

*This article focuses on audience-related factors such as ability, motivation, and media use as well as "ceiling effects" that act as contingent conditions for understanding the "knowledge gap." Ability deficits, individual differences, and ceiling effects, true or imposed, are examined to attempt a clarification of how knowledge gaps are widened or narrowed.*

## **DEFICITS, DIFFERENCES, AND CEILINGS**

### **Contingent Conditions for Understanding the Knowledge Gap**

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The knowledge gap hypothesis introduced into the mass communication literature in 1970 by Tichenor, Donohue, and Olien appears to have important implications for the use of the mass media as a constructive social tool. The hypothesis as originally formulated asserts that "as the infusion of mass media information into a social system increases, segments of the population with higher socioeconomic status (SES) tend to acquire this information at a faster rate than the lower status segments, so that the gap in knowledge between these segments tends to increase" (Tichenor, Donohue, and Olien, 1970: 159). The hypothesis thus implies that attempts to equalize the distribution of information within a social system which employ the mass media are bound not only to fail, but actually to increase the inequality.

This implication has been of interest to students of both developing and developed societies, and a body of literature

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concerning knowledge gaps and other "communication effects gaps" in both sorts of societies has begun to emerge. But while the implications of the knowledge gap hypothesis for social policy may seem clear, the evidence bearing on the hypothesis found in this literature is less clear. The original formulation of the knowledge gap hypothesis, for example, was supported by Tichenor and his associates (1970) through the reinterpretation of several studies conducted in the United States, including a news diffusion study showing that a news event diffused to high SES persons faster than to lower SES persons (Budd, Maclean, and Barnes, 1966). This finding, however, can be balanced against another news diffusion study (Larson and Hills, 1954) which found that slightly more people in a working-class neighborhood heard of the event than people in a professional neighborhood. A later study by Tichenor and his associates (1973) reports that in a number of smaller communities increased newspaper coverage of a *national* news item was associated with a gap in knowledge of that item, while increased coverage of *local* items was not associated with a gap.

Data from developing societies have shown the same mixed results. For example, Galloway (1974) reports data from information intervention programs in India which show a tendency for gaps in health and agriculture knowledge to narrow and show no clear tendency for gaps in the adoption of innovations to either widen or narrow in the course of the program. Shingi and Mody (1976) have also reported a narrowing of the gap in agriculture knowledge in India due to an intervention program. And Katzman (1974) has pieced together historical data showing that the gap between husbands (information-rich) and wives (information-poor) in ability to write their own names widened and then narrowed over long periods of time.

These results suggest that before the knowledge gap hypothesis and its implications for both more and less developed societies can serve as useful inputs for policy development, it will be necessary to elaborate and perhaps modify the hypothesis to account for the results reviewed above. Specifically, it will be necessary to specify the conditions in which an infusion

of mass media information into a social system will widen the gap and those in which it will narrow the gap. This specification of contingent conditions, in turn, requires a fuller understanding of the causal forces acting to widen and narrow the gap.

#### **CAUSAL ANALYSIS OF KNOWLEDGE GAP PHENOMENA**

The knowledge gap literature accumulated to this point consists primarily of data demonstrating widening or narrowing of gaps of various sorts under various conditions. With a few exceptions (Donohue, Tichenor, and Olien, 1975; Genova, 1975), systematic testing of causal factors and contingent conditions is absent. However, a variety of post hoc explanations and intuitively based lists of possible causal factors have been offered. For example, in their original article, Tichenor and his associates (1970) list five factors which may account for widening gaps: (1) differences in communication skills between higher and lower SES persons, (2) differences in existing knowledge from prior exposure, (3) differences in amount of social contact relevant to the topic under study (i.e., public affairs), (4) differences in exposure and retention of information, and (5) the middle-class orientation of the print media which are the primary source of public affairs information.

Katzman (1974), who is concerned with gaps between those with more and less knowledge rather than between higher and lower SES population segments, offers a similar list which includes differences in communication skills due to differences in education, differences in ability to make use of new information due to differences in the individual's existing knowledge, differences in access to new communications technology due to differences in financial resources, and differences in motivation to use communication resources.

Other authors focus on a single factor in attempting to predict or explain their results. For example, Cooke et al. (1975), in their reanalysis of the "Sesame Street" summative

evaluation data, emphasize differences in exposure between higher and lower SES children as the explanation of the modest gap-widening effects they found. Genova (1975) demonstrates that differences in interest in (or salience of) a news event on the part of the audience can produce knowledge gap effects at least under some circumstances. Galloway (1974) emphasizes the social contact factor first advanced by Tichenor, Donohue, and Olien (1970) in his argument that gaps widen when discussion of the innovation is limited to the more advantaged "substructures" within the social system.

