

The general implications of the study seem to be these: On one hand, the findings offer considerable support for Kueth's interpretation of social schemas as general organizing tendencies in social perception, as well as evidence for the learning of social schemas reflected in the age trends noted here. On the other hand, the data suggest that influences of sex and of developmental level limit the generality of specific social schemas. In a more speculative way, the findings may also suggest that children structure their experiences in more spontaneous, individual ways than older, more thoroughly socialized people; that the impact of adolescence—especially among males—may be more preemptive in structuring experience than the more often emphasized effects of distorted social experience, and that the effects of age and sex—clearly biological as well as social in their implications—may make more difference than the socialization variable

in this kind of social perception. Finally, it should be noted that the present data, like the findings of other investigators of a wide range of psychological problems, point to more and to clearer relationships among males than among females.

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### STRUCTURE OF BOREDOM<sup>1</sup>

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The human experience of boredom is studied in relation to arousal, constraint, subjective repetitiveness, and unpleasantness. Intense boredom induced by a simple repetitive task is found to be associated with decreased arousal and increased constraint, repetitiveness, and unpleasantness. In an attempt to synthesize boredom, induction of each independent variable by means of post-hypnotic cues indicates significant effects for arousal and constraint but not for repetitiveness and unpleasantness. No single variable is found necessary for boredom although the evidence suggests that normally all 4 factors are present. Implications of findings for current boredom theories are discussed.

Though boredom is certainly a problem of increasing practical and theoretical importance, psychologists have made little progress toward a molecular theory. There exist some molar concepts that are of use in industrial settings, but

the basic questions remain. What is boredom? What causes boredom? What are its effects?

Whenever boredom is discussed, certain constructs are mentioned. Berlyne (1960) and Hebb (1955, 1958) have stressed the role of arousal. Unfortunately, they disagree as to the level of arousal to be associated with boredom: Hebb suggests a lowered level while Berlyne favors a high level interpretation. Hebb has empirical backing in studies done by Barmack (1937, 1938, 1939b, 1939c, 1940; Seitz & Barmack, 1940), by McBain (1961), and by Heron (1957). Berlyne, not unaware of this evidence, explicitly rejects the "temptation" and formulates a high arousal theory, primarily on the basis of research by

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Sokolov and his associates (Roger, Voronin, & Sokolov, 1958; Vinogradova & Sokolov, 1955) and of his own theory of RAS functioning (Berlyne, 1960). The question is very much an open one.

A second construct often presumed to be related to boredom is monotony. Industrial research typically centers on this variable. With monotony held constant, however, differences in boredom are reported between groups varying on a number of dimensions. To cite the stereotype, the person less likely to be bored by a given task is stupid (Burnett, 1925; Kornhauser, 1922; Wyatt, 1927; Wyatt, Fraser, & Stock, 1929; Wyatt, Langdon, & Stock, 1937), old (Heron, 1952; Smith, 1955), uncreative (Wyatt et al., 1937), with a dull "real" life (Smith, 1955) and a meager fantasy life (Barmack, 1937; Smith, 1955). Such individual differences suggest that monotony objectively defined as an attribute of the situation is less important than the subjective feeling of repetitiveness. This feeling is influenced by the situation one is in, of course, but it also reflects individual characteristics and personal motivations.

A third construct of import might be termed constraint. Barmack (1939a), when asked to distinguish between boredom and satiation, replied that satiation is a point at which a subject will voluntarily reject the task whereas boredom occurs if the subject is compelled to remain at the task after the satiation point. Fenichel (1951) phrased it this way: Boredom "arises when we must not do what we want to do, or must do what we do not want to do [p. 359]." Empirical evidence is sparse on this construct, but perhaps some of Karsten's (1928) work on satiation is relevant. When the experimenter offered mild suggestions to continue after the satiation point had been reached, she found that her subjects had "negative valence" toward the task. Performance deteriorated sharply and complaints of fatigue increased. Such results indicate increasing boredom.

