

A GUIDE TO READING RESEARCH ARTICLES

The best way to assess the evidence supporting a particular theory, proposition, conclusion, or fact is to read the original research report. That will enable you to evaluate the logic of the researcher's theory, the adequacy of the research design, and the interpretation of the results. However, many students are reluctant to read original research because they believe that it is too complicated to understand. Actually the task is not so difficult as

it may at first appear to be. Research articles generally follow a standard format and are divided into distinct sections and subsections that discuss different aspects of the study. We have added explanatory comments to excerpts from an actual research article in order to illustrate this format and guide your reading and understanding of research material.

Social and Personal Bases of Individuation

CHRISTINA MASLACH

Male and female subjects participated in a group experiment which provided them with opportunities (both verbal and nonverbal) to either individuate or deindividuate themselves. When the subjects anticipated the possibility of positive rewards, they made many more attempts to individuate themselves than when they expected that negative consequences were forthcoming. The pattern of individuating behavior was also affected by the subject's sex and prior level of experienced uniqueness. These findings have important implications for theoretical models of individuation and also provide a conceptual link between the phenomena of conformity, deviancy, and personal identity.

Articles usually begin with an abstract that summarizes the purpose, method, and findings of the study. This gives the reader a quick overview of the entire study. In some journals, the summary appears as a concluding statement.

A woman living in a housing project reports that she feels safer because all the apartments look alike from the outside; there is nothing special to attract a burglar to her particular apartment. Men in basic military training quickly learn not to make themselves stand out from the rest of the platoon because if they do, they are more likely to be chosen for the most menial jobs. When a volunteer for an unpopular task is asked for from a group of school children, they often slump down in their chairs, look away, or put their hands in front of their faces in an effort to melt into the crowd and not look different from the others. However, when one of them is going to be chosen for a special reward, they yell, wave their arms, and jump up and down in order to draw attention to themselves. Similarly, contestants on such television shows as "The Dating Game" try very hard to make themselves appear unusual and unique, so that they have a better chance of being chosen for a glamorous date. Many people use clothes to make themselves stand out from others and

The first section of the research article, the Introduction, begins with a statement of the general problem under investigation.

are sometimes upset if they find someone else wearing an outfit identical to theirs. On the other hand, such individuality in clothing usually occurs within the limits of the latest fashion trend, so that people wear what is "in" and not what is "out."

These and many other examples drawn from real life point up an intriguing behavioral paradox: People try to make themselves different and to stand out from others, but they also try to minimize their differences and to be just like everyone else. What are the reasons for engaging in such seemingly contradictory behaviors? When is one more likely to occur than the other? Although little work has focused directly on the dual question of why people want to be different from others but also similar to them, there are several areas of theory and research that are concerned with either one or the other aspect of the problem.

CONFORMITY

If being different from others is a negative characteristic, then we would expect people to try to be more like others by concealing or minimizing their dissimilarity. This idea is clearly supported by the work of social psychologists on conformity. Both Festinger (1950) and Kelley (1952) have discussed the various pressures toward uniformity in groups which cause an individual member to conform to the group norms. The classic experiments of Asch (1951, 1956) have demonstrated that subjects often agree with a unanimous (but clearly incorrect) majority rather than be the only one in the group who disagrees. However, when the subject is joined by someone who agrees with him, the amount of conformity drops sharply. In fact, a consistent minority can sometimes influence the majority (Moscovici, Lage, & Naffrechoux, 1969) probably because the minority opinion cannot then be regarded as an idiosyncrasy on the part of a single individual. Conformity is also greater when the subject's responses are public than when they are private or made anonymously (Deutsch & Gerard, 1955; Mouton, Blake & Olmstead, 1956).

Next, there is a literature review that discusses previous theorizing and research relevant to the current problem. Each reference is indicated by the author's last name and the date of publication; the complete reference is found in the References section at the end of the article (e.g., in case you want to go to the library and read Festinger's 1950 paper on social communication).