Galloway also suggests that the social contacts factor can account for narrowing gaps when discussion cuts across substructures. This notion is based on the attempt by Tichenor and his associates (Donohue, Tichenor, and Olien, 1975) to explain to complex results of the earlier study (Tichenor, Rodenkirchen, Olien, and Donohue, 1973), in which the gap narrowed for local information but widened for national information. The authors argue that mass media information is more likely to narrow knowledge gaps when the knowledge domain under study is salient and conflict-ridden within a community, particularly a homogeneous (i.e., small) community. The effect of salience and conflict is attributed to an equalization of motivation to acquire the knowledge across all segments of the community, while the effect of homogeneity is attributed to the decreased differentiation between the segments resulting in increased interpersonal discussion of the information between the segments. The authors offer data in support of these arguments.

With the important exception of this work by Tichenor and his associates and Galloway's extension of it, the narrowing of gaps is attributed to "ceiling effects." Shingi and Mody (1976: 185), for example, concluded that the information-poor farmers may have caught up to the information-rich farmers because "the more informationally rich farmers encountered a 'ceiling effect' in that they already knew much of the content of the two television programs." Galloway (1974) comes to a similar conclusion. The data cited in Katzman's article also imply that a ceiling effect is responsible for a gap-narrowing, since the

criteria for measuring the gap (i.e., ability of husbands and wives to write their own name) has an inherent ceiling (i.e., successfully writing one's name) beyond which change is not measured.

In summary, then, the wisdom accumulated to date on the causes of knowledge gap phenomena focuses on two categories of causal factors: (1) audience-related factors such as ability (e.g., communication skills), motivation, and media behavior (e.g., exposure), which are held to be the causes of widening gaps, and (2) message-related "ceiling effects," which are held to be the causes of narrowing gaps. The important exceptions to this generalization are Donohue, Tichenor, and Olien's (1975) argument that gaps may be reduced through an equalization of motivation to acquire the information, and Katzman's argument that gaps may be widened through unequal access to communication technology—which may be less an audience than a channel characteristic.

Though intuitively derived and based on post hoc explanations for the most part, these analyses contain insights of value in attempting to isolate those contingent conditions which ought to be specified in a more complete and accurate statement of the knowledge gap hypothesis. The task, then, is to draw out explicitly these contingent conditions, and, in this regard, we wish to develop two theoretical issues raised by this brief literature review. First, we will attempt to draw on theory and research on SES-related differentials by borrowing a conceptual framework for the study of audience-related causal factors which has proven useful in other disciplines concerned with similar phenomena. And, second, we will offer a typology of "ceiling effects."

In focusing on these two issues we will, of course, ignore or gloss over other important issues such as the role of print versus broadcast media in gap phenomena or the implications of defining gaps as the difference between higher and lower SES persons (Tichenor, Donohue, and Olien, 1970; Tichenor, Rodenkirchen, Olien, and Donohue, 1973) rather than the difference between those with more and less information (Katzman, 1974). We will also ignore, for the most part,

methodological issues. We feel, however, that in choosing these issues we have selected two fundamental problems in need of attention.

#### AUDIENCE-RELATED FACTORS

Mass communication research is, of course, not alone in its interest in SES-related differentials. Education, developmental psychology, poverty research, and other disciplines are also interested in these differentials and offer conceptual tools directly applicable to the audience-related factors involved in knowledge gap phenomena.

An important thrust of recent writing in these fields is a shift in interest away from characteristics of the individual and toward the social system in the study of the factors which originate and maintain SES-related differentials. Gans (1969), for example, has argued against the notion of a "culture of poverty" which renders the individual deficient in both motivation and ability to deal with the demands of middle-class life. He maintains that the poor aspire to a better life and are not deficient, but are locked into behavior patterns which are functional in the environment in which they find themselves, though not functional for upward mobility. This perspective has been influential in guiding the research of Greenberg and his associates (e.g., Dervin and Greenberg, 1972) on the communication environment of the poor.

