EFFECTS OF INTRINSIC AND EXTRINSIC REINFORCEMENTS
ON JOB PERFORMANCE AND SATISFACTION

DISSERTATION

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*****

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CHAPTER I

INTRODUCTION AND RELEVANT LITERATURE

A number of research studies have indicated that paying a person based on his performance leads to increased performance. Similarly, it has been shown that enriching the job itself so that it is more interesting, meaningful, and challenging to the individual will serve to increase productivity and job satisfaction. However, few people have examined the effects on performance and satisfaction when pay for an interesting, rewarding job is based on performance. What few studies have examined this issue provide inconclusive and contradictory results. It is the purpose of this study to examine this issue more closely.

Increasing extrinsic reinforcements.—Motivation has been frequently broken down into two basic types, intrinsic and extrinsic motivation. The distinction between these two types is not clear-cut, but essentially intrinsic motivation has been defined as motivation in which the action and the ends served by the action are organically or inherently related such that no apparent rewards follow performance of an activity other than the activity itself. Extrinsic
motivation is therefore seen as the motivational control of behavior through the possibility of reward or punishment external to whatever satisfactions or annoyances reside in the behavior itself (Hilgard, Atkinson, and Atkinson, 1971).

Since the organization has relatively little control over intrinsic motivation, it has tended to focus on the administration of rewards to secure employee behavior instrumental to the survival of the organization. Extrinsic reinforcers may take many forms such as salary, vacation time, insurance benefits, etc. However, the most common reward typically dispensed by organizations is that of pay.

The research evidence on the organizational consequences of pay systems has been quite mixed. Svetlik, Prien, and Barrett (1964) found a negative relationship between the amount of salary and performance as evaluated by the superior. Mair, Ghiselli, and Gordon (1967), Brenner and Lockwood (1965), and Lawler (1964) have also found that pay is frequently unrelated to performance as it has been evaluated by superiors.

Lawler (1971) stated that the failure to tie pay closely to performance in many companies could mean that pay does not motivate job performance. There is considerable evidence to indicate that in situations where pay is actually tied to performances, there appear to be very strong motivational forces acting on the individual. One of the first systematic studies of this was undertaken by Taylor (1911).
By making pay totally contingent on performance, as well as instituting rest periods and other procedural changes, Taylor was able to effect a performance increase of several hundred percent in the individual under study.

Wyatt (1934) conducted a study in which employee compensation was changed from a fixed weekly pay system to a bonus system. This change increased productivity 46%. A flat piece rate system was then instituted which had the effect of raising output by an additional 30%, a productivity level which was maintained throughout the course of the study.

Further evidence is obtained from a study reported by Vitales (1953) in which a change from fixed wages to individual incentive plans led to production gains of 16%, a decrease in accident rates, and increased cooperation with supervision.

In a study conducted by Atkinson and Reitman (1956) subjects were given achievement arousing instructions for a task and then were either offered a $5.00 prize for the best performance or no financial reward. In general, results showed increased performance under the financial incentive condition. This was particularly true, however, for persons low in achievement motivation.

Ayllon and Azrin (1965) in a series of studies with psychotics tied token rewards to work behavior. The patients were allowed to exchange the tokens for privileges and commodities such as extra television time, candy, and
cigarettes. When pay was contingent on performance each of the 44 patients worked approximately one hour per day. When the tokens were given non-contingently, the amount of time worked per person dropped to approximately 1½ minutes per day. As tokens were again given on the basis of performance, the amount of time spent working increased to the former level of one hour per patient and then plateaued.

Locke and Bryan (1967) found financial incentives produced positive effects on goal setting which increased performance. In a similar study, Pritchard and Curts (1973) found that both incentives and goal setting had positive effects on performance.

Schuster, Clark, and Rogers (1971) reported that the more employees believed performance influenced pay, the harder they were willing to improve performance.

Nord (1972) used the extrinsic reward system as a means of increasing attendance. All employees who had perfect attendance for each month were eligible for prize drawings held every month and a major prize drawing every six months. It was found that sick leave payments were reduced by 62% and absenteeism and tardiness were reduced 75%.

Pay contingencies also appear to be strongly related to satisfaction. Cherrington, Reitz, and Scott (1971) revealed the relationship between satisfaction and
productivity was dependent on performance-reward contingencies. When performance was appropriately rewarded, the relationship between performance and satisfaction was strong; when it was inappropriately reinforced the relationship was significantly negative. Greene (1973) in a field study also found that satisfaction resulted from pay for performance. According to Greene, when merit pay does constitute a source of dissatisfaction, it probably does so because of management's failure to effectively relate pay to performance.

