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Mass-Media Information Campaigns and Knowledge-Gap Effects¹

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The knowledge-gap hypothesis of Tichenor, Donohue, and Olien (1970) states that people from the higher socioeconomic segments of society acquire information at a faster rate than people from the lower socioeconomic segments. The consequence is a growing knowledge gap between the high and low segments. The present study investigates some potential causes for this knowledge-gap phenomenon by means of data sets from evaluation studies of 3 mass-media information campaigns. The observed differences in knowledge between low and highly educated respondents could partly be explained by differences in the attention paid to the campaigns but not by differences in information processing.

Segments of the population differ in their awareness of mass-media information. Many studies have shown that knowledge about a large variety of topics is positively related to socioeconomic status (SES) of recipients, especially to their level of education (Adams, Mullen, & Wilson, 1969; Allen & Colfax, 1968; Budd, MacLean, & Barnes, 1966; Hyman & Sheatsley, 1947; Star & Hughes, 1950). Based on these findings, Tichenor et al. (1970) formulated their well-known knowledge gap hypothesis:

As the infusion of mass media into a social system increases, segments of the population with higher socioeconomic status tend to acquire this information at a faster rate than lower segments, so that the gap in knowledge between these segments tends to increase rather than decrease. (pp. 159-160)

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In other words, the mass media may really be not that "mass" but rather "elite." The hypothesis has been confirmed by a large number of studies (see Gaziano, 1983, for a review). Most of these studies are based on one measurement only, whereby a correlation between level of education and knowledge is usually regarded as an indication of the existence of a knowledge gap. However, such data do not provide any insight into the origins of a gap, nor into the question of how gaps develop in time. The results of studies that *did* assess knowledge at least twice from a panel are inconclusive: Of the 15 panel studies Gaziano discusses, 7 report a decreased gap after a period of media attention, whereas 3 report an unchanged gap, and 5 an increased gap. Moore (1987) argues how these inconsistent results might be explained by different knowledge diffusion curves. Following Rogers and Shoemaker (1971), he proposes an S-shaped knowledge diffusion curve rather than a straight line. If people with higher education backgrounds acquire knowledge at a faster rate than less educated people, a steeper S-shaped curve would be the result. Consequently, whether an increase or decrease in knowledge differences will be observed in cross-sectional research might depend on where in the diffusion process knowledge is assessed: Shortly after the start of an information campaign, *increased* differences are more likely to be observed; whereas later on during a campaign, when all the higher educated have acquired the new knowledge, *decreased* differences are more likely if the lower educated catch up with the higher educated.

However, there are some indications that knowledge gaps are the result of differences in motivations, the ability to process information, or both. From the seven studies mentioned above that showed decreased gaps, four concerned local issues. As the lower educated are often more locally oriented (cf. De Walle-Sevenster & Kok, 1991; Rogers, 1983), these four studies suggest the influence of issue involvement in the origins or development of a knowledge gap. In addition, the degree of detail and complexity of the knowledge seems to be important: Gaps are more often observed on detailed, in-depth knowledge and rather difficult topics such as political, administrative or scientific information than on superficial awareness knowledge such as having heard of a topic (Gaziano, 1983).

In sum, the knowledge-gap phenomenon could be an artifact of the moment of knowledge assessment, that is, at the start or later on during the program. It could also be the consequence of differences in the ability or motivation to process the information. The present study aims to provide more insight into these matters.

Another important question is during what *stage* of the communication process the gap develops. Most knowledge-gap studies seem to assume that the gap is caused by a lack of awareness of or attention paid to the information.

However, Rogers (1976) rightfully points to the possibility of an information *processing* problem among the lower educated stemming from lower cognitive abilities as a result of which they might gain less knowledge out of the same amount of information. Until now, this has hardly been investigated. The present study also attempts to provide more insight into this matter: Do gaps develop due to a lack of *awareness* of the information among the lower educated or do they develop because lower educated people gain less knowledge from the same amount of information?