In the fields of education and child development, Cole and Bruner (1971) have argued against the "deficit interpretation" of poor and minority children's intellectual performance and have outlined an alternative which they call the "difference interpretation." This work is particularly appropriate to our concerns since it, in fact, deals with a form of knowledge gap phenomena. Just as mass communication researchers have documented an SES-related gap in public affairs knowledge over the last few years, so educational and child development researchers have documented SES-related gaps in school achievement and intelligence test scores over the last few decades (see Hess, 1970). And just as mass communication researchers

are now examining the effect of new information on gaps, so educational and child development researchers have long debated the effect of education on gaps. For example, as early as 1915, Yerkes and Anderson had formulated the issue of whether or not education increases the correlation between SES and intelligence test scores. In 1951, Fells, Davis, Havighurst, Herrick, and Tyler concluded that allowing for differences in testing of children of various ages, the gap between higher and lower SES children remained constant. However, recent researchers have been unwilling to close the debate and have argued that the gap opens dramatically in preschool years when the mother is the primary educator (Quay, 1974; Ireton, Thriving, and Graven, 1970; Willerman, Broman, and Fiedler, 1970).

A good deal of research has been directed toward specifying the causes of the "achievement gap" and toward developing plans to narrow it. Cole and Bruner (1971: 867) argue that much of this research was conditioned by the deficit interpretation of the relationship between SES and intellectual performance:

Perhaps the most prevalent view of the source of ethnic and social class differences in intellectual performance is what might be summed up under the label "the deficit hypothesis." . . . It rests on the assumption that a community under conditions of poverty (for it is the poor who are the focus of attention, and a disproportionate number of the poor are members of minority and ethnic groups) is a disorganized community, and this disorganization expresses itself in various forms of deficits.

Among the best known and most influential of the "deficit" theorists cited by Cole and Bruner is Bernstein, whose early work on lower-class language in England was instrumental in focusing attention on the symbolic environment of the child. Bernstein's (1961) basic argument is that the language used by lower SES persons is restrictive and undiscriminating in form and content. It is characterized by "a high proportion of short commands, simple statements and questions . . . the symbolism is descriptive, tangible, concrete, visual and of a low order of

generality . . . the emphasis is on emotive rather than logical implications" (Bernstein, 1961: 164). The language used by higher SES persons, on the other hand, is "rich in personal, individual qualifications and its form implies sets of advanced logical operations" (Bernstein, 1961: 164). Pursuing this line of reasoning, Deutsch (1965) argues that this language deficiency is translated into cognitive deficiency—so that the more complex and abstract the task required of the lower SES child, the greater his deficit. Deutsch concludes that this deficiency in cognitive competence combines with the other disadvantages of lower SES life throughout the child's development to produce a "cumulative deficit." Such deficit theorizing was instrumental in the development of the intervention schemes based on intellectual stimulation of the child at an early age, as exemplified by the federally-sponsored Head Start programs.

The alternative presented by Cole and Bruner (1971: 870) is the "difference interpretation":

The crux of the argument . . . is that those groups ordinarily diagnosed as culturally deprived have the same underlying competence as those in the mainstream of the dominant culture, *the difference in performance being accounted for by the situations and contexts in which the competence is expressed.*

In support of the difference interpretation, Cole and Bruner cite the work of Labov (1970), who attacks the concept of linguistic deficiency. An example of Labov's approach related by Cole and Bruner is a language assessment interview of an eight-year-old black child in which the child is first interviewed in a standardized but apparently nonthreatening manner (e.g., black neighborhood figure is used as interviewer) and is shown to be monosyllabic and, thus, linguistically deficient. Later, however, the child is reinterviewed by the same interviewer but in the child's own apartment, lying on the floor, eating snacks, using black dialect and discussing clearly taboo subjects. In this situation the child becomes an active participant in the conversation. From these and other examples produced by Labov, it is concluded that "the usual assessment situations, including IQ and reading tests, elicit deliberate, defensive



behavior on the part of the child who has realistic expectations that to talk openly is to expose oneself to insult and harm. As a consequence, such situations *cannot* measure the child's competence" (Cole and Bruner, 1971: 869).

Another important line of evidence offered in support of the difference interpretation is cross-cultural studies of cognitive abilities. An example of this approach is Gay and Cole's (1967) comparison of nonliterate Liberian rice farmers to Yale sophomores in ability to estimate volume. In the task which required an estimation of the number of cups of rice in several bowls—not surprisingly—the rice farmers were significantly more accurate than the students, and the difference in accuracy increased with the amount of rice to be estimated. In other sorts of measurement tasks, however, educated subjects were more accurate. This example is offered in support of the contention that "one can find a corresponding situation in which the member of the 'out culture', the victim of poverty, can perform on the basis of a given competence in a fashion equal to or superior to the standard achieved by a member of the dominant culture" (Cole and Bruner, 1971: 870).

