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NOTE ON THE DRAWING POWER OF CROWDS OF DIFFERENT SIZE [1]

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This study reports on the relationship between the size of a stimulus crowd, standing on a busy city street looking up at a building, and the response of passersby. As the size of the stimulus crowd was increased a greater proportion of passersby adopted the behavior of the crowd. The results of this study suggest a modification of the Coleman and James model of the size of free-forming groups to include a contagion assumption.

In a typical urban setting, when a group of people engage in an action simultaneously, they have the capacity to draw others into the crowd. The actions of the initial group may serve as a stimulus for others to imitate this action. A careful analysis of the details of crowd formation is of obvious interest to a society in which collective action plays an increasingly important part in social life. One theoretical formulation that bears on this problem is that of Coleman and James (1961).

Coleman and James assumed that there is a "natural process" by which free-forming groups acquire and lose members and thus reach specific maximum sizes. They have developed a model that generates a size distribution that closely approximates the actually observed size distribution of many thousands of groups. The central assumption of their model of acquisition and loss are "a constant tendency of a group member to break away, independent of the group, thus producing a loss rate for the group proportional to size; and an acquisition rate for each group proportional to the number of single individuals available to be 'picked up [p. 44].'" Thus the growth of a group is independent of the size of the group and dependent only upon the number of persons who are available to join the group. However, Coleman and James pointed out that "a contagion assumption—that is, an assumption that a person is more likely to join a large group than a small one [p. 44]," might be needed in their model. (Their use of the term "contagion" is not entirely accurate, since this term does not signify in any direct way that a large group is more effective in attracting new persons than a small one. It is preferable, in this connection, to use the phrase "assumption of initial group size.")

This paper reports on the effects which crowds of different sizes had on passersby, following the quantitative approach to the study of crowd behavior outlined by Milgram and Toch (1969).

A few of the basic concepts used in this study need to be clarified. First there is the *stimulus crowd*. This was provided by the investigators and varied in number from 1 to 15. If the crowd is to draw onlookers, then it must be exposed to an *available population*. The population may be finite, and thus exhaustable, or it may be continually replenished as in the present study. The population may also be in various *states of activity*, that is, sitting around (as at a beach) or moving along paths. The available population in the case of the present study consisted of the stream of pedestrians moving along a major city throughfare. Finally, the crowd must

[1] This study arose out of a graduate seminar in social psychology conducted by the first author at The City University of New York. Among those who took part in the present study were Stuart Baum, Sheryl Bruder, Fay Crayne, Victor Ernoult, Susan Flinn, Bert Flugman, Henry Glickman, Michael Hoffman, Marcia Kay, Jo Lang, Elaine Lieberman, Nicholas Papouchis, Arthur Shulman, Henry Solomon, Sheila Sperber, and Mark Silverman. The study was supported by The City University of New York and by a small grant from the National Institute of Mental Health, Number 16284-01.

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exhibit some sort of *observable action* that the population can imitate or in some manner respond to. In the present study the stimulus crowd stood on the pavement and looked up at the window of a nearby building. This action, or parts of it, could be adopted by the passersby. The passerby could simply look up at the building where the crowd was staring without breaking stride, or he could make a more complete imitative action by stopping and standing alongside the crowd. Analyses were undertaken for both types of responses.

In sum, the investigators wanted to see in what degree crowds, varying in size from 1 to 15 persons, and all performing the same observable action, would draw persons into their activities.

METHOD

Subjects

The subjects were 1,424 pedestrians on a busy New York City street who passed along a 50-foot length of sidewalk during thirty 1-minute trials. The study was conducted on two winter afternoons in 1968.

Procedure

A 50-foot length of sidewalk was designated as the area of observation. At a signal, flashed from the sixth-floor window of an office building across the street from this area of sidewalk, a group of confederates (stimulus crowd) entered the middle of the observation area, stopped, and looked up at the sixth-floor window. This gaze was maintained for 60 seconds. At the end of this period the group was signaled to disperse. After the area was cleared of the gathered crowd the procedure was repeated using a different size stimulus crowd. Five randomly ordered trials were conducted for each of the six different size stimulus crowds. The stimulus crowds were composed of 1, 2, 3, 5, 10, and 15 persons. Motion pictures were taken of the observation area for the 60 seconds during which the stimulus crowd maintained its gaze at the window.

Data Analysis

The motion pictures were analyzed to determine the total number of persons who passed through the observation area and their behavior. Pairs of judges counted the number of persons entering the field; within this group, the number of persons who looked up; and finally the number of persons who stopped.

RESULTS

The first question is whether the number of persons who stop alongside the crowd increases as the size of the stimulus crowd increases. The data are provided in Figure 1 (broken line). While 4% of the passersby stopped alongside a single individual looking up, 40% of the passersby stopped alongside a stimulus crowd of 15. An analysis of variance was performed on the mean percentage of persons who stopped alongside the crowd

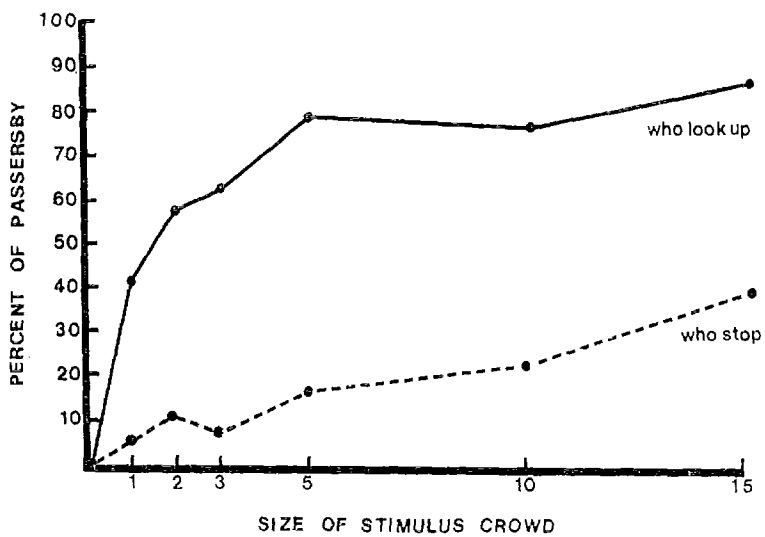

FIG. 1. Mean percentage of passersby who look up and who stop, as a function of the size of the stimulus crowd.