Lawler (1971: 132) summed up the current research by saying:

> When all the evidence...is considered, it is obvious that there is a tremendous amount of empirical support for the proposition that productivity can be increased by making pay dependent upon performance. Regardless of the methodology and the kind of plan considered, when individual pay is clearly dependent upon individual performance, job performance is higher than when pay and performance are not related.

Despite the amount of evidence which indicates the beneficial effects of an individual pay for performance system, it is not widely used in industry today. Aldis (1961) gave three reasons for this:

1. Piece rate systems may be inapplicable. Output may be determined by level of operation of machines, or surpluses in some areas may be dysfunctional.

2. Technological innovations may increase worker efficiency in one area and not in others resulting in inequities in piece rate pay.
3. Group norms determining output levels may be operating.

Aldis provided two possibilities which would serve to tie pay to performance but still remove the worker from a piece rate system.

1. Workers could be paid a certain fixed amount for a given number of units, e.g., three. Then on the next unit produced they would be given a chance to collect double the fixed amount or nothing.

2. An employee's number could be drawn out of a hat each week. How much he won would depend on how much work he had performed during that week.

Lawler (1971) also suggested that incentive systems other than piece rate systems might be useful depending on the characteristics of the organization. Among those organizational characteristics which he suggested taking into account were the climate (authoritarian or democratic), the technology, size, and structure (centralized or decentralized). Based on the particular combination of organizational characteristics, it could be determined whether an individual, group, or company-wide plan was most appropriate.

Increasing intrinsic reinforcements.--In addition to a great deal of interest having been generated by the administration of extrinsic reinforcers, there has been a movement recently to increase the quality of work life by increasing the
amount and number of intrinsic motivators available to the employee. Use of such practices as participative decision making or power sharing and job enrichment were seen as possible means of attaining this goal.

The principle of power sharing represents part of the broad human relations approach which became quite popular after the mid-1940's. In part this was a reaction against scientific management principles which viewed man as basically economically motivated. Power sharing recognized that "social and economic needs of individuals are salient in the work setting and that economic incentives alone generate neither the acceptance of formal authority, nor organizational effectiveness" (Wood, 1972).

A number of research studies have found support for the power sharing approach. In 1948 Coch and French found that there was less resistance to changes in work methods when workers were involved in determining the changes. It was also found that productivity increased and aggression toward management decreased as a result of participation. Bavelas (1950) also found significant productivity increases of 18% when workers were allowed to participate in setting production goals.

Likert (1961, 1967) presented an elaborate conception of participation decision making. Based on several years of study and numerous research reports Likert reported that:
1. High-producing units have employee-centered leaders who focus on human problems, while the supervision of low-producing units is job-centered.

2. High-producing units, contrasted with low-producers maintain a system of general, as opposed to close supervision.

3. Favorableness of attitudes toward the organization does not discriminate high- and low-producing units, but is associated with other effectiveness criteria such as turnover and absenteeism.

4. Productivity is associated with favorable attitudes toward supervision, working conditions, compensation, and the work itself.

5. Freedom for the work group to set its own pace and goals is related to productivity.

In his 1967 elaboration of this theory, Likert described the participative group form of management, or "System 4" by the following:

1. A full use of economic, ego, and high motives
2. Reward systems developed through participation
3. Favorable attitudes toward the organization
4. Mutually reinforcing motivational forces
5. Responsibility, trust, and confidence at all levels
6. High levels of job satisfaction

7. Full and accurate communications in all directions

8. Psychologically close superior-subordinate relationships

9. Extensive cooperative, friendly interaction

10. Extensive subordinate influence on work goals and methods

11. Decentralized decision-making processes with informational inputs from all levels, and based on a group pattern of operation

12. A synonymity of formal and informal organization

13. High productivity, low absence and turnover rates, and minimal wastes, with control mechanisms serving to guide rather than police the worker.

Lawler and Hackman (1969) related participation in decision making to large decreases in absenteeism among janitors, a result which was still observed in a follow-up study two years later.

Herzberg (1968) has been quite a vocal critic of the current system of job specialization. He proposed a two factor theory of motivation which hypothesized that the growth or motivator factors which contribute to job satisfaction were those factors intrinsic to the job, i.e., achievement, recognition, the work itself, responsibility, and growth or advancement. Factors which were extrinsic to the job such as company policy and administration, supervision, interpersonal relationships, working conditions, salary, status, and security he labeled "hygienes." The lack of these factors, he said, would contribute to
dissatisfaction, but their presence would not result in satisfaction. Herzberg proposed a system of job enrichment, or vertical job loading, which would provide the opportunity for the employees' psychological growth. These principles are listed in Table 1.