The major thrust of the difference interpretation is, then, that persons from different social strata and/or cultures manifest their abilities in different circumstances and, further, that these circumstances are predictable and reasonable given the differences in status or culture. Specifically, in regard to the latter point, the Labov example suggests that these circumstances will be those in which the individual is *motivated* to exercise his abilities, while the Gay and Cole example suggest these circumstances will be those in which it is *functional* for the individual to do so.<sup>1</sup> In both cases the behavior of the individual is viewed as an understandable, even logical, adaptation to his environment and place in the social system. This difference interpretation is, then, in stark contrast to the deficit interpretation, the major thrust of which is a transsituational deficiency of basic cognitive ability.

It is apparent that the concepts developed by Cole and Bruner are potentially useful tools for the task of identifying the contingent conditions which should be specified by the

knowledge gap hypothesis, as well as for the larger task of adequately conceptualizing the causes of knowledge gap phenomena.

In regard to the task of identifying contingent conditions, it is apparent that emphasis on transituational deficits (e.g., lack of communication skills) as the explanation of knowledge gap phenomena predicts that gaps will always widen and never narrow (assuming SES and skills are positively related). That is, if lack of communication skills on the part of lower SES persons is a cause of gap phenomena, then, because this lack holds under all circumstances, all knowledge gaps will always widen and never narrow unless, of course, ceiling effects intervene to allow the less skilled to catch up. The point here is that analysis of transituational deficits such as lack of communication skills can reveal nothing about the contingent conditions which the data reviewed above demand.

By contrast, emphasis on situation-specific differences between higher and lower SES persons as an explanation for gap phenomena predicts that gaps widen in those circumstances in which lower SES persons are less motivated to acquire the information or in which the information is less functional for them, while gaps may narrow (and perhaps even fail to materialize in the first place) when the motivation to acquire the information is increased among the lower SES persons or when the information is functional for them. Thus, analysis of situation-specific differences can reveal something about contingent conditions. Specifically, this analysis suggests as candidates for the sought-after contingent conditions the distribution of motivation to acquire the information across social strata and/or the function of the information for persons of various social strata.

Reformulating the knowledge gap hypothesis to embody these contingent conditions, it may be stated:

as the infusion of mass media information into a social system increases, segments of the population motivated to acquire that information and/or for which that information is functional tend to acquire the information at a faster rate than those not motivated or for which it is not functional, so that the gap in knowledge between these segments tends to increase rather than decrease.

In summary, then, it is being argued that the nature of the knowledge gap phenomena (i.e., whether the gap widens or narrows) may be contingent upon certain variables linking the audience and the knowledge domain under study. These variables, to repeat, are the distribution of the motivation to acquire the information in that domain and/or the function of the information in that domain for those of various social strata. An implication of this argument is that gaps may narrow for reasons other than ceiling effects, a point implicit in the argument of Tichenor and his associates (Donohue, Tichenor, and Olien, 1975) that salience and conflict may have narrowed the gap in local public affairs knowledge through an equalization of motivation to acquire the information.

Turning now to the more general task of conceptualizing the causes of knowledge gap phenomena, the arguments presented by Cole and Bruner maintain that the explanation of SES-related disparities in knowledge lies not in transsituational deficits, but rather in situation-specific differences between higher and lower SES persons. The communication skills factor cited by Tichenor, Donohue, and Olien (1970) and others has already been identified with the transsituational deficit concept, and, while Cole and Bruner wish to reject deficits as explanation for the "achievement gap" in school performance, their arguments are, unfortunately, not necessarily a warrant to reject deficit explanations of the knowledge gaps studied in the mass communication literature. This is because on a close reading of their paper Cole and Bruner do not necessarily maintain that *all* differences in performance between higher and lower SES children are merely test artifacts (as Labov claims about linguistic differences) and do not appear to deny that some differences in skills such as reading may be real enough. Nor, perhaps, would they deny the reality of differences in cognitive schema or structures used to organize and interpret incoming information about the world. Higher and lower SES persons, in other words, may well see the world in somewhat different ways. Cole and Bruner do deny, however, that any such differences as these reflect a deficit in basic cognitive ability, as Deutsch (1965) would maintain and would argue that such

differences reflect instead a domain of behavior which the lower SES child has not been motivated to acquire or which he has not found functional to existence in the circumstances in which he finds himself. Of course, if one could muster data to show that Labov's test artifact argument applied to all SES-related differences, including reading, then one would be more justified in rejecting deficit explanations of widening gaps. It is important to note, however, that even if Labov's arguments can be extended in this way, knowledge gaps could still be found—either as test artifacts or because higher and lower SES persons are motivated to, or find it functional to, apply their skills to different knowledge domains.

