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The Differential Impact of Abstract vs. Concrete Information on Decisions[1]

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Recent findings from research on judgment and attribution processes indicate that people regard base rate data, i.e., statistical summaries of populations, as if they were uninformative. It is suggested that base rate information lacks impact because of its abstract, pallid nature. In a demonstration of the inefficacy of abstract information, undergraduates were given mean course evaluations based on ratings of students who previously took the courses. This information had little impact on course choices. In contrast, brief, face-to-face comments about the courses had a substantial impact on course choices. The results suggest that information is utilized in proportion to its vividness.

An important postulate of attribution theory (Kelley, 1967) holds that causal explantions for an actor's behavior are influenced by consensus information, i.e., information concerning the behavior of other people in the same situation. Situational factors are perceived as the chief cause of the actor's behavior if most people behave in the same fashion as the actor; whereas dispositions of the actor are perceived as causal if the actor's behavior is relatively unique. Nisbett and Borgida (1975) and Nisbett, Borgida, Crandall, and Reed (1976) have drawn attention to the substantial amount of research which has failed to support this postulated effect of consensus information. Even powerful manipulations of consensus information (almost everyone behaved as did the actor vs. almost no one) produce very weak or nonexistent effects on causal attributions.

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Nisbett and Borgida (1975) and Nisbett et al. (1976) have observed that the weak effect of consensus information on attribution processes resembles the weak effect of categorical base rate information on predictions. Kahneman and Tversky (1973) have demonstrated this latter point by asking subjects to judge the probability that a target individual, described in a brief personality sketch, was an engineer, given: (a) that he was drawn from a population consisting of 70 engineers and 30 lawyers or (b) that he was drawn from a population consisting of 70 lawyers and 30 engineers. Knowledge of the population base rate for occupational categories had no effect whatever on judgments of the probability that the target individual was an engineer. Instead, subjects relied exclusively on the personality sketch in making their predictions. If the sketch seemed, on balance, to be a representative description of an engineer, they predicted that the target individual was an engineer; if it seemed representative of a lawyer, subjects predicted he was a lawyer.

Nisbett and Borgida (1975) showed that base rate information concerning the *behavior* of a population (i.e., consensus information) was similarly without effect on subjects' predictions about the behavior of a target individual whom they read about or saw in a videotaped interview. Knowledge that the majority of the members of a population behaved in a particular way had no effect on predictions about the behavior of the target individual. The question thus arises as to why people ignore base rate and consensus information in making predictions and attributions. One reason, offered by Kahneman and Tversky (1973), is that people lack cognitive structures for dealing with probabilistic information, and particularly for combining probabilistic information with verbal, descriptive information about target cases. A different, though not incompatible, reason has been suggested by Nisbett and Borgida (1975) and by Nisbett et al. (1976). They propose that base rate information, almost by its very nature, is abstract and pallid, and may simply lack the force to trigger cognitive work of any kind. In contrast, information about target individuals of the kind provided both by Kahneman and Tversky (1973) and by Nisbett and Borgida (1975) was much more concrete and vivid. Such information may, willy-nilly, produce additional cognitive work, overriding the more pallid base rate information in accordance with a kind of Gresham's law of thought. In support of this view, Nisbett and Borgida (1975) found that, although subjects were unwilling to apply population base rates to their predictions about the behavior of particular target individuals whom they viewed or read about, they were quite willing to generalize from the behavior of two such individuals to the behavior of entire populations. In other words, while they were insufficiently willing to apply behavioral base rates to

particular individuals, they were overly willing to infer behavioral base rates from knowledge of the behavior of two particular individuals.