The major hypothesis of this study, which was derived from these formulations, states that people work to individuate themselves when a positive event is forthcoming in the environment, but work to deindividuate themselves in the face of an impending negative event. In other words, people try to make themselves different and stand out

The final part of the Introduction is the researcher's own hypotheses, which are the specific ideas that were tested in the experiment.

from the crowd in order to enhance their chances of receiving available positive rewards. However, they try to melt into the crowd, becoming relatively anonymous, as the likelihood of punishment or other negative consequences increases. A second hypothesis, in which individuation is both the independent and dependent variable, involves a person's prior level of experienced individuation. People who are already in a deindividuated state should have to work harder to make themselves stand out than people who already feel individuated, but should have to work less hard to make themselves anonymous. In contrast, people who are in an individuated state should show the reverse pattern. Finally, there was no reason to predict that these general principles about individuation would not hold true for both males and females. However, the study explored the hypothesis that the two sexes would use different techniques to call attention to themselves, as a result of previously learned sex roles.

METHOD

Overview of Design

Male and female subjects were run in groups of 4 in an experiment which was presumably concerned with group dynamics. After completing several preliminary activities, one of the subjects was to be chosen to be the designer in a city planning game. Half of the groups were told that the designer would win extra money (positive environment), while the others were told that the designer would receive electric shocks (negative environment). Within each group, two of the subjects were called by name, had personal comments made to them, had greater eye contact with the experimenter, and were in closer physical proximity to him (individuation condition). The other two subjects were addressed more impersonally and were not in such close contact with the experimenter (deindividuation condition). The subjects took several tests and participated in a group discussion, all of which were designed to allow them to make either unique or normative responses and thus either individuate or deindividuate themselves. With two levels of each of three independent variables (environment, individuation, and sex of subject), the basic design of

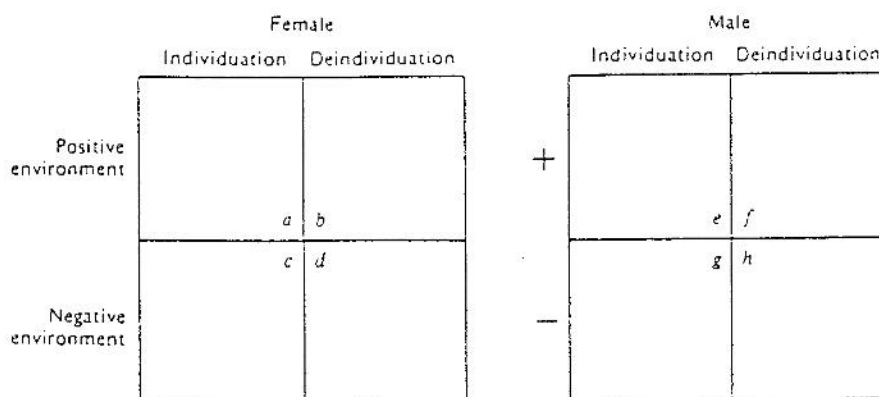
this study was a $2 \times 2 \times 2$ factorial. Ten subjects were run in each of the eight cells of the design for a total of 80 subjects.

◀ The Method section is the second section of the research article. It provides a detailed description of how the study was carried out. In some cases, when the study is rather complex, the Method section will begin with a summary of the design in order to give the reader a broad view of what went on.

◀ An independent variable (IV) is one that is deliberately manipulated by the experimenter in order to determine its effects on other behaviors, dependent variables (DVs).

◀ A factorial design is one in which there are two or more IVs; each level of each IV is completely crossed with the others. Each

subject is assigned to only one cell (a to h) by random assignment (in this case, within each sex). The factorial design described here has three IVs and can be diagrammed as follows:



Subjects

Forty male and 40 female undergraduates at Stanford University participated in the experiment, which was described as a study on group processes. Most of them were paid for their participation, while a few completed the experiment in order to satisfy a course requirement in introductory psychology. All of the subjects were contacted by telephone, and precautions were taken to assign them to a group where they were unacquainted with the other subjects.

◀ A subsection describes characteristics of the people who made up the subject population of the study, including their number, age, sex, the population from which they were drawn, and how they were recruited.

Procedure

A group of four subjects was run in each session, with the sex of the group (either all males or all females) being randomly determined. After arriving at the experimental room, the subjects were greeted by Experimenter 1 and told that the study was concerned with different aspects of group behavior. In the first part of the study, group norms were to be obtained on personal associations and reactions, while in the second part, the subjects were going to engage in a group discussion.

