, and make inferences as to ongoing actions. The resulting scale varied from 0 to 8, with a mean of 4 and acceptable reliability (alpha=.64). Of the 388 women included in the analysis, about one third were classified as low (0-2 points), one third as moderate (3-4) and one third as high (5-7).

Exposure to the flyer was classified either high or low: high exposure included those people who had seen the flyer and still had a copy they could show the interviewer. Low exposure included those women who said they had seen the flyer but did not have a copy in their homes. The results are presented in figure 6.

Figure 6
Pictorial Ability, Flyer Exposure and Comprehension in The Gambia



As figure 6 illustrates, Spain found that visual ability affects the influence of flyer exposure on flyer comprehension. The interaction of the two predictors was highly significant when added to a multiple regression equation already including the main effects of visual ability and flyer exposure. The interaction, clearly enough, is negative. Those who had relatively greater visual ability learned to interpret the flyer with little exposure and weren't much helped by repeated exposure to it. Those who were less visually able comprehended it far better if they had repeated exposure to it.

Enduring Characteristics of Individuals

In an earlier period there was a great deal of emphasis on personality and strongly held values as explanations for failures to adopt innovation. The concepts of innovativeness, of fatalism, of entrepreneurial spirit, of the need for achievement all played important roles in early theories of development. For some scholars these traits might be modified as individuals became exposed to 'modern' institutions like the factory or the mass media (Inkeles and Smith, 1974, Lerner, 1958); for others they were fixed at an early age (McClelland, 1961). However for all they were seen as major determinants of the pace of development. These scholars assumed that there were many possibilities for change awaiting individuals if only they were willing to grasp them, but it was their own reluctance to change which held them back.

These individual personality explanations lost favor in the skeptical intellectual tides of the late 1960's, when explanations emphasizing the failures of systems rather than of individuals came to the fore. This change reflected a variety of forces. There was some evidence that indeed structural barriers held individuals back from change. There was also some preference from a policy perspective for system-blame explanations recognizing that systems might be more open to intervention than were personalities. Finally there was a sincere political preference among the people who worked on developing country problems to see those problems as systemic rather than individual in character. These forces led to a rejection of the enduring characteristics of individuals as a favored explanation for slow development. However they are not evidence that such variables do not matter.

Enduring characteristics are, indeed, the residual explanation: if nothing else explains the knowledge-behavior gap, it must be personality. However establishing that positively, rather than merely by claiming it to be the residual explanation is a difficult matter.

There are two different versions of enduring characteristics hypotheses worth discussion. One version recognizes that there is variation in behavior not

predictable from available measures of likely variables. The unexplained variance is partly to be seen as the product of unmeasured variables, partly seen as the product of poor measurement of available variables, and partly the product of idiosyncratic factors. Some may see such idiosyncratic variance as representing irreducible individual differences which reflect the operation of fundamental personality traits. There may be no claim that a particular trait is operating; rather unexplained variation in behavior is credited to the complex mix of traits which define individual character but whose measurement is beyond available technology.

This version of the enduring characteristics hypothesis may be a fair and accurate way to explain residual variance in behavior. But, by definition, it is empirically untestable. Thus, for all practical purposes, it does little to move the argument forward; one might as well take the extreme opposite view and declare unexplained variance in behavior random.

The second version of the enduring characteristics hypothesis makes more direct claims. Assume that, for example, an openness to innovation was a personality characteristic rather than a description of behavior. In parallel with the model used for the previous categories, one could hypothesize that those who, by dint of personality, were more open to innovation would be more likely to to turn achieved knowledge into behavior.

The set of research studies from which examples were drawn for the rest of this chapter do not contain any good illustrations of this type of study. This is partly a reflection of the less favored status of this category of hypothesis; it is also a statement about the sheer difficulty of doing satisfactory measurement of personality characteristics like innovativeness. Then, in contrast to the previous sections which presented illustrations of tests of hypotheses, this section focuses on the difficulty of measuring enduring characteristics in field studies.

The difficulty of assigning individuals scores as to their degree of innovative personality, for example, seems daunting. One way is to use a paper and pencil measure in which individuals describe their openness to new ideas or practices. Robertson uses a measure of attitude toward innovation relevant to U.S. consumption studies, "How willing are you to buy new products - very willing to

very unwilling?" and finds that responses to that question are associated with the number of new products purchased (1971:89).

However the difficulty of relying on such abstract measures can be illustrated by imagining that the research had shown no association. Would the author have rejected the hypothesis that innovativeness is related to innovative behavior? That seems unlikely; rather the tendency would have been to reject the abstract measure on the assumption that any measure of innovativeness had better predict behavior if it is to be useful. The criterion for describing someone as more or less innovative is their behavior, with abstract measures but a surrogate for that measure. But that is another way of saying that the obvious best measure of innovativeness is the actual innovative behavior individuals undertake.

If innovative behavior is the best measure then one is in a bind since specific innovative behavior is also the dependent variable in any study of the interaction of personality with knowledge in producing behavior. One cannot use innovative behavior as a predictor (representing innovative personality) and as an outcome (representing behavior) also without risk of tautology. Alternatively, one might use an abstract measure of innovativeness and a measure of behavior only for the dependent variable. But then the measure of the dependent variable is a better indicator of innovativeness than is the putative measure of innovativeness, an impossible situation. Surely this problem reoccurs with many personality characteristics said to be related to changes in practice (like openness to risk, and venturesomeness, which are often considered predictors of innovative behavior). The best evidence for the presence or absence of the personality trait is often the behavior it is meant to explain.