Paul, Robertson, and Herzberg (1969) reported results of a number of studies in which job enrichment was introduced. In general, high increases in productivity (12%-21%) occurred for experimental groups participating in job enrichment programs. When job satisfaction was measured, the most significant gains occurred when the trial period was longest, leading Paul et al. to conclude, "There is every reason to believe that in the long term attitudes catch up with performance and that job enrichment initiates a steady and prolonged improvement in both."

Other studies have reported successful results using job enrichment. Walker (1950) reported increased product quality and a decrease in time necessary for preparation, operation, and inspection as the result of job enrichment. Davis (1957) in a review of three studies also found support for the use of job enrichment to increase productivity and satisfaction.

While still showing support for job enrichment, recent studies have provided evidence for the idea of an individual differences model. Turner and Lawrence (1965) found that the relationship between worker satisfaction and job
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<td>B. Increasing the accountability of individuals for own work</td>
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<td>D. Granting additional authority to an employee in his activity; job freedom</td>
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<td>E. Making periodic reports directly available to the worker himself rather than to the supervisor</td>
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<td>F. Introducing new and more difficult tasks not previously handled</td>
<td>Growth and learning</td>
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<td>G. Assigning individuals specific or specialized tasks, enabling them to become experts</td>
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*Herzberg, 1968: 59*
complexity was moderated by cultural differences. For urban workers there was a negative relationship between job complexity and satisfaction; for rural workers, the relationship was positive. They explained this discrepancy by using Durkheim's theory of anomie or normlessness. Blood and Hulin (1967) and Hulin and Blood (1968) offered another explanation for these results. They suggested that it was not alienation in general or anomie which was operating, but rather an alienation from middle class norms and the Protestant Work Ethic which caused urban workers to be more satisfied with lower level jobs.

Hulin (1966) found community setting also had an effect on satisfaction. As the degree of slums increased and prosperity and productive farming decreased, job satisfaction as a result of job enrichment increased.

Centers and Bugental (1966) reported that white collar workers valued intrinsic aspects of the job while blue collar workers favored extrinsic job factors such as pay and security.

Hackman and Lawler (1971) found that when jobs were high on four "core dimensions," i.e., variety, autonomy, task identity, and feedback, employees who seek satisfaction of higher level needs tended to have high motivation and high job satisfaction, were absent from work infrequently, and were rated by superiors as doing high quality work. Additionally, Hackman and Lawler found a slight relationship
between cultural background (urban-rural) and satisfaction with enriched jobs. They concluded by saying:

It should be re-emphasized...that while jobs appear to be highly potent in determining employee satisfaction, there is no one best way to design a job. Instead, the results of the present research suggest that the substantial motivational potential of jobs can be realized only when the psychological demands and opportunities of jobs mesh well with the personal needs and goals of employees who work on them.

Argyris (1964) however, felt that the reason some persons express dissatisfaction with a system such as job enrichment which would increase their ability to self actualize was due to a build-up of psychological failure experiences. With psychological success experiences, however, the psychological energy of the individual would increase. For this psychological success to occur, Argyris said that individuals must value themselves and aspire to a sense of competence, they must have an organization that provides opportunities for work in which the individual can define his immediate goals, paths to these goals, relate his goals to organizational goals, evaluate his own effectiveness, and increase the degree of challenge at work. Furthermore, the person must be in a culture that places high value on self esteem and competence.

Combining intrinsic and extrinsic reinforcements.—It has been long assumed by organizational behaviorists that the effects of intrinsic and extrinsic reinforcements are
additive. This notion has been a major part of the basic theories of human behavior. In classical learning theory, Thorndike's Law of Effect (1911) specifies the conditions under which a stimulus will be followed by a given response:

Of several responses made to the same situation, those which are accompanied or closely followed by satisfaction to the animal will, other things being equal, be more firmly connected with the situation, so that, when it recurs, they will be more likely to recur; those which are accompanied or closely followed by discomfort to the animal will, other things being equal, have their connections with that situation weakened, so that, when it recurs, they will be less likely to occur. The greater the satisfaction or discomfort, the greater the strengthening or weakening of the bond.