Method

Sample and Design

The study was executed on evaluation data from three mass-media information campaigns on environmental issues. These three campaigns were conducted by the Dutch Ministry of Housing, Physical Planning, and Environment by means of the so-called "P.O. Box 51"-method in which the public is informed of the existence of a brochure concerning a specific topic by means of TV commercials and newspaper ads. These brochures can be ordered via P.O. Box 51 (hence the name of the method). They can also be collected (free of charge) at various distribution points such as post offices and libraries. In chronological order, the three campaigns were held on the following topics: radiation (RAD), cars with catalytic converters (CAT) and domestic chemical waste (DCW). All three campaigns were aimed at the general public. For this reason, the language of the brochure was at primary-school level, while the information was kept very simple. The RAD brochure contained some basic information about various kinds of radiation and their potential (harmful and harmless) consequences to the environment. In the CAT brochure, the major advantages of cars with catalytic converters were explained. In addition, some incorrect beliefs on the subject held by the general public were discussed. The DCW brochure contained information about the quantity of chemical waste that is produced each year by the Dutch population, its potential harmfulness to the environment, an overview of which waste has to be regarded as domestic chemical waste, and some suggestions on how to reduce the production of chemical waste.

The evaluation studies of these three campaigns had almost identical designs. The effects of each campaign were assessed by means of pre- and posttests, both of which were administered to the same group of respondents: For each campaign, respondents were (randomly) selected from a panel of 2,000 respondents that was representative of the Dutch population. This panel contained about as many males as females, varying in age from 18 to 75 years and in education from primary school to university. Each panel member had

consented to participate in weekly opinion polls, consumer studies, and other surveys. For the large majority, this consent had been given several years ago; the average dropout rate per year was about 10%. Each questionnaire that panel members received contained questions on various topics (each week a different combination), thus preventing the occurrence of systematic dropout from people with little interest. Furthermore, panel members were frequently rewarded for their participation in order to minimize dropout even further. These rewards consisted of small gifts such as a set of pens or a little digital clock. Questionnaires were transmitted by means of a modem to a personal computer that panel members had received in loan from the research institute. Responses were transmitted to the research institute by modem as well.

In addition to these panel data, data concerning the information diffusion process were gathered during each campaign from independent representative samples of the Dutch population, 1,000 respondents each (cross sections). In this way, the size of potential panel effects could be estimated.

Each pretest was held 2 weeks before the official start of the respective campaign and provided data on the respondents' level of education (as a general indicator of cognitive ability), their knowledge on the issue (as a specific indicator of cognitive ability), and their personal involvement with the issue (as a motivational factor). The questions measuring these variables were put in as similar wording as possible, except for the questions assessing preexisting knowledge, which, although all put in multiple-choice form, were each tuned to the specific topic of the campaign.

Each posttest was held shortly after the moment that the specific campaign had been terminated. For the RAD campaign this moment was 22 weeks after the pretest; for the CAT campaign, it was 3 weeks; and for the DCW campaign it was 10 weeks. Related to data from the pretests, these posttests provided data on changes in knowledge. In addition, they provided data on the attention paid to the program, that is, whether respondents had been aware of the campaigns and whether they had collected and read any of the three brochures. The percentage of target group members collecting a brochure during a typical P.O. Box 51 campaign is usually too small to allow for reliable statistical analyses on the group of collectors within a sample of 1,000 respondents. In order to enable such analyses, two of the three brochures were mailed to random samples of 300 panel members each. This gave us the advantage of being able to analyze program effects between more randomized groups than otherwise would have been the case.

The number of pre- and posttest data sets was 769 for the RAD campaign, 418 for the CAT campaign and 909 for the DCW campaign. The three data sets were matched at an individual level. A complete data set of the pre- and posttests of all three campaigns was available for 119 respondents.

Operationalizations

The questions from the posttests assessing the respondents' awareness of and attention paid to each campaign were almost identical for the three campaigns: In all three posttests, respondents were asked whether they had watched the respective TV commercial, collected a brochure, and read the brochure and to what extent.

Changes in knowledge that had occurred during each campaign were assessed in all three campaigns by means of the difference between the number of correct responses to the multiple choice questions from the pre- and posttests. The questions were derived from the information items each brochure contained. In the RAD campaign, knowledge was assessed by means of 18 multiple-choice questions, each of which had four response categories. A Cronbach's alpha value of .57 was obtained after deletion of four items. It was decided to perform further analyses on the remaining 14 items. In the posttest, Cronbach's alpha was .88 for these 14 items. In the CAT campaign, knowledge was measured by 14 multiple-choice items which also had four response categories. An optimum value of Cronbach's alpha was obtained after deletion of one item. Therefore, we used 13 items for further analyses. The Cronbach's alpha of these 13 items was .62 in the pretest and .80 in the posttest. Finally, pre- and posttests concerning the DCW campaign contained only three multiple-choice items with four response categories. In addition, respondents were asked to indicate which of 17 kinds of domestic waste belonged to the category of *chemical* waste. These questions can be regarded as multiple-choice items with two response categories (i.e., right or wrong). These 17 items were added to the other three multiple-choice items in order to obtain a knowledge scale of comparable length to the other two scales. The Cronbach's alpha of these 20 items was .62 in the pretest and .71 in the posttest.