Some researchers in the field of sensory deprivation (Freedman, Grunebaum, & Greenblatt, 1961) have hinted that degree of constraint may be a factor in the boredom produced in deprivation settings.

A final candidate for a major role in boredom is general negative affect or unpleasantness. Everyone assumes that boredom is unpleasant and Block's (1957) study lends some introspective support. Again, however, there is controversy here about the reason why boredom is unpleasant (if, indeed, it is). Berlyne (1960) and Fenichel (1951) take a traditional stand,

suggesting that the unpleasantness in boredom is caused by the presence of a high drive state. Hebb (1949) argues that low drive or arousal produces the unpleasantness through disorganization of neural firing.

Thus we have four constructs that might allow an embryonic theory if their relationships to boredom were known. The purpose of this study is to obtain empirical evidence on these relationships.

## METHOD

Four male subjects served in this experiment. All were selected from student volunteers for paid research at the University of Michigan. Since the procedure utilized hypnotic induction, subjects were selected primarily on the basis of their scores on Form A of the Stanford Hypnotic Susceptibility Scale (SHSS; Weitzenhoffer & Hilgard, 1959); only those scoring 11 or 12 (maximum score = 12) were retained. The lack of personality correlates of hypnotic susceptibility (Hilgard, in press) would indicate that such a selection procedure does not lead to great sample bias.

## Overview of the Experiment

*Training.* The subject began the experiment with a training session designed to enable him to reliably identify various degrees of boredom and interest. Three degrees of each were induced by means of posthypnotic cues. With amnesia for the presented cue, the subject labeled his experience by saying one of the cues, the series of which, in effect, became a boredom-interest self-rating scale. Training continued until the subject's accuracy reached 75% or better.

*Natural series.* Here various levels of boredom (as assessed by the subject's rating) were induced by varying durations of a simple repetitive task: making checks on a piece of paper. Performance decrement (quality and placement of checks) was assessed to partially validate the verbal rating of boredom level. Time estimates were used for the same end. The dependent variables were levels of arousal, constraint, unpleasantness, and repetitiveness as assessed by self-rating scales. This phase thus constituted the analysis of boredom in terms of the constructs presumed to be operating.

*Partly synthetic series.* The synthesis of boredom was attempted by inducing various levels of arousal, constraint, unpleasantness, and repetitiveness by means of posthypnotic cues. Boredom becomes the dependent variable. Each of the four independent variables was individually induced in various levels and the degree of boredom was indicated by the subject's verbal report. The amount of behavioral activity was observed and rated to partially validate the boredom rating. For the same purpose, the subject made time estimates while in the different states.

*Wholly synthetic series.* This series was identical to the preceding except for the instruction (given to the subject under hypnosis) to keep each of

the "other" independent variables constant at a neutral level while the one was being manipulated. For example, when constraint was induced at a high level, the subject was to keep unpleasantness, arousal, and repetitiveness constant at a normal degree. Thus the effect of each factor in isolation could be assessed.

**Factorial series.** With arousal held neutral, constraint, unpleasantness, and repetitiveness were manipulated conjointly in a  $2 \times 2 \times 2$  factorial design.

### *Operational Criteria*

**Boredom.** Boredom and interest were indicated primarily by the following cues: B3, very, very bored; B2, fairly bored; B1, slightly bored; I3, very, very interested; I2, fairly interested; I1, slightly interested; 0, not bored, not interested.

The subject was instructed under hypnosis that whenever he heard or saw one of these cues (in the laboratory only) he would respond with the appropriate degree of boredom or interest. In addition, whenever asked to describe his experience of boredom or interest, he was to reply by giving the cue closest to his actual feeling. The subject was free to interpret boredom as it had meaning for him in real life, but inquiries were made under hypnosis to insure that this interpretation was common and not idiosyncratic.