(Table 1). This analysis indicates that the size of the stimulus crowd significantly affects the proportion of passersby who stand alongside it.

But the influence of the stimulus crowd is not limited to those who stop and stand alongside it. For a larger number of passersby partially adopt the behavior of the crowd by looking up in the direction of the crowd's gaze, while not, however, breaking stride and standing alongside it. Here again the influence of the stimulus crowd increases along with its size. While one person induced 42% of the passersby to look up (whether or not they also stopped), the stimulus crowd of 15, all looking in the same direction, caused 86% of the passersby to orient themselves in the same direction (Figure 1, solid line). An analysis of variance again confirms the difference in means (Table 2).

A trend analysis for unequal intervals was performed on the data (Gaito, 1965). There is a significant linear trend ($F = 101.7$, $p < .01$) and a nonsignificant quadratic trend ($F = .42$) for the passersby who stopped. However, for the passersby who looked up, there are both significant linear ($F = 57.2$, $p < .01$) and quadratic ($F = 11.6$, $p < .01$) components. This bears on a recent discussion of Gerard, Wilhelmy, and Conolley (1969). In their study, conformity increased in linear fashion as a function of group size, in contrast to Asch (1951), who found a curvilinear relationship. The present study shows that a single set of group-size manipulations can generate both types of functions, depending on the specific dependent variable selected for analysis.

A comparison of those who stop and those who look up shows that while both behaviors increase with the size of the stimulus crowd,

TABLE 1

ANALYSIS OF VARIANCE OF THE PROPORTION OF PASSERSBY WHO STOP AS A FUNCTION OF THE SIZE OF THE STIMULUS CROWD

Source	*SS*	*df*	*MS*	*F*
Between	.423	5	.085	20.63*
Within	.099	24	.004	
Total	.522	29		

* $p < .001$.

TABLE 2

ANALYSIS OF VARIANCE OF THE PROPORTION OF PASSERSBY WHO LOOK UP AS A FUNCTION OF THE SIZE OF THE STIMULUS CROWD

Source	*SS*	*df*	*MS*	*F*
Between	.628	5	.125	16.28*
Within	.187	24	.008	
Total	.815	29		

* $p < .001$.

the percentage of those who only look up is always higher than those who stop, regardless of the size of the stimulus crowd. It appears that the more demanding, in time or effort, the behavior the less likely it is that the passerby will join it.

Two additional points need to be made. First, it is clear that while the effects of a precipitating group of a given size for the subsequent growth of the crowd were studied, the size of the stimulus crowd increased as soon as persons joined it. Thus, the effect of a stimulus crowd of *constant* size was not studied. In order to do this it would be necessary to withdraw a member of the stimulus crowd as soon as a passerby joined it.

Second, the maximum size which the crowd attains is dependent not only on the initial size of the crowd, but also on the nature of the stimulus to which the passerby is directed. In the present study, passersby were oriented by the gaze of the crowd to a scene that had no special holding power. (Pedestrians looked up to the sixth floor of an office building where some dimly perceived figures were peering back from inside. It was not a scene of compelling interest.) If, instead, an acrobat were performing on the building ledge, the interest of the scene would likely hold crowd members for a longer period of time, and the crowd would grow to a larger maximum size within a 1-minute interval (the size of the crowd at any given moment being equal to the initial stimulus crowd plus additions minus withdrawals.) There is some logical basis for joining larger crowds: all other things being equal, the larger the crowd the more likely

its members are attending to a matter of interest.

The results of this study show that the number of persons who will react to, and join in, the observable behavior of a stimulus crowd is related to the size of the stimulus crowd. These findings contradict the acquisition assumption of the Coleman and James model. The acquisition rate is not, as they assume, dependent only upon the number of persons available to join the group. (For the present study, the mean number of such individuals was not significantly different for the different size stimulus crowds.) An assumption of initial group size is indeed necessary.

REFERENCES

ASCH, S. E. Effects of group pressure upon the modification and distortion of judgment. In H. Guetzkow (Ed.), *Groups, leadership, and men.* Pittsburgh: Carnegie Press, 1951.

COLEMAN, J. S., & JAMES, J. The equilibrium size distribution of freely-forming groups. *Sociometry,* 1961, 24, 36–45.

GAITO, J. Unequal intervals and unequal *N* in trend analysis. *Psychological Bulletin,* 1965, 63, 125–127.

GERARD, H. B., WILHELMY, R. A., & CONOLLY, E. S. Conformity and group size. *Journal of Personality and Social Psychology,* 1968, 8, 79–82.

MILGRAM, S., & TOCH, H. Collective behavior: Crowds and social movements. In G. Lindzey & E. Aronson (Eds.), *The handbook of social psychology.* Vol. 4. (2nd ed.) Reading, Mass.: Addison-Wesley, 1969.

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