Issue involvement was measured in the pretest (i.e., before the start of each campaign) by three identical questions:

1. How often do you read about . . . (campaign topic)?
2. How often do you watch programs on TV or listen to the radio to programs about . . . (campaign topic)?
3. How often to you speak with others about . . . (campaign topic)?

Each of these questions had four response categories: *often*, *regularly*, *sometimes*, and *never*. Involvement scores were computed separately for each campaign as the mean response to these three questions (Cronbach's alpha coefficients of these three involvement scales were .73, RAD; .65, CAT; and .67, DCW, respectively). For each campaign, respondents were divided into two groups for further analyses (median split): highly involved versus little involved.

Finally, level of education was measured in all three pretests on a 7-point scale, varying from *elementary school* to *university*. In the analyses, this number of categories was reduced to three, each of which contained about one third of the respondents: low (primary school and low vocational training), middle (secondary school and middle vocational training), and high (university and higher vocational training).

Results

Data Cross Sections

The information diffusion process of the three campaigns was similar in each. From the cross-sectional data, it appeared that 37% of the target group had been aware of the RAD campaign, 40% had been aware of the CAT campaign, and 39% had been aware of the DCW campaign. The TV commercials appeared to have contributed the most to these percentages of campaign awareness.

A total of 5% of the entire target group had collected a RAD brochure, 8% had collected a CAT brochure, and 7% had collected a DCW brochure. Once collected, the probability it was read appeared to be high, with percentages of readers (from the entire target group) of 3.3%, 7.7%, and 7.0%, respectively. Thus, the greatest absolute loss in reaching the target group occurred during the first step of the information diffusion process, that is, becoming aware of the program's existence: During this step, about 60% of the target group was "lost." At the next step, collecting a brochure, at least another 32% of the target group was lost, which means the largest *relative* loss: At least 80% of those who were aware of a campaign, did not collect a brochure. The smallest loss—absolute as well as relative—was observed with respect to the reading of the brochure: Less than 2% of the total target group was lost during this step.

Figure 1 shows the diffusion curves of the information brochures for the three different education groups during the RAD campaign. In disagreement with Moore (1987), the diffusion curves do not seem to be S-shaped, but look more like negatively accelerated monotonic growth curves. During the first weeks of the campaign, diffusion rates were fastest among the respondents with the highest levels of education (i.e., those with university degree or high vocational training) and slowest for those with the lowest education (primary school and low vocational training). Thus, it clearly shows the development of a gap between the high and low categories. For the lower educated group, the maximum diffusion rates were obtained within a few weeks after the start of the campaign. Continuation of the campaign after the 6th week only increased diffusion among the middle and higher education groups. A closer inspection

Figure 1. Collected RAD brochure percentages, subdivided into education groups.

revealed that this increase occurred only in two out of the five subgroups (university and middle vocational) and that the three remaining middle and higher education subgroups remained constant. Thus, at the end of the campaign after 22 weeks, the low-educated respondents had still obtained much lower diffusion rates than the higher educated group and showed no signs at all of catching up. The only group that did catch up with the highest educated groups was the group of respondents with middle vocational training. Data from the DCW campaign showed a similar pattern in awareness (the CAT campaign did not last long enough to investigate this issue); that is, the maximum degree of awareness was reached within a few weeks without any signs of catching up from the lower educated respondents. Thus, the data do not seem to support Moore's (1987) suggestion that the knowledge-gap phenomenon might be entirely explained as an artifact of the moment of knowledge assessment.

Panel Data

To what extent can attention paid to the respective campaigns be explained by existing differences in cognitive abilities (education, prior knowledge) or motivational differences? For each campaign, this question was analyzed by means of a multiple regression analysis on the panel data with education, prior knowledge, and issue involvement as predictors and awareness of each respective campaign as a dependent variable. Prior to these analyses, correlations between these three variables were computed which are shown in Table 1.