In various stages of the study, concurrent measures theoretically related to boredom were taken to substantiate the verbal rating. In the natural series, performance decrement on the simple repetitive task was rated. In both synthetic series, the subject was observed (without his knowledge) through a one-way mirror as he sat alone in the experimental room. Two raters without knowledge of the posthypnotic cues to which he was responding independently rated his level of behavioral activity on a 7-point scale running from 1, "very withdrawn, weary," to 7, "fairly alert and responsive."<sup>3</sup> It was assumed that more boredom would be reflected in lower ratings. Finally, the subject made production estimates (Bindra & Waksberg, 1956) of 10-second intervals while in the various states; previous research (Geiwitz, 1964a; Loehlin, 1959) suggested that more boredom would be reflected in greater overestimation.

**Arousal.** Arousal as an independent variable was induced with posthypnotic cues as follows: +AA, mental arousal at a fever pitch, corresponding to a state of great excitement (but not nervous or upset); +A, mental arousal halfway between 0 and +AA; 0, mental arousal at normal waking level; -A, mental arousal halfway between 0 and -AA; -AA, mental arousal corresponding to what it is at the deepest stage of hypnosis or in sleep (but not actually asleep).

<sup>3</sup> Geiwitz (1964b) includes the details of procedure. The reader interested in the behavioral rating scales, the self-rating scales, verbatim instructions, and other details is asked to refer to that manuscript.

Arousal was carefully described to exclude any sensorimotor emphasis and to stress the purely cognitive aspects. As defined for the subject, it was the general level of mind activity, a volume control, so to speak, which could be turned up or down by the cues.

Arousal as a dependent variable was assessed by two self-rating scales designed to indicate degree by either of the two aspects the subject wished to emphasize. The first ran from 1, "very, very tired," to 9, "very, very alert"; the second ran from 1, "mind extremely active," to 8, "mind mostly a blank." That scale which correlated higher with the posthypnotic cues for arousal was used in the statistical analyses.

**Constraint.** The subject was told that what we meant by the subjective feeling of constraint was "a feeling that if you were perfectly free to do anything you wanted to do, you would not be doing what you are doing, you would choose to do something else." As a dependent variable, constraint was assessed by a self-rating scale which ran from 1, "very, very much like to do something else," to 7, "like doing this." The subject was instructed to use this scale on the basis of its less emotional aspect, a sort of unemotional recognition of being compelled to do something, as distinguished from the emotional aspects implied by the perhaps unfortunate inclusion of the word "like."

The posthypnotic cues indicating levels of constraint as an independent variable were phrases taken from the self-rating scale: "content doing this" (low constraint), "like to do something else" (medium), "very much like to do something else" (high).

**Unpleasantness.** The degree of unpleasantness experienced by the subject on a trial was assessed by a self-rating scale running from 1, "definitely pleasant," to 9, "definitely unpleasant." As an independent variable, the posthypnotic cues (taken from the scale) were: "possibly on the pleasant side" (low), "mildly unpleasant" (medium), "definitely unpleasant" (high).

**Repetitiveness.** The self-rating scale (dependent variable) running from 1, "endlessly repetitive," to 7, "not at all repetitive," was accompanied by clarifying instructions. The subject was told to use this scale in reference to his subjective feeling of how repetitive the situation was, as distinguished from any sort of objective assessment of the factor. The posthypnotic cues used were: "not noticeably repetitive" (low), "fairly repetitive" (medium), "very, very repetitive" (high).

### *Design and Procedure*

**Natural series.** The subject sat alone in a small room facing a table on which several sheets of Champion 636 data paper were placed. At the signal "start" communicated through earphones from the experimenter in an outer observation room, the subject began making checks at a previously learned rate of about 40 per minute, counting aloud from 1 to 10 (over and over) as he did so. Six different task durations were used: 12, 6, 4, 3, and 1 minutes,

and 30 seconds. At the signal "X" the subject stopped making checks and visualized a mental image of an X.<sup>4</sup> By prior instruction under hypnosis, whatever mental state pertained at the X signal was to be maintained until the completion of the second time estimate (see below). After visualization of the X, the experimenter gave another signal—"begin." When the subject thought that 10 seconds had elapsed from that signal, he said "stop." By instruction, he then gave his rating of his boredom or interest by saying one of the cues. A second time estimate followed. Finally, the subject, now in a normal waking state, reported his level of arousal, constraint, unpleasantness, and repetitiveness from the self-rating scales. Each trial was separated from the next by a short inquiry about the ease or difficulty of using the self-rating scales.