The point of all of this is that, in adapting the transituational deficit concept from education to mass communication, we have shifted from a concern with basic cognitive capacity to more specific skills in applying that capacity.<sup>2</sup> Cole and Bruner clearly reject SES-related differences in basic cognitive capacity, but appear to allow for them in specific skills such as reading and, possibly, also in the development of cognitive schema. The implication is that transituational deficits such as differences in communication skills remain a potential explanation for widening knowledge gaps. Of course, as stated above, such deficits cannot explain narrowing gaps.

If Cole and Bruner's work does not allow the rejection of transituational deficits in communication skills as an explanation of knowledge gap phenomena, it should at least spur interest in the development of a difference interpretation of those phenomena. Such a difference interpretation, as outlined above, would hold that gaps between higher and lower SES persons widen because lower SES persons are not motivated to acquire information from the particular knowledge domain (e.g., public affairs) under study or do not find that information functional in their circumstances. And just as the lack of communication skills factor was cast into a deficit interpretation of the knowledge gap, so a number of causal factors suggested by Tichenor and his associates (1970) and others may be cast into a difference interpretation.

The selective exposure and retention factor (Tichenor, Donohue, and Olien, 1970) is one such causal factor which may be readily incorporated into a difference interpretation. SES-related differences in media exposure (in terms of both amount of exposure to various media and content preferences) are well documented in the mass communication literature (see, for example, Dervin and Greenberg, 1972), and similar differences in retention of information have also been reported (e.g., Williams and Lindsay, 1971). Thus, differences in exposure and/or retention could explain the widening of gaps, as Cooke et al. (1975) has argued is true in the case of "Sesame Street." These differences, however, in turn, require explanations, and the answer could well be differences in motivation to acquire the information. The status of selective exposure and retention in the difference interpretation is that of intervening variables linking motivation and function to rate of knowledge acquisition.

Another factor which fits readily into the difference interpretation in much the same way is differences in social contacts relevant to the topic under study (Tichenor, Donohue, and Olien, 1970). It is not that lower SES persons lack social contacts in general, for indeed they do not (Dervin and Greenberg, 1972), but, as Chaffee (1972) generalizes, "likes talk to likes" (see also Troidahl and Van Dam, 1965). Interpersonal communication is, then, not likely to cut across social strata, as noted by Galloway (1975), thus allowing those in each social strata to define for themselves what shall be discussed. And what sort of information will be discussed? The answer should be clear by now. Here, again, interpersonal discussion during social contact is an intervening variable linking motivation and function to knowledge acquisition.

The prior knowledge factor (Tichenor, Donohue, and Olien, 1970; Katzman, 1974) is one whose role in the difference interpretation is less clear. From one perspective prior knowledge could also be an intervening variable in the difference interpretation. That is, lack of motivation in the past hindered knowledge acquisition in the past, which in turn hinders

knowledge acquisition in the present. From another perspective, however, prior knowledge could be an intervening variable in the *deficit* interpretation. That is, lack of communication skills (e.g., reading ability) or other transituational deficits in the past hindered knowledge acquisition in the past, which hinders knowledge acquisition in the present. A simple example of this is presented by Shingi and Mody (1976), who found that lack of understanding of technical jargon hindered learning. On a more complex level, lack of development in the past of cognitive schema necessary to process the incoming would render learning impossible.

From still another perspective, lack of prior knowledge may be an antecedent of motivation to acquire information. Kline, Miller, and Morrison (1974) have demonstrated that adolescents who perceived themselves to be behind significant others (e.g., peers) in family planning knowledge learned more from mass media messages than those who perceived themselves to be ahead, presumably because their "behind" status motivated them to learn. These three perspectives on prior knowledge, of course, are not mutually exclusive, and each may be correct under different circumstances. In any case, the role of prior knowledge seems to be a complex one, and worthy of further research.

The preceding comments have been offered as examples of how a difference interpretation of knowledge gap phenomena might be fleshed out and to suggest how such an interpretation can organize the maze of causal factors already appearing in the literature. A good deal more research must be directed toward the task of specifying how differences in the life-styles and environments of persons of various social strata are translated into differences in motivation and function. Certain lines of research in the mass communication literature may, however, be useful in this regard. For example, the current generation of uses and gratifications research may give some indication of the attitudes and behaviors which mediate the relation between one's social context and his media use; research on information seeking (Atkin, 1973; Fett, 1975) may indicate something about the function of information under various circumstances; and research on alienation may shed light on the motivation to

acquire certain types of information, such as public affairs (Seeman, 1966; Nielson, 1973). Of course, other disciplines (e.g., Hess, 1970, in developmental psychology; Moynihan, 1969, and Shostak, 1969, in sociology) offer a variety of approaches of potential value in developing the differences interpretation.