Table 1

Pearson Correlations Between Involvement, Prior Knowledge, and Education for Each Campaign

	RAD (N = 769)		CAT (N = 471)		DCW (N = 909)	
	Educa- tion	Prior knowledge	Educa- tion	Prior knowledge	Educa- tion	Prior knowledge
Involvement	.11	.16	.16	.21	ns	.10
Prior knowledge	.38		.28		.11	

Table 2

Multiple Regression Analyses of Issue Involvement, Prior Knowledge, and Education on Campaign Awareness

	RAD (N = 769)		CAT (N = 471)		DCW (N = 909)	
	r	β	r	β	r	β
Involvement	.13	.09**	.09	.09†	.14	.12***
Prior knowledge	.21	.17***	.02	-.01	.08	.05
Education	.13	.06	.03	.02	.18	.17***
R		.24***		.09		.23***

** $p < .01$. *** $p < .001$. † $p = .06$.

All correlations were low. The highest correlation (.38) was found between education and prior knowledge in the RAD campaign; but in the CAT and DCW campaign, the correlation between these two variables was .28 and .11, respectively. The relatively large difference in correlations between education and prior knowledge may be an indication that a knowledge gap already existed before the campaigns had started, as will be explained in the Discussion section.

Results from the multiple regression analyses are shown in Table 2. In two out of three campaigns, differences in issue involvement appeared to be a significant predictor and in one campaign a marginally significant predictor of campaign awareness. In addition, awareness of the RAD campaign appeared to

be significantly related to prior knowledge, whereas awareness of the DCW campaign was related to the level of education. In other words, motivational differences appeared to have had at least some predictive value for awareness in all three campaigns, while differences in cognitive abilities also appeared to have had some predictive value: in the RAD campaign as a specific ability factor, and in the DCW campaign as a general ability factor. However, percentages of explained variance are low in all three campaigns. It should be noted that the percentages of panel members who had been aware of each campaign were 13 to 30% higher than awareness percentages obtained from the cross sections. This is a clear indication of the occurrence of panel effects among panel members. Due to these panel effects, the results of the analyses reported above are likely to be conservative, that is, relationships between predictors and the dependent variables might be slightly stronger in reality than the ones reported above. After all, participation in a pretest may enhance a respondent's involvement with the subject, but is unlikely to reduce it. Thus, participation in the pretest may attenuate the influence of involvement, education, and prior knowledge concerning the attention paid to each campaign.

Campaign Effects on Knowledge Level

For each panel member, changes in knowledge during the three campaigns were computed by subtracting the number of correct responses on the knowledge items in the pretest from the number of correct responses in the posttest (difference scores). Thus, a positive difference score indicates an increase of knowledge.

The mean difference score in the RAD campaign was +0.77 ($SD = 2.45$) for a total of 14 items. In the CAT campaign it was +1.30 ($SD = 2.47$) for a total of 13 items and in the DCW campaign it was -0.04 ($SD = 3.07$) for 20 items (*ns*). This means that the RAD and CAT campaigns had a modest effect on the target groups' knowledge level, whereas the DCW campaign had no effect.

To what extent were these changes in knowledge related to brochure reading and cognitive and motivational differences between readers? For each campaign, this question was investigated by performing an ANOVA on the difference scores, whereby a significant main effect of brochure reading was expected for each campaign. Potential differences in knowledge change should be revealed by significant main effects of education or issue involvement, or in a significant interaction effect between brochure reading and education or involvement. No differences in knowledge change were found between respondents who had collected a brochure themselves and those who had received a brochure by mail. For this reason, the analyses were performed on all respondents who indicated they had read a brochure, regardless of whether or not they had collected it themselves. The results of the analyses are shown in Table 3.