Such unscientific tendencies of thought as these were commented on by Bertrand Russell (in 1927), who observed that "popular induction depends on the emotional interest of the instances, not upon their number" (p. 269). Anecdotal evidence abounds supporting Russell's contention. The most important of the examples supporting the contention concern the difficulty of persuading people to take action in their own best interests on the basis of statistical data alone. The per capita consumption of cigarettes in the United States was as great in 1975 as it was in 1955, before the widespread publication of mortality base rates for smokers and nonsmokers. Government attempts to promote use of seat belts by the dissemination of statistics concerning probability of survival in accidents were so unsuccessful that coercive devices such as buzzers and ignition locks were ultimately resorted to. The so-called "Green Revolution" was made possible by advances in agricultural techniques in the 1930s, but government pamphlets reporting productivity rates were not by themselves sufficient to persuade American farmers to change their procedures.

Such anecdotal evidence, however, cannot adequately establish the point that it is difficult to move people to action by means of statistical information. It is always possible that the target behavior is under such severe constraints that information of any kind would be insufficient to change it; moreover, it usually is not known whether the population has actually received the proffered information. In order to bridge the gap between laboratory research and real world applications, it would be useful to have a controlled demonstration of the inefficacy of base rate information in prompting behavior in line with self interest. Such a study should sample as heavily as possible from naturally occurring concerns and information sources, it should insure receipt of the base rate information, and it should include a demonstration that the behavior in question is subject to modification by non-base rate information.

It should not be necessary to go beyond the college campus to find a suitable paradigm. At many American colleges and universities, base rate information about the quality of courses is made available in the form of guides giving mean course evaluations of students who have previously taken the courses. Such information would seem, on the face of it, to be highly pertinent to course choices. Scale labels are usually unambiguous (excellent down to poor or very poor), mean evaluations for individual courses usually vary across almost the full range of the scale, and the reliability and validity of the information is not in question if the full population of students taking the courses has been polled. Yet, if experience at the University of Michigan is any guide, such information is largely ignored. Students often assert that they

have not seen such information, or if they have seen it, that they do not find it "helpful." Most students insist that they rely instead on comments by friends and acquaintances. If these student reports are accurate, then they are behaving in their everyday lives like subjects in the laboratory experiments. They are ignoring base rate data of great stability and with clear implications for behavior.

In the present study, all prospective psychology majors enrolled in introductory psychology at The University of Michigan were contacted. Some of these students were shown mean evaluations of upper level psychology courses and then asked to fill out a "tentative schedule" of psychology courses for the rest of their college careers. It was anticipated that exposure to this base rate information would have little effect on course choices. In order to show that course choices could be affected by at least some sort of information, other students were exposed to the equivalent of "campus scuttlebutt"—face-to-face exposure to the comments of two or three students who had taken the courses.

Method

Subjects

Subjects were male and female University of Michigan students enrolled in introductory psychology courses. Subjects were preselected on the basis of a subject pool form that was circulated to all introductory sections at the beginning of the term requesting the names of those students who felt that there was a "good chance" they would become psychology majors. In order to corroborate their status as psychology majors at the time of the experiment, later in the semester, subjects were asked to indicate whether their major would definitely, probably, probably not, or definitely not, be psychology. Those students who indicated they definitely or probably would be psychology majors were classified as prospective majors for purposes of analysis, whereas those who indicated they probably or definitely would not be majors were classified as nonmajors. Fifty-eight of 87 subjects were prospective psychology majors.

Procedure

Subjects arrived in groups of varying size at a classroom in the Psychology Department. They were randomly assigned to one of three conditions: a base rate condition where subjects were shown mean course evaluations, a face-to-face condition where they heard evaluative comments by a few students, and a no evaluation control condition. For all conditions, the experimenter introduced himself and his graduate student assistant and explained the purpose of the session:

> . . . I'm on a faculty committee that's concerned with long-range planning for the department. One of the biggest planning problems the department has is knowing how many people will be taking particular courses 2, 3, or 4 years from now. . . . I thought that one way of getting around that would be to just ask prospective psychology majors what they planned to take in the way of psychology courses during their careers here. All of you indicated at the beginning of the term that you might become psychology majors. So you represent people who are likely to be the biggest takers of psychology courses. What we'd like to ask you to do is to read over the catalog and essentially give us your best guesses about the courses you're likely to take.