◀ A subsection presents the details of the experimental procedure, including what subjects were told, what experimental treatments they experienced, and what they were asked to do.

Environment manipulation. In the third and last part of the study, the subjects were supposed to play a game of city planning, in which one person was to be the "designer," while the other three were to be "consultants." The designer was supposed to build a model city based on the informational cues provided by the consultants. Half of the groups (randomly assigned) were told that the designer would receive money for each trial where he or she correctly integrated the information provided (positive environment

◀ *Random assignment* of subjects to experimental treatment means that there is no systematic variable other than the treatment that is likely to cause the observed ef-

condition). The other groups were told that the designer would receive an electric shock each time he or she made a mistake in using the consultants' information (negative environment condition). After the procedure was described, each group saw one of four stimulus videotapes (with appropriate environment condition and sex) of "previous subjects" engaging in the city planning game. In addition to clearly showing the roles of the designer and the consultants in the game, the tape emphasized the rewarding aspects of the positive environment condition (the designer smiled and joked about all of the money he or she was winning) or the unpleasant ones of the negative environment condition (the designer was fairly grim-faced and visibly reacted to the shocks).

Experimenter 1 then explained to the subjects that one of them would be chosen to be the designer by Experimenter 2, who would be running the rest of the study. His decision would be based on the subject's performance on the association tests and in the group discussion.

In terms of experimental control, the use of two experimenters instead of one meant that each of them was blind to one of the experimental variables. Experimenter 2 was blind to the environment condition, while Experimenter 1 was unaware that the interviews were part of an experimental manipulation and thus was blind to the individuation variable.

The ostensible purpose of these presentations was to provide the group members with information on which they could base a discussion. Experimenter 2 then asked the subjects to engage in a discussion for about 10 minutes while he made observations. Both the presentations and the discussion of each group were recorded on videotape for subsequent analysis. In addition, there were two observers behind a one-way glass who rated the subjects' verbal and nonverbal behavior on standardized check lists.

RESULTS

... It was critical to the design of the present study that the subjects clearly perceive a connection between their test and discussion behavior and the selection of one of them as the designer. At the end of the study, the subjects were asked to state what they thought were the reasons for the selection that was made. Virtually all of the subjects indicated that their test answers and

◀ An experimenter is *blind* to an independent variable when he or she is prevented from knowing which treatment the subject is in. As a result, this procedural control prevents the experimenter from systematically biasing the subject's responses, either consciously or unconsciously.

◀ The way in which the dependent variables were recorded and coded is presented either with the procedure (as it is here) or in a separate subsection on dependent measures.

◀ The third section of the research article describes the results of the study and presents the statistical analyses. This is the crux of the article: what was found.

◀ In many cases, the Results section of a social psychology experiment involving a manipulation of the subject's motives or perception begins with an assessment of whether subjects actually perceived the instructions and experimental treatments accurately (i.e., as the researcher intended).

discussion participation were the basis for the experimenter's decision.

. . . The major hypothesis, that positive environment subjects would try to individuate themselves more than negative environment subjects, received a good deal of empirical support. . . . Positive environment subjects gave more unusual self-descriptions ($F = 4.72, df = 1/72, p < .05$), which were accompanied by more expressive arm gestures ($F = 5.46, df = 1/66, p < .025$), than did negative environment subjects.

Following this check of experimental manipulations, the Results section presents data that are relevant to evaluating the hypotheses.

The numbers in parentheses refer to a particular statistical analysis. An F -value is the result of an analysis of variance. It is performed when there are more than two groups being compared and tells how much of the variability in the dependent variable is caused by the independent variable and how much by other (chance) factors. The df term refers to the degrees of freedom used in the analysis, which are a function of number of subjects and number of variables. The p -value is the level of significance and indicates the probability that the observed finding could have occurred by chance alone (rather than by experimental manipulation). In the first example here, $p < .05$ means that the probability of this finding occurring by chance is less than 5 times in 100 and that the finding is considered significantly different from chance. In other words, 95 times in 100 this result would probably be caused by the experimental treatment. After the F -value and df are computed, prepared tables in statistics books are consulted to determine what p -values are associated with those particular figures.

. . . When the test items included norms, individuated subjects gave much less unusual public answers than when no norms were involved ($t = 4.15, df = 38, p < .001$). In contrast, deindividuated subjects showed no such differences ($t = .83, ns$).