The actual time elapsed in the time estimates was recorded from a stopwatch. The subject had been instructed not to count to himself while estimating.

Two trials per subject per duration constituted the natural series. Order of durations was randomized independently for each subject.

*Partly synthetic series.* The subject sat alone in the inner experimental room facing a small table containing a number of index cards. At the signal "turn" from the experimenter in the outer room, the subject turned over the top card and immediately began to respond to the posthypnotic cue written there. He then placed the card face down in a box next to him, thereupon forgetting what was written on the card although continuing to experience the proper feeling. The cue was one of the three levels of constraint, unpleasantness, or repetitiveness or one of the five levels of arousal. The effect of the cue was to last until the second time estimate, as in the natural series.

The assessment battery was identical to that used in the natural series. Thirty seconds after the subject turned over the top card, the experimenter said "X," which began the assessment. The 30 seconds preceding the assessment were used to observe the subject's behavioral activity.

Two trials per subject per cue—a total of 28 trials per subject—constituted the partly synthetic series. These 28 trials were divided into three sessions: a randomized sequence of 10, composed of two trials for each of the arousal cues; a randomized sequence of 9, one trial for each of the other conditions; another session like the second, that is, the second trial for each of the other cues.

*Wholly synthetic series.* The procedure for this series was identical to that used in the previous series. The subject, however, had been instructed to hold the three "other" independent variables

constant at a neutral level while responding to the one written on the card. The neutral degree was carefully specified for each condition: arousal, the zero condition; constraint, "50:50, don't mind doing this, don't mind doing something else"; unpleasantness, "neither pleasant nor unpleasant"; repetitiveness, "not noticeably repetitive."

To give a sample trial, the subject might turn over a card with the phrase cue, "Like to do something else." He was to respond with that level of constraint (medium) while simultaneously holding arousal at the normal waking level, unpleasantness at "neither pleasant nor unpleasant," and repetitiveness at the degree signified by "not noticeably repetitive."

Only the three lower levels of arousal were used (0, -A, -AA), enabling us to complete this series in two blocks of 12 randomized trials.

*Factorial series.* The factorial series was the only one in which the independent variables were varied conjointly. Two levels (high and low) of constraint, unpleasantness, and repetitiveness were induced in a  $2 \times 2 \times 2$  factorial design. Arousal was held constant at the zero level on all trials.

The subject sat alone in the inner experimental room, as before. The experimenter read the phrase cues depicting the levels of constraint, unpleasantness, and repetitiveness to be assumed on each trial. After 15 seconds, the experimenter said "X" and then asked for the subject's rating of boredom or interest.

With eight possible treatment combinations and a desired two trials per combination, we could have completed this series in 16 trials. Instead 19 trials were run, with 5 replications of the base-line combination (low of all 3) instead of 2 in order to assess any order effects. The 19 trials were completed in one session; order was counterbalanced.

## RESULTS

### *Validation of Boredom Reports*

In the natural series, subjects made checks on paper for varying durations, then reported their degree of boredom. If their reports truly reflected boredom, one would expect that the quality of their performance on the task would be related to their report. The checks were rated independently by two judges (median interrater reliability = .91) and the results are shown in Part A of Table 1. The 12 trials for each subject were divided as closely as possible to a median split on the basis of degree of boredom reported.

For all four subjects, the greater decrement is associated with more boredom.

Behavioral observation of the subject's level of activity in the 30 seconds from cue presentation to assessment in the two synthetic series provided another validation measure. Two independent observers were used (median reliability = .85). As mentioned previously, the observers did not know to which cue the subject

<sup>4</sup> Visualization of mental images was included under the assumption that it would reflect level of arousal. Work directly testing this assumption was done concurrently by G. S. Blum. His results suggest a relationship but by no means a simple one. Further discussion of mental images is therefore omitted from this study.