For subjects in the base rate condition, the experimenter extended his introductory remarks as follows:

> . . . Before you do that, though, we'd like to give you some more detailed information than the catalog has about some of the big enrollment courses. We'll show you the full course description that's on file in the psychology office and we'll show you the evaluations given by the students at the end of the term. In psychology courses, students evaluate the course on a 5-point scale. The evaluations are based on a minimum of about 30 students and in most cases a much higher number. We've chosen the particular courses that you'll be reading about both because they're high enrollment courses and because the same person usually teaches them.

For subjects in the face-to-face condition, the experimenter extended his introduction as follows:

> . . . Before you do that, though, we'd like to give you some more detailed information than the catalog has about some of the big enrollment courses. I've asked several upper-level students in the Department to come here and talk about the courses. I asked them to think about the courses and just jot down their evaluations. I'll read the full course description for each course taken from the Psychology Department files. Then I'll ask each student to rate the course on a 5-point scale: excellent, very good, good, fair, and poor. Then they'll comment on what they liked and didn't like about the course. We've chosen the particular courses that they'll be talking about both because they're high enrollment courses and because the same person usually teaches them. Let me ask you not to talk to them (the members of the panel) because we're going to be videotaping this. If this turns out to be an effective way of communicating, we'll be using videotapes to do it.

The presence of portable videotape equipment operated by the experimenter's assistant during each session of the face-to-face condition was intended to inhibit any dialogue between panel members and the audience, and no dialogue in fact took place.

At this point, subjects in the base rate condition read a brief pamphlet which contained full and rather lengthy course descriptions and read the mean course evaluations. Subjects in the face-to-face condition listened as the experimenter read the course descriptions and panel members gave their oral evaluation of the courses. Subjects in the no evaluation control condition did not receive any form of course information. Then, as the assistant distributed the dependent measure forms (and panel members in the face-to-face condition departed), the experimenter said the following to subjects in all three conditions:

> . . . We'd appreciate it if you'd check off on these lists that are being passed around the courses you think you'll be likely to take in psychology. What we'd like you to do is check off 5 to 10 courses that you think you'll take over the next few years. We've left out required courses like labs and statistics and we've left out senior seminars, but the list you have represents almost all the intermediate courses. Ordinarily a student would take at least 5 of these, but no more than 10. So put a check by the 5-10 courses you think at this point you're likely to take. Then circle those checked courses that you're reasonably certain at this point that you'll take.

Dependent measure forms were completed, subjects were debriefed, and the experimenters answered questions about the undergraduate psychology program.

Stimulus Materials

Base rate condition. Subjects in the base rate condition read a 4-page pamphlet composed of the 10 course descriptions read to face-to-face subjects. Beneath each description was a 5-point course evaluation scale ranging from excellent to poor. The "mean course evaluation" was marked on each scale. This mean was in all cases the mean of course evaluations given by confederates on the panel in the face-to-face condition. Subjects were told, however, that each mean course evaluation was based on practically all the students who had enrolled in the course during the previous semester, a number which ranged between 26 and 132. For one such course, for example, subjects read:

Mean evaluation of course (based on 112 of 119 enrolled):

Face-to-face condition. Ten undergraduate psychology majors, all of whom had actually taken at least one of the high enrollment lecture courses, were paid $3.00 an hour to participate as panel members. At the rehearsals prior to the first experimental session, the experimental design was explained and

panel members were encouraged to be as laudatory or critical as they felt in their comments about those courses they had taken. The only guidelines for panel members were (a) that they limit their comments to less than 2 minutes per course and (b) that they preface their comments by rating the course on the departmental 5-point scale ranging from excellent to poor. A transcripted example of one such comment, a relatively long one, is provided below:

> . . . I took the learning and memory course, and I rated it good. My major reason for rating it good is that I think it presents a wide range of important concepts in psychology. It covers learning and memory fairly well, although being so general it can't go into as much depth as one might like. I didn't have discussion sections when I took the course. I preferred the lecture format because I thought that (the professor) was a fairly good lecturer. My major complaint . . . about this course is that I thought it was taught on a much too simplistic level. At times I found myself bored simply because it was covering material that I had covered already in introductory psychology. But there was a substantial amount of worthwhile information, and I think that learning and memory is certainly a worthwhile course to take.