Table 3

ANOVA Changes in Knowledge by Brochure Reading, Education, and Issue Involvement as Independent Factors

	RAD		CAT		DCW	
	<i>df</i>	<i>F</i>	<i>df</i>	<i>F</i>	<i>df</i>	<i>F</i>
Main effects	4	8.6	4	22.2***	4	7.3***
Brochure reading	1	32.9***	1	83.4***	1	6.1*
Education	2	0.3	2	1.1	2	9.7***
Involvement	1	0.3	1	1.0	1	0.1
2-way interactions	5	1.0	5	0.6	5	0.8
Involvement × Brochure	1	0.0	1	0.7	1	0.7
Involvement × Education	2	2.5	2	0.6	2	0.3
Brochure × Education	2	0.0	2	0.5	2	1.3
3-way interactions	2	0.5	2	0.5	2	0.6
Involvement × Brochure × Education	2	0.5	2	0.5	2	0.6
Accounted for	11	3.7***	11	8.4***	11	3.1***
<i>N</i>	768		417		908	

* $p < .05$. *** $p < .001$.

A significant main effect of brochure reading was found in all three campaigns. Those who had read a brochure showed a greater increase in knowledge on that particular issue than did those who had not read that particular brochure. In the DCW campaign, the mean increase was relatively small: 0.49 more correct responses to the knowledge items (out of a total of 20) for the group who had read a brochure ($SD = 2.73$). Effects of the other two brochures were more substantial: 1.42 (RAD, $SD = 2.53$) and 2.93 (CAT, $SD = 2.41$) more correct responses in the posttest in comparison to the pretest (out of a total of 14 and 13 questions, respectively).

In none of the three campaigns was a significant main effect of issue involvement on knowledge change found. Education did not produce a significant main effect either on knowledge change in two of the three campaigns. A significant main effect of education was only found in the DCW campaign. Separate ANOVAs within the groups that had and that had not read the DCW

brochure revealed that this effect had only occurred in the group that had *not* read the brochure: nonreaders, $F(2, 672) = 10.10$, $p < .001$, mean difference scores = -0.80 (low), 0.02 (middle), and 0.73 (high); readers, $F(2, 235) = 0.41$, *ns*. This means that the significant main effect of education in the entire research population does not represent differences that were caused by the brochure. Since no significant interaction effects were found either, we may conclude that the three brochures have had about equal effects on the highly and little involved, as well as on the higher and lower education groups. Thus, each of the three brochures appear to have consolidated existing differences between different population segments and do not seem to have increased or decreased preexisting differences.

Knowledge-Gap Hypothesis

Finally, we investigated whether the three campaigns combined led to increased differences in knowledge between the three education groups identified (low, middle, high). This was tested for the group of respondents that had *not* received any of the three brochures by *mail* ($n = 82$). For the purpose of this analysis, an overall knowledge-difference score of the three campaigns was computed for each respondent by summation of the difference scores of each of the three separate campaigns. Subsequently, a one-way ANOVA was performed on the aggregate-difference scores, with education as an independent variable. The analysis showed a marginally significant effect for education, $F(2, 81) = 2.60$, $p = .08$. The knowledge level of the most educated group appeared to have increased more (with an average of 7.21 more correct responses; $SD = 5.55$) than the two other education groups, which did not differ much from each other, with respective means of 3.35 and 3.13 more correct responses ($SD = 5.57$ and 6.42). From this we may conclude that differences in knowledge *did* increase during the research period, in spite of the most educated group's advantage in prior knowledge, due to which the occurrence of a ceiling effect might not have been unlikely. This is in agreement with the knowledge gap hypothesis. Since no differences were found among the three education groups for brochure effects on knowledge, whereas significant differences in attention between these groups did occur, these increased differences are likely to have been caused by the higher level of awareness and attention paid to each of the three campaigns among the most-educated respondents.

Discussion

The information diffusion processes of the three campaigns were remarkably similar. This especially holds with respect to the target groups' awareness of

the campaigns, which hardly differed among the three campaigns. Differences in brochure collection and reading were also very small. The resemblance is all the more striking considering the fact that the length of the periods in which these data were obtained varied strongly: from 3 to 22 weeks. The best diffusion results were observed in the campaign with the shortest duration (the CAT campaign). Cross-sectional data collected from independent representative samples during the course of the RAD campaign revealed a maximum reach within a few weeks after the start of this campaign, indicating the occurrence of a ceiling effect. Cross-sectional data from the DCW campaign showed a similar pattern in campaign awareness. Apparently, awareness of a campaign is established within a relatively short period, after which continuation of campaign activities does not increase awareness any further. Continuation of campaign activities after these few weeks did not increase diffusion rates much further, nor were there any signs that low educated people were catching up with the higher educated groups. The diffusion rates do not seem to follow the S-shaped curve as Moore (1987) suggested, but rather appear to be shaped as a monotonic, negatively accelerating growth curve. Thus, the data do not provide much support for the notion that the knowledge gap phenomenon might be explained entirely as an artifact of the moment of knowledge assessment during an S-shaped diffusion process.