The difference interpretation, though still far from fully developed, does offer a reasonable explanation of certain knowledge gap phenomena. It is easy, for example to come up with a variety of reasons why higher SES persons would be more motivated than lower SES persons to acquire public affairs knowledge of the sort studied by Tichenor and his associates (1970, 1973), or why that sort of information would be more functional for them. It is reasonable to expect, then, that widening gaps will be found in the knowledge domain of public affairs unless something intervenes to alter the motivation and/or function patterns, and Tichenor and his associates (Donohue et al., 1975) argue that in regard to the local public affairs information they studied, this is exactly what did happen: the importance of the issues for the small towns was so great that persons from all social strata were motivated to acquire information on those issues.<sup>3</sup>

Genova's (1975) work, which shows that differences in interest in (or the salience of) the knowledge domain on the part of the audience may produce knowledge gaps between more and less interested persons, also fits well into the difference interpretation. Genova did not, however, actively pursue the problem of linking differences in interest to SES which would be necessary for this analysis to directly bear on the difference interpretation as outlined here.

This difference interpretation may also serve as a useful heuristic device for exploration of knowledge gap phenomena. For example, Torsvik (1972) has reported data showing a narrowing of a knowledge gap in national public affairs information after the introduction of television into three northern Norwegian provinces. Specifically, his data (Table 1) show that the less educated Norwegians who acquired television between 1965 and 1969 showed a larger increase in knowledge

TABLE 1  
 Mean Knowledge Scores for Those Acquiring Television and  
 Interviewed in 1965 and 1969

	<u>pre-tv (1965)</u>	<u>post-tv (1969)</u>	<u>% gain</u>
high education	2.36	3.37	43
low education	1.54	2.99	92
	N=374	N=374	

(i.e., recognition of national political leaders' pictures) than the more educated who acquired television at the same time. This knowledge gap was thus narrowed (Figure 1). This data is made more interesting, but perhaps less explicable, by the finding that, in this Norwegian data, education and amount of television use are not correlated, and that the broadcast media are the universal source of national public affairs information.

It is certainly possible to attribute this gap narrowing to some sort of ceiling effect as has been done with most gap narrowing phenomena in the past. At this point, we cannot reject a ceiling

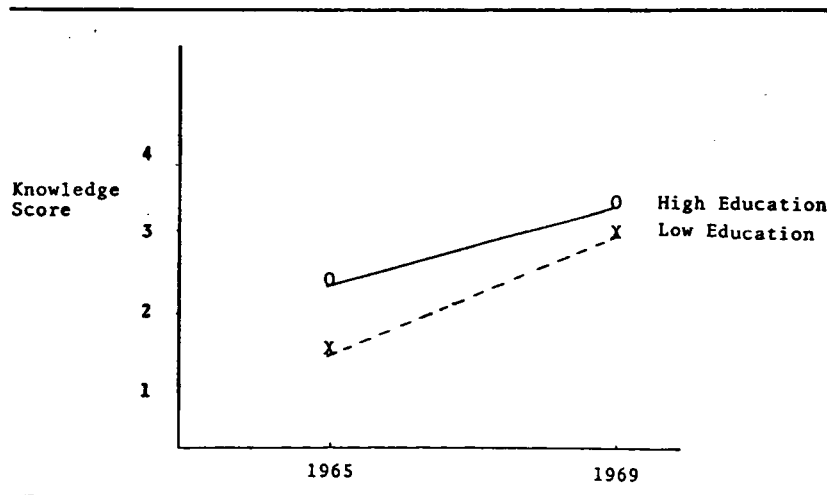


Figure 1: Graphic Presentation of Gain in Knowledge Between 1965 and 1969 for those Acquiring Television



effect explanation of the data, but the difference interpretation at least suggests that alternative explanations involving motivational and/or functional factors may be found. Such an alternative is, in fact, suggested by Rokkan and Valen (1970), who, employing the same data as Torsvik, studied the 1969 Norwegian election. Their analysis showed that in 1969 the Labor Party made large gains over 1965 at the expense of the Socialist People's Party. Most significantly, these gains were especially marked in the northern provinces—those studied by Torsvik—and the predominant characteristic of those voters who shifted parties was their low level of education.