The t -values refer to the results of a statistical analysis called a t -test (comparing mean differences in two groups). In the first example, $p < .001$ means that the probability of this finding occurring by chance is less than 1 in 1,000. Therefore, the probability is very strong indeed. In the second example, ns means that the finding is not significantly different from what would occur by chance alone. By convention, $p < .05$ is the smallest probability value at which a result is judged significant.

. . . Females who spent a lot of time in describing themselves were less likely to smile ($r = -.52, p < .001$) or to joke ($r = .34, p < .04$) during the discussion.

The r -value refers to the degree of correlation between two variables. It describes the strength of the association between them.

[Subjects who had high social desirability scores were distributed equally throughout the experimental conditions ($\chi = 1.60, df = 3, ns$).]

The χ -value refers to the result of a chi-square test, which is used to compare whether different frequencies observed could be expected to occur by chance alone.

DISCUSSION

On reviewing this complex set of data, several clear behavioral patterns emerge. Some subjects made attempts to individuate themselves, while

The fourth and final section of a research article is the Discussion. Here the researcher evaluates and interprets the results of the study. The Discussion usually begins with a review of the findings in

in the positive environment and deindividuated conditions, as predicted. Individuating behavior was both verbal (more unusual and longer self-descriptions, more unusual test answers) and nonverbal (more expressive arm gestures, more looking at the experimenter). Because of the nature of the experiment, the subjects who wanted to deindividuate themselves could not do so in very extreme ways (such as disguising themselves or getting lost in a large crowd). However, these subjects did take the deindividuating options that were available to them by conforming more often, exhibiting a different type of conversational behavior (many short, unrevealing comments), and often looking away from the other people. In addition to these individuation differences, subjects showed different emotional responses which generally corresponded with the environment manipulation. Positive environment subjects were relaxed and enjoying the study, while negative environment subjects (particularly those in the negative individuated condition) felt more uncomfortable and behaved in a rather boisterous and agitated way. Overall, the above pattern of results was more striking for female subjects than for males.

reader should be sure to evaluate whether the conclusions drawn are appropriate to the actual results and to note conclusions that take too much liberty with the data.

One of the major outcomes of the present study is that it has underscored the complexity of the individuation process. A particularly critical problem is the way in which the process is put into operation. . . . Since being different obviously necessitates the use of a reference group, the first step is to evaluate the other people in the particular situation and determine the dimensions on which one could differ from them. For example, a person could disagree with a position taken by the others, could dress differently from them, could disrupt some ongoing activity, could react with more extreme emotion. . . .

The Discussion also develops important theoretical points arising from the study.

Throughout the present study, the concern has been with how and why the single individual tries to be different from others. However, there are also collective attempts at individuation, in which people become members of a group that behaves very differently from the rest of society. . . . In collective individuation, the individual group member must first become very similar to some people in order to become very different from others, while such sameness is not a necessary prerequisite for singularity. Interesting questions raised by the collective phenomenon are how much group members want to be individuated within the group, and the extent to which such individuation could occur before the person

raises new issues for consideration.

risked the loss of the collective identity.

In this experiment, . . . the hypothesis was operationalized by varying an outcome that was external to the subject (i.e., money or electric shocks). However, it would be misleading to assume that this hypothesis only applied to human behavior that is controlled by external consequences. People often change their behavior as a function of chronic, internal, self-evaluative processes, such as pride or shame, and one would expect that the general hypothesis would also apply in such instances. For example, a person who anticipates feeling embarrassed or ashamed should try to deindividuate himself in order to minimize the chance of this occurring.

and proposes new hypotheses for the researcher to follow up in his or her next study or for other investigators to test.

REFERENCES

Asch, S. E. Effects of group pressure on the modification and distortion of judgments. In H. Geutzkow (ed.), *Groups, leadership, and men*. Pittsburgh: Carnegie Press, 1951.

Asch, S. E. Studies of independence and conformity: I. A minority of one against a unanimous majority. *Psychological Monographs*, 1956, 70(9, Whole No. 416).

Deutsch, M., & Gerard, H. B. A study of normative and informational social influences upon individual judgment. *Journal of Abnormal and Social Psychology*, 1955, 51, 629-636.