Between one and four panel members commented on each course; for most courses, either two or three members made comments.

Dependent Measures

Two different types of course choice indices were derived from subjects' course selections as indicated on the mock course bulletin consisting of 27 course titles and brief, one-line course descriptions. The first set of scores was simply the number of recommended courses chosen, the number of nonrecommended courses chosen, and the number of unmentioned courses chosen. Recommended courses were seven courses with a mean evaluation of 2.50 or better, and nonrecommended courses were three courses with mean evaluations of 3.75 or poorer. (There were no courses with mean evaluations between these two values.) A second, weighted choice tendency index was constructed in order to reflect the certainty with which subjects chose recommended, nonrecommended, and unmentioned courses. For this index, a course was assigned a weight of zero if it was unchosen, a weight of one if the course was chosen, and a weight of two if the course was a circled, definite choice. To the extent that a manipulation was effective, the indices should show that subjects chose more recommended courses, with greater certainty, and fewer nonrecommended and unmentioned courses, with less certainty, than control, no evaluation subjects.

Results

Table 1 presents the mean number of courses chosen and the weighted choice tendency indices for prospective psychology majors. It may be seen

TABLE 1
MEAN NUMBER OF COURSES CHOSEN AND WEIGHTED CHOICE TENDENCIES

Condition	Recommended courses		Nonrecommended courses		Unmentioned courses	
	Number chosen	Weighted choice tendency	Number chosen	Weighted choice tendency	Number chosen	Weighted choice tendency
Face-to-face (N = 22)	4.73[a]	8.31[a,b]	.50[a]	.77[a,b]	3.09[a,b]	4.32[a,b]
Base rate (N = 18)	4.11	6.33[b]	.94	1.56[b]	4.17[b]	5.89[b]
No evaluation (N = 18)	3.33[a]	5.22[a]	1.39[a]	2.17[a]	5.39[a,b]	7.17[a]
$F(2,55)$	6.14**	10.34**	6.59**	6.65**	13.24**	8.19**

[a]Column means sharing this superscript differ from each other at the .01 level by a Newman-Keuls test.
[b]Column means sharing this superscript differ from each other at the .05 level by a Newman-Keuls test.
*$p < .005$.
**$p < .001$.

that the base rate information had little effect on course choice. Favorable base rate information did not significantly increase course selection and unfavorable base rate information did not significantly decrease course selection.[3] Only for the number of unmentioned courses chosen was there a significant difference between the base rate condition and the no evaluation condition. The failure of base rate information was not due to any general imperviousness to influence. On the contrary, subjects exposed to face-to-face comments were highly influenced. For all six measures, the face-to-face method differed from control values at the .01 level of significance. In addition, the face-to-face method produced significantly more influence than the base rate method on four of the six measures.

Since the trend for all measures was for the base rate method to be slightly effective, an omnibus index of manipulation effectiveness was constructed. For each subject, the score of weighted recommended courses was divided by the sum of weighted nonrecommended and weighted unmentioned courses. Even this index, which simultaneously reflects influence on all types of courses, failed to reveal a significant impact of the base rate method. Mean scores for this index, for both majors and nonmajors, are presented in Table 2.[4] The noteworthy aspect of Table 2 is that the face-to-face method was quite ineffective for nonmajors, no more effective than the base rate method was for either majors or nonmajors. This may have occurred because the quality of psychology courses was more centrally important to subjects who were planning to major in the field, and thus the comments of the panel

[3] All significance levels are based on two-tailed tests.

[4] In order to avoid ratio scores approaching either zero or very high numbers, a constant value was added to each score in the composite index. All analyses were performed on these constant weighted scores. However, Table 2 values are based on the original weighted choice tendency scores.