TABLE 1  
VALIDATION MEASURES FOR REPORTED BOREDOM

| A. Performance decrement <sup>a</sup>  |          |      |      |      |                       |
|--|----------|------|------|------|-----------------------|
| Level of boredom <sup>b</sup>          | Subjects |      |      |      |                       |
|  | A        | B    | C    | D    |                       |
| Low                                    | 2.18     | 2.25 | 2.13 | 3.23 |                       |
| High                                   | 4.46     | 3.06 | 2.44 | 3.83 |                       |
| B. Behavioral observation <sup>c</sup> |          |      |      |      |                       |
| Level of boredom <sup>b</sup>          | Subjects |      |      |      | Subseries             |
|  | A        | B    | C    | D    |                       |
| Low                                    | 6.37     | 3.99 | 3.87 | 4.73 | Partly synthetic, I   |
| High                                   | 2.56     | 2.88 | 3.05 | 3.89 |                       |
| Low                                    | 5.92     | 5.15 | 3.76 | 5.28 | Partly synthetic, II  |
| High                                   | 3.14     | 4.74 | 3.47 | 4.89 |                       |
| Low                                    | 5.76     | 4.13 | 3.34 | 4.43 | Partly synthetic, III |
| High                                   | 3.10     | 3.76 | 3.20 | 4.27 |                       |
| Low                                    | 4.75     | 3.91 | 3.94 | 4.43 | Wholly synthetic, I   |
| High                                   | 3.92     | 3.69 | 3.30 | 4.14 |                       |
| Low                                    | 5.19     | 3.24 | 4.81 | 3.78 | Wholly synthetic, II  |
| High                                   | 3.74     | 3.00 | 3.97 | 3.27 |                       |

<sup>a</sup> Rating scale for performance decrement: from 1, "Better than average" (average equals performance at start of Trial 1), to 6, "Extreme decrement."

<sup>b</sup> Approximate median split.

<sup>c</sup> Rating scale for behavioral observation: 1, "Very withdrawn, weary," to 7, "Fairly alert and responsive."

was responding, nor did the subject know he was being observed (according to the inquiry following the experiment). With again a median split on the basis of reported boredom, one would expect less activity (more withdrawal) to be associated with greater boredom. The results are shown in Part B of Table 1. Since the data from the partly synthetic series were gathered in three sessions and those from the wholly synthetic in two, we have five observation sessions per subject. As Table 1 shows, all five comparisons are in the expected direction for every subject, rather conclusive evidence that the subject's report was not isolated from other observable signs of boredom.

The estimates of 10-second intervals were expected to show greater overestimation with more boredom. This assumption failed; in general, the estimates were approximately equal in mean value for high and low boredom. Without minimizing these results, later inquiry suggested that the subjects did not make their estimates in a way conducive to mean differences. We had ex-

pected time to pass more slowly as boredom increased. While all subjects reported this to be so, they also suggested that more boredom made them "lose track of what they were doing"—a reasonable expectation, had we considered it. Inattention during the estimation task would tend to produce longer estimates (underestimation by this method) while the "slow time" would have just the opposite effect. Thus high boredom seems to have produced two effects which, over many trials, cancel each other—hence, no mean differences.

Three of the four subjects showed significantly greater variance among estimates made on "more boredom" trials, as would be expected from our revised, post hoc assumption.

The overall validation picture, however, is good. The performance decrement and behavioral observation results are in ample agreement with the boredom reports. The failure of time estimates to relate to reports has a reasonable explanation other than lack of validity.

Inquiries following the experiment gave evidence that the experiences of boredom were real to the subjects. All said it was about the same in quality as that they experienced in "real life"; two said it was slightly greater in intensity, one said it was about the same, and the fourth reported it to be slightly weaker.

#### Results of Primary Analyses

*Natural series.* Analysis of the boredom state takes the form of correlations of reported boredom induced by varying durations of a simple repetitive task with arousal, constraint, unpleasantness, and repetitiveness as assessed by self-rating scales. Table 2 gives the results for each subject in each of the two sessions of the natural series. Signs of the correlations have been reversed in some cases so that a positive sign indicates the correlation of more boredom with low arousal and high intensities of the other three factors.

