Social influence and the estimation of time

ROBERT L. MONTGOMERY and RUSSELL F. ENZIE
University of Missouri, Rolla, Mo. 65401

The usefulness of time estimation as a standard task in social-influence studies was determined by replicating Sherif's autokinetic research. Divided into two conditions, Ss received 15-, 45-, or 75-sec time intervals during two sessions. Half of the Ss wrote estimates in Session 1 and gave oral estimates in Session 2. The other half of the Ss gave oral estimates during Session 1 and wrote estimates in Session 2. The results were in agreement with Sherif's autokinetic research, indicating that time estimation is an acceptable substitute for the autokinetic effect, which is expensive and cumbersome.

A significant portion of the theory and research dealing with social influence rests on the assumptions that (1) given any highly ambiguous situation, individuals in a group converge in their judgments when evaluating the situation, and that (2) the extent of convergence is directly related to the degree of ambiguity or uncertainty in the situation.

In large measure, the conceptual roots for these assumptions lie in the classic autokinetic studies done by Sherif (1936) and later by Sherif & Harvey (1952). Sherif (1936) had Ss estimate the "apparent" movement of a stationary light in a completely dark room on separate days in the order of alone-group (A-G) or group-alone (G-A). In the A-G order, Ss gave estimates alone on the first day and in a group on the second day. In the G-A order, Ss gave estimates in a group the first day and alone the second day.

The suitability of time estimation as a standard task in social-influence studies was determined in the present study by using it in a manner similar to Sherif's autokinetic research. Divided into two conditions, Ss estimated 15-, 45-, or 75-sec time intervals during two sessions. Half of the Ss gave written estimates during Session 1 and oral estimates during Session 2 (a condition comparable to Sherif's A-G order). The other half of the Ss gave oral estimates during Session 1 and written estimates during Session 2 (a condition comparable to Sherif's G-A order).

Specific hypotheses tested were similar to those of Sherif (1936) and Sherif & Harvey (1952). In light of Sherif's findings, it was hypothesized that (1) Ss making oral estimates in Session 1 converge more than Ss making written estimates in Session 1; (2) Ss making oral estimates in Session 2 converge less than Ss making oral estimates in Session 1; and (3) Ss making written estimates in Session 2 converge more than Ss making written estimates in Session 1. The findings of Sherif & Harvey (1952) suggested that as ambiguity increases (e.g., fewer anchorages in the order of 75 > 45 > 15 sec in the present study), an increase occurs in the variability of written judgments, whereas oral judgments increasingly converge.

METHOD

The Ss were 180 male undergraduates enrolled in introductory psychology courses at the University of Missouri-Rolla; they were divided randomly into 18 sets of 10 Ss each. Nine of the 18 sets of 10 Ss were assigned to a written-oral (W-O) condition, and nine were assigned to an oral-written (O-W) condition. Ss assigned to the W-O condition wrote private estimates on a form provided during Session 1 and gave public, oral estimates during Session 2. Ss in the O-W condition gave oral estimates during Session 1 and wrote estimates during Session 2.

Within the nine sets of Ss in each condition (i.e., W-O and O-W), three sets of Ss received 15-sec intervals, three sets received 45-sec intervals, and three sets received 75-sec intervals. All Ss received 15 presentations of the appropriate time interval (15, 45, or 75 sec) during each day of testing, and all intervals were timed with a Brenno stopwatch.

The design of the experiment required that each set of 10 Ss appear at the laboratory for two sessions, 48 h apart. One S was absent from Session 1, and seven were absent from Session 2. For a summary of the number of Ss in each set and the treatment each set received, see Table 1.

The Ss were given the following instructions during both sessions: "We are interested in determining whether humans can accurately judge various time intervals. I will say 'Start,' signaling the beginning of an interval. At the end of the interval, I will say 'Stop.' You are to estimate the amount of time that has elapsed in the interval between 'start' and 'stop.' Do not attempt to take the detective attitude such as counting to yourself, or looking at your watches. We are interested in obtaining as pure a measure of your ability as possible."

If Ss asked why they had to participate with other Ss, E told them that time pressures necessitated using more people at the same time. If Ss asked why they wrote their estimates one day and gave them orally on another, they were told that the E was unfortunately out of data sheets during the oral session.

RESULTS

The median scores for each individual were determined for both sessions. These scores were used in a series of standard F tests to compare variances for sets of Ss pertinent to the hypotheses. For all hypotheses discussed, high convergence was operationally defined as a low variance between judgments within a set of Ss.

The first hypothesis stated that greater convergence (i.e., smaller variance) occurs for Ss giving oral estimates during Session 1 (O of O-W) than for Ss writing estimates during Session 1 (W of W-O). As seen in Table 2, the variances for the oral estimates in Session 1 were significantly smaller than the variances for the written estimates in Session 1 at all levels of ambiguity. These data are in agreement with the findings reported by Sherif (1936), i.e., Ss in groups converge to a greater extent than Ss making judgments alone.

The second hypothesis stated that convergence would be greater for Ss giving oral estimates during Session 1 (O of O-W) than for Ss giving oral estimates during Session 2 (O of W-O). Partial support for this hypothesis was found, in that all variances, except the middle level of ambiguity, were significantly smaller for oral Ss in Session 1 than for oral Ss in Session 2. As can be seen in Table 2, the data for sets of Ss receiving the 45-sec intervals were not significant. These data, then, only partially agree with the findings of Sherif (1936).

A third hypothesis was that more convergence would occur for Ss writing estimates during Session 2 (W of O-W) than for Ss writing estimates during Session 1 (W of W-O). As seen in Table 2, the variances for the written estimates in Session 2 were significantly smaller than the variances for the written estimates in Session 1 at all levels of ambiguity. These results are similar to those of Sherif (1936), i.e., Ss alone on the second day maintain the group standards formed on the first day and, therefore, converge more than Ss alone on the first day.