TABLE 2

COMPOSITE INDEX FOR WEIGHTED CHOICE TENDENCY AS A FUNCTION OF MAJOR STATUS AND EXPERIMENTAL CONDITION

Status	Condition		
	Face-to-face	Base rate	No evaluation
Major	2.26 ($N = 22$)	1.04 ($N = 18$)	.59 ($N = 18$)
Nonmajor	.96 ($N = 8$)	1.32 ($N = 6$)	.58 ($N = 15$)

members would have been of greater concern to them. Perhaps Bertrand Russell's "emotional interest" lies as much in the beholder as in the "instances" he confronts.

DISCUSSION

The experiment provides a firm foundation for the supposition that real world failures of base rate information are related to a similar inefficacy of base rate information in laboratory research. Base rate information was shown to have little effect on important choices under conditions where (a) it was logically pertinent to the choices, (b) all members of the population were exposed to it, and (c) non-base rate information had a pronounced effect on choices.

The possibility exists, however, that though subjects were exposed to the base rate information, they did not actually read it, or retain it long enough for it to influence their choices. In order to rule out this possibility, an additional study was conducted in which subjects were quizzed about the information they were exposed to. This study was conducted during the Spring term when fewer subjects, including prospective psychology major subjects, were available. Fifty-seven subjects stated at the beginning of the term that they might become majors. Of these, 34 intended to become majors at the time of the experiment. The smaller number of subjects necessitated the abandonment of the no evaluation condition.

The procedures of the main study were followed exactly, except for the following changes:

(a) Comments in the face-to-face conditions were not made by students who had taken the courses, but instead were made by either two or three of five actors working from scripts based on actual evaluative comments available in departmental records.

(b) Mean evaluations given to base rate subjects were the actual mean evaluations obtained for the course from the preceding semester. Evaluative ratings made by actors preceding their comments were keyed to these mean evaluations. Thus, if a course received a mean evaluation of 2.5, and two actors commented on it, one rated it very good (2) before making his general comments and one rated it good (3). The mean of actors' ratings never deviated by more than .15 from the true mean supplied to base rate subjects.

(c) Base rate subjects *read a written verbatim transcript* of comments made in the face-to-face condition, and were told that these comments were chosen because they were representative of comments in general.

(d) At the end of the experiment, all subjects were quizzed about the course information they had received. This quiz contained eight items

requiring subjects to match course content descriptions with course names, eight items requiring subjects to match evaluative comments with course names, and five items requiring base rate subjects to state the mean evaluation of courses and requiring face-to-face subjects to estimate the mean of the two or three ratings that were given by the actors.

The study effectively ruled out the possibility that base rate subjects did not attend to the information they were given. On the contrary, the written format in which they received the information was apparently more conducive to learning than the oral presentation in the face-to-face condition. Base rate subjects were more accurate in their recall of the mean evaluations than face-to-face subjects were in their recall of the average of the actors' evaluations ($p < .02$). Base rate subjects also more accurately matched course description statements with course names ($p < .02$). The two groups were equally accurate in their matching of evaluative comments with course names.

Remarkably, there was a strong tendency for the fact-to-face method to affect course choices more than the base rate method. The investigators had to obtain the permission of instructors in order to examine departmental records for the courses described in the study. Probably because of this requirement, none of the 10 courses they were permitted to use received genuinely poor mean evaluations. The "worst" course had a mean of 2.80, slightly above the "good" point on the scale. For the five "most recommended" courses (mean evaluations of 2.33 or better), majors in the face-to-face condition chose to take an average of 4.13 vs. 3.44 for majors in the base rate condition ($p = .06$). There was no difference between conditions in choice of the five "less recommended" courses, but for the single most poorly recommended course, the difference in weighted choice tendency was significant ($p < .03$), with face-to-face majors rejecting the course more strongly than base rate majors. The same interaction between major status and experimental condition as in the main study was obtained for the composite weighted choice tendency index ($p < .05$). Majors in the face-to-face condition were substantially more influenced than nonmajors ($p < .01$), whereas majors and nonmajors responded similarly in the base rate condition.