While not offering a conclusive explanation of Torsvik's data, these results are suggestive. It is not unreasonable to expect that this marked political activity among the less educated would be accompanied by increased motivation on their part to acquire political information. For example, intensive grass-roots political activity among workers by the Labor Party between 1965 and 1969 could be the antecedent of both the voting shift and increased motivation to acquire information among the less educated.

Another example of data which may be fruitfully explored using a difference interpretation is provided by Jennings and Langton (1968), whose study of political socialization was based on a national sample of 1,700 high school seniors. Focusing on the black students, they found that as parental education increased there was a shift in attitudes about citizenship among the students who had taken a civics course from a concentration on participation to a concentration on loyalty:

Both loyalty and participation are emphasized in the civics curriculum, and for White and lower status Negro students the dual emphasis has about equal effect. But as noted earlier, the higher status Negro may have received from his more active parents a "realistic" appraisal of the institutional and social restrictions placed upon Negro participation in American politics. Consequently, the participation emphasis in the curriculum has little impact. The reality factor may cause the higher status Negro to select out of the curriculum only those role characteristics which appear to be most

congruent with a preconceived notion of political life chances.  
 [Jennings and Langton, 1968: 864]

The authors provide data showing that black students whose parents have less education felt more politically efficacious, were more interested in politics, and talked more about it if they had taken a civics course as compared to students who had more education.

Given this pattern of greater political interest and activity among the children of less educated black parents, it does not seem unreasonable to expect that these children would also be more motivated to acquire civics knowledge. It may be predicted, then, that the relationship between knowledge and civics instruction would be stronger among the children of the less educated blacks as compared to the more educated blacks, since the former are likely to be more motivated to acquire information from the courses.

A reanalysis<sup>4</sup> of the Jennings and Langton data (Table 2) shows that the relationship between civics knowledge and number of civics courses taken by the students is strongest for the children of parents with an elementary education, and weakest for children of parents with a high school education, with the relationship for children of college-educated parents at an intermediate level. This curvilinearity is not predicted by the difference interpretation, but is not necessarily at odds with it either. The participation-related motive to acquire information may well decline across all three education groups (as indicated by the declining relationship between the course taken and felt efficacy as shown in Table 2) and, thus, act to decrease the

TABLE 2  
 Relationship (gamma) Between Number of Civics Courses Taken and  
 Civics Knowledge and Perceived Efficacy of Black Students from  
 Families of Three Education Levels

	<u>parents-elem.</u>	<u>parents-HS</u>	<u>parents-col.</u>
courses X knowledge	.57	.27	.44
courses X efficacy	.56	.35	.05

relationship. However, among the highest status black families another factor, such as motivation to do well in school or superior communication skills, may intervene to increase the knowledge scores.

These, then, are two examples of knowledge gap phenomena for which the difference interpretation may not have provided the ultimate explanation, but for which it at least served to generate plausible explanations and also served to guide further analysis.

#### CEILING EFFECTS

The second theoretical issue we wish to discuss is the distinction among the various "ceilings" which have been encountered in the literature reviewed above. Specifically, three types of ceilings appear in the literature, which may tentatively be labeled artifacts, imposed ceilings, and true ceilings.

In regard to the first type of ceiling, Cooke et al. (1975) suggest that the measurement instruments developed for the "Sesame Street" evaluation had a ceiling effect built-in, since they were more sensitive to pre- to posttest improvements by children who scored toward the lower end of the scale on the pretest than improvements for those who scored at the higher end. Even though gaps in certain skills widened in spite of this situation, the example suggests how measurement instruments alone may be responsible for data which show lower SES or the less informed catching up. Such a narrowing of a gap is, of course, nothing more than a measurement artifact and, as such, is of great methodological importance but little theoretical importance.

"Imposed ceilings" are of more theoretical interest and may be subdivided into two categories. One of these categories is ceilings imposed by the message, as exemplified by the Shingi and Mody (1976) study. In this case, the authors argue that the message contained only a limited amount of the available and relevant agricultural information, and, since the more informed farmers were likely to already have this information, the

message served to help the less informed farmers catch up. One is likely to dismiss this as an experimental artifact and, therefore, also of no theoretical importance, especially since the message was under the control of the experimenter. Such imposed ceilings, however, may be characteristic of many "naturally occurring" messages, particularly in the mass media as compared to specialized media.