As long as intrinsic and extrinsic factors are in fact functioning as reinforcers of behavior, they should have the same effect on the individual of strengthening the stimulus-response bond.

Expectancy theory also views the effects of intrinsic and extrinsic rewards as additive. It states that the force on a person to perform an act is the multiplicative function of the expectancy that effort will lead to performance and the probability that performance will lead to positively valued outcomes. These outcomes may be intrinsic such as achievement, responsibility, etc., or extrinsic such as pay. Figure 1 illustrates these linkages as proposed by Lawler (1971).

House (1971) in his formulation of Path-Goal theory of leadership specified this additive interaction of intrin-
Fig. 1 Motivation-performance-satisfaction cycle

(Lawler, 1971: 270)
sic and extrinsic outcomes as:

\[ M = IV_b + E_1 \left[ IV_a + \sum_{i=1}^{n} (E_2 EV_i) \right] \]

where:

- \( M \) = motivation to work
- \( IV_b \) = intrinsic valence associated with goal directed behavior
- \( IV_a \) = intrinsic valence associated with work goal accomplishment
- \( EV_i \) = extrinsic valence associated with work goal accomplishment
- \( E_1 \) = subjective probability estimate that effort will result in work goal attainment
- \( E_2 \) = subjective probability estimate that work goal accomplishment will result in extrinsic valences

Thus, both intrinsic and extrinsic outcomes were seen as having an incremental effect on an individual's motivation to perform.

It appears, therefore, quite logical to expect that intrinsic and extrinsic reinforcements should combine incrementally to increase the total amount of motivation. However, there is a body of literature which contends that intrinsic and extrinsic rewards are not additive, but, in fact, are incompatible. DeCharmes (1968) suggested that the locus of control for extrinsically motivated behavior resided in the environment rather than in the individual. In such a situation, the person views himself as a "Pawn" of the mediator of the reward—he had lost some of his freedom.
Intrinsically motivated behavior, on the other hand, involved no such loss of freedom; hence, the person views himself as an "origin." This idea is closely related to Brehm's (1966) idea of psychological reactance which flowed from reduction or threat of reduction of freedom. According to Brehm, when faced with such a threat, the individual would become aroused to prevent any further loss of freedom, and would attempt to regain that freedom which had been lost. Thus, when extrinsic rewards were given for a task, the individual reacted against this loss of freedom and attempted to become his own locus of control again. The observable effect of this psychological reactance would be the lowered intrinsic motivation of the task which should result in lower satisfaction and/or productivity. Actual experiments which have examined this issue have reported mixed results.

An experiment reported by Lepper, Greene, and Nisbett (1973) tested the hypothesis that intrinsic interest in an activity may be decreased by linking the performance of that activity explicitly to the attainment of some extrinsic goal. In order to obtain baseline data, children's interest in artistic activities was measured prior to administration of extrinsic rewards for those activities. The children were then exposed to one of three conditions:

(1) Expected Award Condition—children drew pictures in order to receive a reward.

(2) Unexpected Award Condition—children had no knowledge of the award which was to be given
them until after the task had been completed.

(3) No Award Condition—children neither expected nor received an award.

It was found that the Expected Award group showed a significant decrease in intrinsic interest for drawing activities following the experimental period. This was not true of children in the Unexpected Award or the No Award conditions.

Erskine (1974) conducted a study which involved two task conditions (high and low visual stimulation) and three monetary payment conditions (non-contingent pay, contingent pay, and no pay). The dependent variable of intrinsic motivation was operationally defined as "the time taken to initiate a new task sequence following the completion of a previous task sequence." Self reports of overall satisfaction, general arousal, task attractiveness, and task complexity were also obtained. The session was divided into three 20-minute segments with pay occurring only in the second segment. It was found that groups receiving money were significantly more persistent during the second and third segments and more positive in describing the task than were the no-pay groups. This finding held regardless of task conditions.

Another study, conducted by Foster and Hamner (1974) also examined the effects of high and low task interest and three levels of pay (no-pay, non-contingent pay, and contingent pay) on satisfaction and performance. They found that intrinsic and extrinsic rewards had an additive
effect on motivation for both boring and interesting tasks.

Calder and Staw (1974b), however, described an interaction effect found between task interest and extrinsic reward. With the introduction of money, the high interest task was rated as less enjoyable than the low interest task.