All variables exhibit generally high correlations in the positive direction. As boredom increases, arousal decreases while constraint, unpleasantness, and repetitiveness increase.

*Partly synthetic series.* This phase was designed to test the effect of the four factors as inducers of boredom. Taking the average of the two boredom reports in each condition, the Friedman analysis of variance for rank order of conditions was computed. The means and analysis are given in Table 3.

All factors reach significant levels of effect except arousal, which approaches significance. Inspection of the means shows that induction of

TABLE 2  
CORRELATIONS OF BOREDOM WITH AROUSAL, UNPLEASANTNESS, CONSTRAINT,  
REPETITIVENESS, AND TASK DURATION IN TWO SESSIONS  
OF NATURAL SERIES ( $N = 6$ )

| Variable       | Subjects |     |     |     |                |     |     |     |
|----------------|----------|-----|-----|-----|----------------|-----|-----|-----|
|                | A        |     | B   |     | C              |     | D   |     |
|                | I        | II  | I   | II  | I              | II  | I   | II  |
| Arousal        | .99      | .99 | .49 | .96 | .91            | .95 | .88 | .78 |
| Unpleasantness | .25      | .93 | .88 | .92 | — <sup>a</sup> | .87 | .98 | .89 |
| Constraint     | .78      | .99 | .88 | .93 | .87            | .90 | .91 | .92 |
| Repetitiveness | .94      | .97 | .70 | .95 | .83            | .91 | .81 | .92 |

<sup>a</sup> Correlation cannot be computed because one "variable" does not vary.

more boredom is caused by lower arousal, higher constraint, higher unpleasantness, and higher repetitiveness.

*Wholly synthetic series.* The partly synthetic series, by design, did not provide a pure test of the effect of each factor on boredom because when one of the four was induced, the other three were free to vary. They usually did. For example, when high unpleasantness was cued, the assessment scales showed an accompanying increase in constraint and repetitiveness and a decrease in arousal. It was almost as if each cue sparked a reintegration of the entire complex that was associated with boredom in the natural series.

TABLE 3

BOREDOM AS A FUNCTION OF AROUSAL, UNPLEASANTNESS, CONSTRAINT, AND REPETITIVENESS IN PARTLY SYNTHETIC SERIES

| Condition and degree | $M$  | $X_r^2$ |
|----------------------|------|---------|
| Arousal              |      |         |
| +AA                  | 5.62 |         |
| +A                   | 5.06 |         |
| 0                    | 4.25 | 8.75*   |
| -A                   | 3.25 |         |
| -AA                  | 2.69 |         |
| Unpleasantness       |      |         |
| Low                  | 4.62 |         |
| Medium               | 2.62 | 8.00**  |
| High                 | 1.62 |         |
| Constraint           |      |         |
| Low                  | 4.62 |         |
| Medium               | 2.44 | 8.00**  |
| High                 | 1.25 |         |
| Repetitiveness       |      |         |
| Low                  | 4.44 |         |
| Medium               | 2.94 | 8.00**  |
| High                 | 1.56 |         |

Note.—Scale equivalents of boredom: B3 = 1 = very, very bored; B2 = 2; B1 = 3; 0 = 4; I1 = 5; I2 = 6; I3 = 7 = very, very interested.

\*  $p < .10$ .

\*\*  $p = .01$ .

The wholly synthetic series, however, showed little of this reintegration effect since subjects were under instruction to hold the other three constant at a neutral level when one was induced. It therefore functions as a test of the isolated effect of each factor. Table 4 gives the means and Friedman analysis.

The general picture is one in which low arousal and high constraint are significant factors in boredom. The effect of unpleasantness reaches trend level but that for repetitiveness is not nearly significant.