Sherif & Harvey (1952) found that as the stimulus situation became more ambiguous, the variation of individual judgments became larger. In keeping with Sherif and Harvey, the variances

Table 1
Design of the Experiment

Condition W-O	First Session			Second Session		
	Written Estimates			Oral Estimates		
15-Sec Interval	10	10	10	10	10	10
45-Sec Interval	10	10	10	8	9	10
75-Sec Interval	10	10	10	8	10	10
Condition O-W	Oral Estimates			Written Estimates		
15-Sec Interval	10	10	10	10	10	10
45-Sec Interval	10	10	10	9	10	10
75-Sec Interval	9	10	10	9	10	10

Table 2
Comparison of Variation of Estimate Medians

Between	Time Interval	Variances	F Values	p
W of W-O	15	44.67/2.41	18.53	< .0005
vs	45	141.58/32.32	4.37	< .0005
O of O-W	75	529.25/23.15	22.86	< .0005
O of W-O	15	7.84/2.41	3.25	< .005
vs	45	21.36/32.36	.66	> .05
O of O-W	75	75.16/23.15	3.24	< .005
W of W-O	15	44.67/6.76	6.60	< .0005
vs	45	141.58/43.41	3.26	< .005
W of O-W	75	529.25/103.92	5.09	< .0005

Table 3
Comparison of Variation of Estimate Medians as a Function of Level of Ambiguity

Comparison	Variance	F Values	p
Session 1 Written			
15 Sec vs 45 Sec	141.58/44.67	3.16	< .005
15 Sec vs 75 Sec	529.25/44.67	11.84	< .0005
45 Sec vs 75 Sec	529.25/141.58	3.73	< .005
Session 2 Oral			
15 Sec vs 45 Sec	21.36/7.84	2.72	< .01
15 Sec vs 75 Sec	75.16/7.84	9.58	< .0005
45 Sec vs 75 Sec	75.16/21.36	3.51	< .005

Table 4
Ratios of Variance Between Session 1 Written and Session 2 Oral Sets

Ratio	Variance	F Ratio	p
15 Written: 15 Oral	44.67/7.84	5.69	< .0005
45 Written: 45 Oral	141.58/21.36	6.62	< .0005
75 Written: 75 Oral	529.25/75.16	7.04	< .0005

for the three levels of ambiguity were contrasted for both written estimates in Session 1 and oral estimates in Session 2. As shown in Table 3, the results are in agreement with those of Sherif and Harvey, i.e., individual variation is in the direction of 75 > 45 > 15 and to a statistically significant degree for both oral and written sessions.

Sherif & Harvey (1952) also reported that as the stimulus situation became more ambiguous, judgments increasingly converged for those in group situations. In the present study, these findings were tested by comparing the ratio of the variances of written estimates in Session 1 (W of W-O) to the oral estimates in Session 2 (O of W-O) at each level of ambiguity. If the degree of convergence for oral Ss increased as ambiguity increased, these variance ratios should increase at each level of ambiguity. As can be seen in Table 4, the results followed the predicted outcome. The ratio at the 75-sec level was greater than the ratio at the 45-sec level, which was greater than the ratio at the 15-sec level, i.e., 7.04 > 6.62 > 5.69.

DISCUSSION

Under the conditions described in this experiment, time estimation produced results very similar to those in previous social-influence studies utilizing the autokinetic effect. The following general statements can be made: (1) Ss giving oral estimates in Session 1 converged to a greater extent than Ss giving written estimates in Session 1 and demonstrated the influence of the group upon the perception of the individual; (2) Ss giving oral estimates in Session 2 converged less than Ss giving oral estimates in Session 1 and indicated the formation of Session 1 anchorages even in the absence of group influence; (3) Ss giving written estimates in Session 2 converged more than Ss giving written estimates in Session 1 and demonstrated the maintenance of group standards formed in Session 1 when estimates were given orally; and (4) as ambiguity increased through the reduction of temporal anchorages, written judgments became more variable, whereas judgments given orally increasingly converged.

Since the results generated with time estimation were very similar to those obtained with the autokinetic effect, an obvious implication for future social-influence research lies in considering time estimation as an alternative to the autokinetic effect. This might prove useful for several reasons. First, autokinetic equipment is often expensive, bulky, and can be used only in a completely darkened room. Its use, therefore, is restricted to the rather artificial environment of the psychological laboratory. Time estimation, however, circumvents these problems because only a wrist watch with a second hand is required, and it may be used in a variety of settings. Secondly, there is no physical reality in estimating the movement of the autokinetic light because the light does not move. Hence, there is no right or wrong way by which the E can judge the correctness of a S's estimate. In time estimation, however, a physical scale parallels subjective reality, and, when necessary, an E can judge the correctness of a S's estimate. Finally, since autokinetic movement is an optical illusion, there is a ceiling in inches beyond which the light does not seem to move (Montgomery, 1971; Whittaker, 1964). Theoretically, at least, there is no limit or ceiling in the length of time intervals that might be used.

REFERENCES

MONTGOMERY, R. L. Status, conformity, and resistance to compliance in natural groups. Journal of Social Psychology, 1971, in press.

SHERIF, M The psychology of social norms, New York: Harper & Row, 1936. (PB: Torchbook, 1966, Harper & Row.)

SHERIF, M , & HARVEY, O. J. A study in ego functioning: Elimination of stable anchorages in individual and group situations. Sociometry, 1952, 15, 272-305.

WHITTAKER, J. O. Parameters of social influence in the autokinetic situation. Sociometry, 1965, 65, 141-147.