In all of these studies, however, task interest was not rated by the subjects as being clearly high or low. This may be contributing to the confusing nature of the results. Where two levels of interest were examined, the levels were presented as being significantly different from each other, but not necessarily at opposite ends of a continuum. In examining the effects of pay on performance of a high interest task, Lepper, et al., (1973) and Kruglanski, Friedman, and Zeevi (1971) found that extrinsic reinforcers such as awards or pay had a negative impact on performance quality. Other studies, namely the equity theory literature (Adams, 1963; Adams and Jacobsen, 1964; Andrews, 1967; Lawler and O'Gara, 1967) found variance in quantity and quality was related to the individual's feelings of over- or under-payment. It is still not known how task interest would combine with pay and impact on quantity and quality of performance.

Deci (1971, 1972a, 1972b, 1972c) also examined the additivity of intrinsic and extrinsic rewards. The experimental paradigm most often used in his studies involved the use of a puzzle called Soma which consisted of seven
interlocking pieces. It could be put together in a number of ways to form a variety of shapes. Each subject participated in a one hour session during which he was asked to assemble the blocks to match a design drawn on paper. If at the end of 13 minutes he had not succeeded in assembling the blocks, he was shown how to do it, then asked to proceed to the next drawing. At the end of the hour, the experimenter said he had to leave for a few minutes to get more configurations for the subject to solve, and that in his absence the subject could do anything he liked. In the room when the experimenter left were copies of three magazines (New Yorker, Playboy, and Time), an ashtray, and additional drawings of Soma figures (all impossible to work).

Intrinsic motivation was measured by the number of seconds during the experimenter's eight-minute absence the subject worked with the Soma puzzle.

When the experimenter returned, the subject was given new configurations and told to continue as before. Depending on the condition to which the subject had been assigned, he was also given one of the following:

(1) pay, contingent on performance ($1 per puzzle completed)

(2) verbal praise

(3) verbal praise and contingent pay

(4) neither verbal praise nor pay (control group)

Another measure of intrinsic motivation was taken at the end
of the second time period. In the third period extrinsic rewards were removed and subjects were again asked to solve a new set of configurations, with "motivation" being measured at the end of the session.

It was found that for those subjects in the pay only condition, length of time spent working on the puzzle while "unobserved" dropped significantly from the first to the third time periods. Subjects in the verbal praise, verbal-praise plus pay, and control groups showed no such decrease. In interpreting these data, Deci suggested that verbal rewards may not be phenomenologically distinguishable from feelings of satisfaction which the person received from doing the task. Thus, it was felt that positive feedback served to "increase the total positive value properties associated with the activity by strengthening the person's sense of competence and self determination." This, in turn, was seen as increasing the intrinsic motivation to perform. Pay, however, served to decrease the amount of intrinsic motivation felt.

In another study, Deci (1972b) tested the effects of non-contingent pay, threats of punishment, and negative feedback as well as contingent pay and positive feedback. Using a one-session paradigm identical to session two of the previously reported study, it was found that while contingent monetary payments, threats of punishment and negative feedback caused a decrease in intrinsic motivation, non-contingent pay produced no such change.
Building on the work of de Charmes (1969), Deci proposed a Cognitive Evaluation Theory which had as its basic premise that intrinsic motivation could be adversely affected by a change in perceived locus of behavior causality. When this locus of behavior shifted from self to the environment, the individual would cognitively re-evaluate the activity as one which he did because it provided him with extrinsic rewards. The intrinsic rewards normally received from performing the task, therefore, decreased with the addition of extrinsic rewards. In order to cause this shift in causality, there had to be a belief that performance on the activity was causally linked to the extrinsic reward. In the case of non-contingent pay where the reward was received regardless of performance, such causal linkages were not apparent to the subject; therefore, no shift in causality occurred. On the basis of his cognitive evaluation theory, Deci concluded:

Interpreting these results in relation to theories of work motivation, it seems clear that the effects of intrinsic motivation and extrinsic motivation are not additive. While extrinsic rewards such as money can certainly motivate behavior, they appear to be doing so at the expense of intrinsic motivation; as a result, contingent payment systems do not appear to be compatible with participative management systems.