*Factorial series.* The final part of the experiment was a test of the effects of constraint, unpleasantness, and repetitiveness varied factorially with arousal held constant at a neutral level. Over the sequence of 19 trials in the series, the base-line combination (low degree of each

TABLE 4

BOREDOM AS A FUNCTION OF AROUSAL, UNPLEASANTNESS, CONSTRAINT, AND REPETITIVENESS IN THE WHOLLY SYNTHETIC SERIES

| Condition and degree | $M$  | $X_r^2$ |
|----------------------|------|---------|
| Arousal              |      |         |
| 0                    | 4.19 |         |
| -A                   | 3.06 | 6.5*    |
| -AA                  | 2.38 |         |
| Unpleasantness       |      |         |
| Low                  | 4.50 |         |
| Medium               | 2.94 | 4.6     |
| High                 | 2.44 |         |
| Constraint           |      |         |
| Low                  | 4.06 |         |
| Medium               | 3.12 | 7.1*    |
| High                 | 2.19 |         |
| Repetitiveness       |      |         |
| Low                  | 3.75 |         |
| Medium               | 3.12 | 1.1     |
| High                 | 2.31 |         |

Note.—Scale equivalents of boredom as in Table 3.

\*  $p \leq .05$ .

TABLE 5  
MEANS AND ANALYSIS FOR FACTORIAL SERIES

| Source                       | df | MS    | F        |
|------------------------------|----|-------|----------|
| Between subjects             | 3  |       |          |
| Within subjects              | 28 |       |          |
| Levels of unpleasantness (A) | 1  | 9.85  | 32.08*   |
| A × Subjects                 | 3  | .31   |          |
| Levels of constraint (B)     | 1  | 13.85 | 419.70** |
| B × Subjects                 | 3  | .03   |          |
| Levels of repetitiveness (C) | 1  | 3.61  | 24.56*   |
| C × Subjects                 | 3  | .15   |          |
| A × B                        | 1  | .20   | 1.67     |
| A × B × Subjects             | 3  | .12   |          |
| A × C                        | 1  | .09   | <1.00    |
| A × C × Subjects             | 3  | .14   |          |
| B × C                        | 1  | .12   | <1.00    |
| B × C × Subjects             | 3  | .13   |          |
| A × B × C                    | 1  | .00   | <1.00    |
| A × B × C × Subjects         | 3  | .07   |          |

Means<sup>a</sup>:

|                     |                 |                     |      |
|---------------------|-----------------|---------------------|------|
| Low unpleasantness  | Low constraint  | Low repetitiveness  | 4.38 |
|                     |                 | High repetitiveness | 3.45 |
|                     | High constraint | Low repetitiveness  | 2.75 |
|                     |                 | High repetitiveness | 2.12 |
| High unpleasantness | Low constraint  | Low repetitiveness  | 2.98 |
|                     |                 | High repetitiveness | 2.06 |
|                     | High constraint | Low repetitiveness  | 1.72 |
|                     |                 | High repetitiveness | 1.25 |

<sup>a</sup> Scale equivalents of boredom as in Table 3.

\*  $p < .05$ .

\*\*  $p < .01$ .

factor) was repeated five times to assess "boredom drift." For only one subject did any drift occur and his data were therefore adjusted to an arbitrarily set base of "0." Adjustments assumed a linear drift between any two base-line assessments and that drift and cue effects were simply additive. Table 5 gives a four-factor analysis of variance.

It can be seen that these results are congruent with those of other phases in regard to constraint. Here, however, we find significant main effects for unpleasantness and repetitiveness, although the  $F$  for constraint is much greater. No significant interactions are found.

**Summary.** The general conclusions supported by the four experiments are these: Reported boredom is associated with low arousal, increased feelings of unpleasantness, constraint, and repetitiveness. Boredom can be produced or synthesized by lowering arousal or by increasing one of the other three factors. Each variable tends to reintegrate a complex of all four which, in turn, results in a report of intense boredom.

Each alone, however, with the others held constant, can produce boredom, a conclusion unequivocal for lowered arousal and constraint but less certain for unpleasantness and repetitiveness.