Results from the present study show that differences in attention for a campaign are related to motivational differences and differences in prior knowledge and education, in which the influence of issue involvement appeared to be the most consistent. Next to involvement, attention paid to the DCW campaign also appeared to be related to the general cognitive factor *education*, whereas attention paid to the RAD campaign was related to the more specific cognitive factor *prior knowledge*. At the time these campaigns were started, domestic chemical waste was a relatively new issue the government wanted to introduce to the public. Conversely, radiation was an issue that at least part of the general public should have been relatively familiar with, due to the extensive media coverage of the accident with the nuclear power plant at Chernobyl and the National Discussion on nuclear energy that had been held in the Netherlands a few years before. From this perspective, the relatively high correlation that was found between education and prior knowledge in the RAD campaign is no surprise and is in agreement with the knowledge-gap hypothesis: It may be regarded as the reflection of a knowledge gap that had been developed during earlier media attention for the topic of radiation. Therefore, the results indicate that after long-term attention from the mass media, the influence from education might be replaced by prior knowledge, which is in agreement with the knowledge-gap hypothesis.

In all three campaigns we found that knowledge about the campaign's topic had increased more among those who had read the brochure compared to those

who had not, although in the DCW campaign the mean increase was relatively small. Thus, we may conclude that the brochures had the intended effects. In reality, increases in knowledge may be somewhat larger than reported here: The fact that the alpha values of all three posttests were substantially higher than the alpha coefficients of the pretests suggests that correct answers were more frequently obtained by guessing during the pretests than during the posttests.

No significant differences were found between the high and little involved with respect to the effectiveness of the brochures on the respondents' level of knowledge, nor among the three education groups. All identified groups gained about as much knowledge from the brochures. In other words, each of the three brochures consolidated rather than increased or decreased preexisting differences in knowledge.

Analysis of variance of the summated difference scores on all knowledge items of the three campaigns revealed a marginally significant increase in knowledge differences between higher and lower educated respondents. As this analysis was performed on a relatively small number of respondents ($n = 82$) with a high variance in scores and considering the large time interval that elapsed between the first pretest and the last posttest with a high probability of distracting influences, this result can tentatively be interpreted as a confirmation of the knowledge-gap hypothesis. Thus, the campaigns did indeed lead to an increase in the knowledge gap between the lower and higher educated respondents, though this increase was limited in magnitude. These increased differences were not shown to have been caused by differences in effectiveness for each of the brochures. Therefore, it is more likely that the increased knowledge gap was caused by the higher level of attention paid to each campaign by the higher educated. In other words, should one be able to increase attention for campaigns among the lower educated, the problem of an increasing knowledge gap between lower and higher segments of the population might be diminished or even avoided.

Although impact assessment from all three campaigns showed panel effects, it is unlikely that these panel effects limited the validity of the results of this study for a variety of reasons. First, it is more likely that participation in a pretest attenuated rather than amplified influences of issue involvement, education, and prior knowledge on campaign attention and effects. Therefore, the relationships among these variables, as observed in this study, may in reality be stronger rather than weaker. The same holds with respect to the effect of any possible form of systematic dropout, such as of the less interested panel members. Although we do not have any indications that such a problem of systematic dropout occurred, it also would have diminished rather than increased the differences between the higher and lesser involved. This means that the analyses were conservative rather than liberal in this respect as well. Apart

from this, the variety of topics within each questionnaire made the occurrence of any kind of systematic dropout unlikely. Finally, although the three campaigns were held in sequence, the occurrence of any sequence effects is unlikely due to the fact that respondents were distracted from the three evaluation studies through many other questionnaires on entirely different topics. Thus, panel members could hardly have noticed a relationship among the three studies.

In sum, it can therefore be concluded that the data from this study provide support for the knowledge-gap hypothesis and indicate that gaps between education groups more likely develop as a result of a lower degree of attention among the lower educated than as a result of motivational or cognitive differences between the higher and lower educated.

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