From any logical standpoint, the information available to base rate subjects should have been more determinative of course choice than that available to face-to-face subjects. Base rate subjects read all the information available to face-to-face subjects, and in addition were given actual mean evaluations and were (correctly) assured that the specific comments they heard were representative of comments about the courses. The only "superiority" of the information available to face-to-face subjects was the sight and sound of the "students" reading their lines.

Why is base rate information, even when supplemented with written evaluative comments, so ineffective? And why are face-to-face comments, made by a few individuals, so effective? To speculate briefly, we suspect two sorts of inferential foibles are operative—a greater potency of concrete, vivid information over abstract, pallid information, and a lack of understanding of the fundamental principles of statistical inference.

Abstract vs. Concrete Information

The sensory vividness of information. Information provided to base rate subjects was preprocessed and secondhand. Information provided to face-to-face subjects was collected with their own senses and was firsthand. It may be that the latter sort of information remains in thought longer and triggers more inferences because of its greater dramatic interest and salience. In addition, there may be a kind of "eyewitness" principle of the weighting of evidence, such that firsthand, sense-impression data is assigned greater validity and relevance simply because one gathered it oneself: "I was there," "I saw it with my own eyes."

Concrete information facilitates access to scripts. Abelson (1976) has argued that many inferences in everyday life proceed along the lines of preestablished cognitive "scripts," or narrative, episodic schemas, which have implications for action. Thus information that calls to mind a particular script will be assimilated to the script and subsequent judgments and actions will be guided by the contents of the script. Nisbett et al. (1976) have suggested that access to scripts is much more readily achieved by information that is concrete and vivid than by information that is pallid and remote. Thus the comments of panel members in the present studies may have generated the "solid course" script or the "boring wipeout" script, with their attendant implications for action. Mean evaluations do not readily call forth these scripts, and written transcripts may be less effective in doing so than in vivo comments.

Intuitive Statistical Assumptions

Belief in the "law of small numbers." Tversky and Kahneman (1971) have shown that people fail to understand either the robustness of statistics based on large samples or the unreliability of statistics based on small samples. They have labeled this blindness to sample size as a "belief in the law of small numbers," and they have shown that even scientists have little conception of the stability of trends established by large (unbiased) samples or of the variability and poor replicability of trends based on small samples. Thus the pallid nature of base rate data is compounded by people's failure to understand its predictive utility from an intuitive statistical standpoint. And the inferences that are so readily generated from small sample, concrete, target

case information are not impeded by any recognition of the statistical unreliability of such information. Thus, in the present research, the opinion of a single, perhaps highly atypical individual is probably taken as quite indicative of opinions in general. The similar opinion of a second, let alone a third or fourth individual, is then regarded as more than sufficient to clinch the matter. In the face of such faith in the reliability of small samples, the addition of dozens of further opinions would be regarded as sheer redundancy. The value of small sample information is thus inflated and the value of large sample information is degraded.

Sampling assumptions. Subjects in the present studies may have regarded the population that generated the base rates as being of dubious comparability to themselves: "Who are these people anyway? I don't know them." In the face-to-face condition, they saw the people who generated the evaluations and could tell for themselves that they were reasonable people whose views could not be discounted. There is a grain of rationality in this, since confederates were chosen in part for their presentableness, and there were no drug-crazed hippies or inarticulate lantern-jawed athletes among them. Still, if such a principle were operative, it almost surely is based largely on erroneous sampling assumptions. The people who generate base rates for course evaluations are college students, like the subjects themselves. Any tendency to ignore such base rate data on sampling grounds thus would be due to an underestimation of the extent to which the population is similar to students in general and to themselves in particular.

Regardless of the specific inferential processes responsible, however, it seems clear that different forms of information have different implications for action. The link between course information and decisions in the present experiment was more evident to subjects when recommendations were conveyed by direct face-to-face commentary than when conveyed by base information.

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