An additional problem in the use of abstract measures for personality traits is that they require introspection by respondents, and thus depend on their articulateness. Particularly in parts of developing countries where the survey interview is an unusual activity, people may be unused to answering the types of questions required to assign them scores on personality traits. Surely the articulateness of respondents will be a function of their education, their comfort with the research context and other factors unrelated to the trait being measured. Apparent variation in personality traits may just be a stand-in for variation in social class and educational background. Unlike the fairly concrete

measurement tasks associated with the previous categories of explanation for the knowledge-behavior gap, measuring personality may be a morass.

Some Closing Comments

The previous pages have described elements of a particular approach to organizing explanations for the gap between knowledge and behavior. Examples from public information programs studied in developing countries accompanied each category of explanation. However it should be understood that the purpose of the discussion was to present the underlying approach. These studies are neither a census nor are they a representative sample of all studies which fit in these categories. They are a purposive sample designed to make the case for the approach, not to lead to any definitive conclusions about the substantive hypotheses they examine. Some other related work includes many analyses in the McDivitt and Wilkins studies, and studies by Contreras-Budge (1978) and Ferencic(1985). Lei(1984) and Gould (1982) have done related studies using data gathered in the United States. Not all of them found the interactions they were looking for.

The fact is that we are more at the point of believing that these are important ways of looking at the issue than of knowing what the eventual answers will be. We do not know whether the knowledge-behavior gap will have different predominant explanations depending on the behavior, depending on the public information approach taken or depending on the context in which the program operates. We do not know whether eventually we will be able to classify behaviors and contexts in a parsimonious way. We do not know whether we will be able to suggest that for this behavior, in this context, the best class of predictors for the failure to turn knowledge into behavior tend to be this type of characteristic.

In these closing pages it will be useful to address a number of miscellaneous concerns which may help put the previous discussion in context. These concerns include: the importance of this focus on knowledge and behavior gaps with regard to overall study of public information programs; the meaning of

"knowledge"; the possibility of refocusing the discussion from the point of view of the system to that of the audience, and possible application of the categories of explanation to explain other gaps, including those between exposure to communication and knowledge or practice.

Research studying knowledge-behavior gaps may play only a secondary role if one were faced with the task of evaluating public information programs and explaining why they had or had not achieved their goals. The best explanations for relative success or failure of programs probably have to do with how many people were reached by messages, how often they were reached, and how clearly the messages provided information that would help the recipient solve a problem that was already recognized. Most projects, in developing countries at least, founder because these tasks are not done very well (Hornik, 1988). While explaining the knowledge-behavior gap is of substantial theoretical interest, it is possible to remain agnostic as to its practical utility. That decision will await evidence that these types of hypotheses explain very much of the variation in practice and have implications for intervention design.

In each of the illustrative examples a case was made for the relevance of different measures of knowledge, without much explicit consideration of the notion that they represented the type of knowledge which should lead to behavior. Expressing concern about a knowledge-behavior gap assumes that the knowledge was sufficient to serve as the foundation for behavior. If one accepts that assumption then it is reasonable to wonder why there was no 'practice' house constructed on the 'knowledge' foundation. However, if the knowledge was inadequate that in itself may be sufficient explanation for the lack of behavior, without need to turn to susceptibility explanations.

This emphasizes the need to consider carefully what type of knowledge is being measured in a particular study. One wants to be sure not to confuse mere recognition of a solution (like recognizing a packet of rehydration salts) with sufficient knowledge of how it is used and what problem it solves if this latter knowledge is what is required if knowledge is to lead to practice. Weaker measures of knowledge (like the recognition measure) may be useful indicators of a more developed level of knowledge, but they are not the same thing. Their

use is likely to dilute any effects of a susceptibility variable, since they will only permit an imprecise estimate of the true knowledge-behavior relation.

A related issue is the care one must take in making inferences about causal direction. The susceptibility studies reported here depend on cross-sectional data, that is data gathered at a single point in time. Any observed knowledge-practice relation might be explained as easily by the effects of practice on knowledge as vice-versa. Unless one can sort out temporal order among variables, one only may be able to make an inference that a susceptibility variable is associated with a greater or lesser correlation of knowledge with behavior.

The organization of this discussion examined the issues from the point of view of the audience. What individual, community and system characteristics condition the individual's response to knowledge? However many of these hypotheses can also be regarded from the perspective of the system that generates new practices and tries to diffuse them. For example one can ask whether the tendency to use fertilizers, given knowledge of them, reflects individual disposable income. Or one can express the same issue differently. Why is it that agricultural agencies produce recommendations that fit with the financial resources of better off farmers but not poorer ones? The original version focuses on the lack of resources of the individual; the second, looking at the same problem, addresses the failure of the system to respond to that situation. Conceptually the two views are quite similar; from a policy view they may lead down quite different paths.

Similarly, one may note that the lack of a prior intellectual framework makes it difficult for someone to make use of knowledge -- for example knowledge about rehydration fluids may not fit with an individual's notion of the problem of diarrhea and therefore only be accepted reluctantly as a diarrhea treatment. However that view can be turned around. One can ask why the information communicated about the rehydration fluid wasn't better adapted to the conceptual framework common in the audience? In the first view the emphasis is on the individual's 'failure' to have a receptive conceptual framework; in the second the emphasis is on the 'failure' of the message delivery system.

The focus of this chapter has been on the knowledge-behavior gap and how it is to be explained. However one can easily extend most of the logic to other gaps within the field of purposive communication. One can ask why exposure to information doesn't always turn into knowledge. In Figure 1, knowledge was on the horizontal axis and practice on the vertical axis. The exposure-knowledge gap hypotheses would move knowledge to the vertical axis and exposure to the horizontal axis. Again one might search for variables within the five categories which predict stronger or weaker relationships between exposure and knowledge. One might also extend the model to the direct relation between exposure and practice ignoring the intervening knowledge variable.

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