#### Alternative Explanations

Following the experiment proper, each subject was asked to indicate, for a list of 19 "feelings" or "experiences," whether he thought an increase in that feeling would produce an increase, a decrease, or no change in his experience of boredom. Our interest centers on 8 of these 19 feelings, 4 of which were experimental variables and 4 of which were feelings judged "bad" and "low" on semantic differential scales in a study by Block (1957): grief, guilt, humiliation, and worry. Thus an attempt was made to assess the influence of "general negativity" in our experiment.

The results show that while subjects saw the experimental variables as important in boredom, they suggested that the other four variables are not. In 12 of the latter 16 cases (4 feelings, 4

subjects), subjects reported that an increase in the negative feeling would result in either no change or perhaps even a decrease in boredom. These results indicate that the general factor of negativity is not predominant.

A second task was designed to test the effect of the subjects' expectations. They were asked to rank order the four experimental variables in terms of their expected effect on boredom. Three of the four rated repetitiveness first and all rated low arousal last. Since the empirical results give essentially the opposite ordering, the subjects' expectations could not have been an overwhelming factor.

### DISCUSSION

Several experimental findings deserve further research attention. For example, the association of boredom with low arousal, as we mentioned in the introduction, is by no means generally accepted. Subjective repetitiveness as the most equivocal factor is surely not in line with common interpretations of boredom. The major role of constraint, a factor typically ignored in scientific discourse, suggests that its absence is a serious oversight.

In regard to arousal, we might suggest that theoretical disagreement is at least partly a semantic illusion. In this study, we defined and used the construct with major emphasis on its cognitive aspects. Let us then say that low *cognitive* arousal has been shown to be influential in boredom. Berlyne (1960), the major theorist holding a high arousal position, may well agree with these results; the cause of high arousal in his system is inhibited cortical activity—low cognitive arousal? In other words, we may be discussing two distinguishable forms of arousal, one cortical or cognitive and the other more peripheral, sensorimotor, or organismic. All might agree that cortical arousal is low in boredom; the dispute would center on the second level.

What can we say about the effects of monotonous stimulation? The finding that subjective repetitiveness is not the most important factor in boredom does not invalidate the hypothesis that monotony, objectively defined, is very important. Monotony may well have its effects on boredom by decreasing cognitive arousal rather than by increasing subjective repetitiveness. Another possibility, one more acceptable in the light of this experiment, is that the typical effect of monotony issues from its ability to induce all four factors, as in the natural series.

Finally, the general empirical finding that no one of the experimental variables was necessary for boredom, that is, that boredom could be and was produced at times with any given factor held

constant at a neutral level, is another intriguing area for further study. Many theorists are on (or over) the verge of suggesting that one or another of these factors is the sine qua non of boredom; the results here indicate otherwise. In addition, the sometimes puzzling effects of boredom may be explained by the possibility that one or more of the factors are absent. For example, numerous studies have shown reported boredom without the usual decline in performance (Barmack, 1939b; Smith, 1953); perhaps this boredom has developed without a decrease in arousal. Worker dissatisfaction, another undesirable consequence of boredom, may be more directly related to unpleasant feelings. Thus, while we have centered on the determinants, research on the effects of boredom has also been given guidelines.

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## ACCURACY OF EMPATHIC JUDGMENTS OF ACQUAINTANCES AND STRANGERS

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This study investigates the relationship between familiarity with a person and ability to make accurate empathic predictions of that person's behavior. Psychology students predicted the responses of 2 fellow students on an adjective list using the Q-sort technique; one fellow student was known well to the judges and the other only slightly. The judgments of the acquaintances were more accurate than those of the strangers, but the latter were better than chance. The superiority in accuracy for the acquaintances was not due to the effect of assimilative projection and is attributed to stereotype and differential accuracy.

Can one make more accurate personality judgments of persons whom one knows well than of persons whom one barely knows? The answer to this question is not as simple as it looks. Even though a judge has more information to

work with when he evaluates a close acquaintance, beyond a certain point more information is a handicap and may even interfere with the correct use of existing information (Taft, 1959). Knowing a person well may lead to so much