The theoretical importance of imposed ceilings cannot, then, be so easily dismissed, and, in fact, such source-imposed ceilings seem to be the most readily available, though not an altogether desirable, method for policy makers attempting to equalize the distribution of information within a social system.

The other category of imposed ceilings includes those imposed by the members of the audience upon themselves. While this type of ceiling has not yet appeared in the literature to date, it seems that the explanation of the Kline, Miller, and Morrison (1974) data, for example, could be rephrased as follows: "ahead" adolescents (from a social comparison point of view) felt that they had enough information and, thus, were not motivated to acquire any more, allowing the "behind" adolescents to catch up. This explanation shifts the focus from increased motivation on the part of the "behind" adolescents to decreased motivation on the part of the "ahead" adolescents. The audience-imposed ceiling idea, then, is really a recasting of the difference interpretation into ceiling effect terms. The audience-imposed ceiling concept, however, may be a useful one, particularly if the psychological reality of the concept can be demonstrated.

The third type of ceiling, which we have labeled "true ceilings," is exemplified by the data cited by Katzman (1974) concerning the ability of husbands and wives to write their names. In this case, the knowledge domain (which Katzman refers as the "criteria" for measuring the gap) is writing one's name and has a true ceiling which is simply the fully developed ability or knowledge of how to do so. The data, then, may be explained by the fact that when the husbands had learned to write their name, they had reached the true ceiling of the

particular knowledge domain, and their wives were thus bound to catch up.

It is also possible to dismiss the theoretical importance of this sort of ceiling by arguing that if the researcher focuses on "literacy" rather than on "ability to write one's name" as the knowledge domain or criteria, then the ceiling disappears (a point made by Katzman), making the "true" ceiling nothing more than an artifact of a too narrowly defined knowledge domain. This criticism is significant, but it is wise to remember that the total body of human knowledge gets divided up in a variety of ways for a variety of reasons, and in some cases a true ceiling or a practical approximation of one may have value. Knowledge of a single news event which is the cornerstone of news diffusion research has a ceiling in this sense, in that limiting the knowledge domain to a single news event has methodological and theoretical value in this area of research. Larson and Hill's (1954) diffusion data, which showed very little difference in knowledge of a simple news event (death of a public figure) between workers and professionals, may thus be explained by a true ceiling effect.

The implications of the distinctions made here for the task of specifying contingent conditions need little explanation. Under conditions of a source-imposed ceiling on the message or a true ceiling on the knowledge domain, gaps will be likely to narrow. Similarly, gaps will narrow when the higher SES members of the audience impose a ceiling on themselves while the lower SES members do not. Under opposite conditions the gap will widen.

#### SUMMARY

In terms of specifying the conditions in which gaps will widen and those in which they will narrow, we have argued that it may be necessary to specify (1) the distribution across social strata of the motivation to acquire the information under study and/or the degree to which that information is functional for various social strata, and (2) the presence or absence of ceilings

derived from the message, the knowledge domain, or the audience itself. For the present, there must remain only possibilities, subject to verification by research which is yet to be done.

In terms of the more general task of developing a theory of knowledge gap phenomena, we have identified three categories of possible causal factors: (1) transituational deficits (e.g., lack of communication skills), (2) differences in distribution of motivation to acquire the information under study and/or the degree to which that information is functional for various social strata, and (3) ceilings of which two theoretically important types have been distinguished (imposed and true ceilings). These are not mutually exclusive explanations of gap phenomena; rather, all three or any combination of them are potentially the causes of any particular gap situation. This suggests that a theory of knowledge gap phenomena will have at least three parameters which must be estimated to predict gap phenomena. Again, research will be required to establish the reality of these parameters and then to estimate their value across various messages, knowledge domains, and social systems.

#### NOTES

1. These may be viewed as the same thing, depending on one's stance in regard to functionalism. In any case, this distinction will be maintained here.

2. Cole and Bruner, in fact, make this basic capacity-specific skills distinction themselves, based on Flavell and Wohlwill (1969).

3. The community homogeneity variable invoked by Donohue, Tichenor, and Olien (1975) may well have an influence on the gap by increasing the flow of interpersonal discussion across social strata, but it may have an even more powerful influence by reducing differences in SES within the community. In the latter regard, invoking the homogeneity variable is not so much an explanation of why the gap narrowed, but rather a statement that when conditions necessary for a gap to widen (i.e., SES differences within a social system) do not occur, then the gap will not widen. Homogeneity thus begs the question of causes of gap phenomena, but does remind us that SES differences are more than a dichotomy between high and low and should be treated as a continuous variable.

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