Festinger, L. Informal social communication. *Psychological Review*, 1950, 57, 271-282.

Kelley, H. H. The two functions of reference groups. In G. E. Swanson, T. M. Newcomb, & E. L. Hartley (eds.), *Readings in social psychology*. (2nd ed.) New York: Holt, 1952.

Moscovici, S., Lage, E., & Naffrechoux, M. Influence of a consistent minority on the responses of a majority in a color perception task. *Sociometry*, 1969, 32, 365-380.

Mouton, J. S., Blake, R. R., & Olmstead, J. A. The relationship between frequency of yielding and the disclosure of personal identity. *Journal of Personality*, 1956, 24, 339-347.

The References section gives you an alphabetically arranged listing of the sources cited in the article. Each of those sources has its own reference list. Thus, the reader can readily become well informed in the general area under investigation by reading the references (and their references) as well.

ON EXPERIMENTAL DESIGN

[Mark Twain]

I constructed four miniature houses of worship—a Mohammedan mosque, a Hindu temple, a Jewish synagogue, a Christian cathedral—and placed them in a row. I then marked 15 ants with red paint and

turned them loose. They made several trips to and fro, glancing in at the places of worship, but not entering.

I then turned loose 15 more painted blue; they acted just as the red ones had done. I now gilded 15 and

turned them loose. No change in the result; the 45 traveled back and forth in a hurry persistently and continuously visiting each fane, but never entering. This satisfied me that these ants were without religious preju-

dices—just what I wished; for under no other conditions would my next and greater experiment be valuable. I now placed a small square of white paper within the door of each fane; and upon the mosque paper I put a pinch of putty, upon the temple paper a dab of tar, upon the synagogue paper a trifle of turpentine, and upon the cathedral paper a small cube of sugar.

First I liberated the red ants. They examined and rejected the putty, the tar and the turpentine, and then took to the sugar with zeal and apparent sincere conviction. I next liberated the blue ants, and they did exactly

as the red ones had done. The gilded ants followed. The preceding results were precisely repeated. This seemed to prove that ants destitute of religious prejudice will always prefer Christianity to any other creed.

However, to make sure, I removed the ants and put putty in the cathedral and sugar in the mosque. I now liberated the ants in a body, and they rushed tumultuously to the cathedral. I was very much touched and gratified, and went back in the room to write down the event; but when I came back the ants had all apostatized and had gone over to the Mohammedan communion.

I saw that I had been too hasty in my conclusions, and naturally felt rebuked and humbled. With diminished confidence I went on with the test to the finish. I placed the sugar first in one house of worship, then in another, till I had tried them all.

With this result: whatever Church I put the sugar in, that was the one the ants straightway joined. This was true beyond a shadow of doubt, that in religious matters the ant is the opposite of man, for man cares for but one thing; to find the only true Church; whereas the ant hunts for the one with the sugar in it.

A KEY TO SCIENTIFIC RESEARCH LITERATURE

What was said	What was meant	What was said	What was meant
It has long been known that . . .	I haven't bothered to look up the original reference but . . .	satisfactory fair	doubtful imaginary
Of great theoretical and practical importance . . .	Interesting to me.	It is suggested that . . . It is believed that . . . It may be that . . .	I think.
While it has not been possible to provide definite answers to these questions . . .	The experiment didn't work out, but I figured I could at least get a publication out of it.	It is generally believed that . . .	A couple of other guys think so too.
The operant conditioning technique was chosen to study the problem . . .	The fellow in the next lab already had the equipment set up.	It is clear that much additional work will be required before a complete understanding . . .	I don't understand it.
Three of the Ss were chosen for detailed study . . .	The results on the others didn't make sense.	Unfortunately, a quantitative theory to account for these results has not been formulated.	I can't think of one and neither has anyone else.
Typical results are shown . . .	The best results are shown . . .	Correct within an order of magnitude . . .	Wrong.
Agreement with the predicted curve is: excellent good	fair poor	Thanks are due to Joe Glotz for assistance with the experiments and to John Doe for valuable discussion.	Glotz did the work and Doe explained what it meant.

Hodge, M. H. Table 1. A key to scientific research literature. *The American Psychologist*, March 1962, p. 154. Copyright © 1962 by the American Psychological Association. Reprinted by permission.