Deci proposed that workers be paid non-contingently in order to maximize intrinsic interest. "The non-contingent payments (or salaries) would help to satisfy and keep them on the job especially if the pay were equitable" (1972: 227).
Calder and Staw (1974) and Foster and Hamner (1974) have presented a number of flaws in the Deci research. The first of these concerns Deci's measure of intrinsic motivation. Foster and Hamner state that according to expectancy theory, performance = motivation X ability. Therefore, before "motivation" to perform a task can be measured, the subjects must possess the ability to perform the task. Since the subjects' experience with Soma was limited prior to the experiment, Deci's conclusions may be limited to the learning stage and not to the maintenance stage of job performance. Another criticism of Deci's measure of intrinsic motivation concerns the lack of information about performance levels. Calder and Staw suggest that free time spent on the task might be due to differences in performance level during the task period rather than to differences in intrinsic motivation. If one assumes a higher degree of effort was exerted by the experimental groups receiving contingent rewards, the decreased amount of free time spent on the puzzles might simply be due to factors such as fatigue or satiation rather than a cognitive re-evaluation of the task.

Another ambiguity concerns the magnitude of the reward. Since performance data are not given in any of the Deci studies, it is impossible to determine whether differences in intrinsic motivation are due to the contingent nature of the rewards or to differences in the amount of rewards given. Responding to this criticism, Deci (1974) reported the
average earnings of the subjects in the contingent payment condition were $2.38, whereas the earnings in the non-contingent condition were $2 per subject.

A third issue concerns the timing of the reward. In one study (Deci, 1972b) reported data which showed an increase in intrinsic motivation when payment followed the experimental task but was given before the free period. This was interpreted by Deci as supporting equity theory; a feeling of overpayment inequity was being resolved by spending additional time on the task. However, Calder and Staw emphasize that payment before the free period should have "made the extrinsic reward more salient, thereby reducing intrinsic motivation." They add, "In short, there does not seem to be any obvious theoretical rationale for limiting changes in intrinsic motivation to contingent rewards presented after the free-time period." These results do seem to contradict Deci's statement.

Money makes a difference. Those students whom we had paid spent significantly less time with the puzzles when they were alone later than did those who had done the same puzzles for free. Once they got money for doing a fun game, their intrinsic motivation decreased; to an extent they had become dependent on the external reward (1972c: 58).

If one returns to the original 1971 study and examines the actual data, once again Deci's conclusions seem to be unwarranted. In this study which used the three time period design, subjects spent significantly less time in the free period following the third session than did the control
group. Both groups had approximately equal baseline data as measured following period one. Deci used this difference in period three as confirmation of his hypothesis that extrinsic rewards decrease intrinsic motivation. However, as seen in Table 2, in the free period following the second time period, the only one in which subjects received pay for their performance, the experimental group spent considerably more time working on the puzzle than did the control group.

Table 2

Mean number of Seconds Spent Working on the Puzzle During the Eight-Minute Free Choice Periods

<table>
<thead>
<tr>
<th>Group</th>
<th>Time 1</th>
<th>Time 2</th>
<th>Time 3</th>
<th>Time 3 - Time 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>248.2</td>
<td>313.9</td>
<td>198.5</td>
<td>-49.7</td>
</tr>
<tr>
<td>(n=12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>213.9</td>
<td>205.7</td>
<td>241.8</td>
<td>27.9</td>
</tr>
<tr>
<td>(n=12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E(T₃ - T₁) - C(T₃ - T₁)</td>
<td>-77.6*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note.—The higher the score, the higher the motivation.
*p<.10, df = 22, one-tailed t test.

(Deci, 1971: 109)

What appears to have occurred is that withdrawal of rewards led to extinction of behavior. In other words, it appears not to be the addition of extrinsic rewards which decreases intrinsic motivation, but rather it appears to be
the withdrawal of expected rewards which causes the observed decrease in non-rewarded performance. This is a crucial distinction. In the employment situation, if linking extrinsic rewards to performance causes decreases in motivation, we should perhaps attend to Deci's suggestions to limit such linkages in situations where the nature of the task is highly intrinsically appealing. However, if it is the removal of expected extrinsic rewards which decreases motivation, we should try to make the task to be performed as rewarding as possible by maximal use of extrinsic and intrinsic rewards, simply ensuring that such rewards are not removed in the future.

Many studies in the psychological literature attest to the effects of withdrawal of reinforcement on extinction of response. Ayllon and Michael (1959) used withdrawal of reinforcement to extinguish the response of patients in a psychiatric hospital from entering the nurses' office. Before extinction procedures began, the average number of times a patient visited the nurses' office was sixteen times per day. During extinction, the nurses ignored the patient. At the end of eight weeks the number of visits had declined to two per day. Withholding attention by ward nurses was also used by Ayllon and Haughton (1964) to extinguish psychotic verbal behavior of mental patients.

Baer (1962) controlled thumbsucking in preschool children by turning off an animated cartoon whenever the
child put his thumb in his mouth.

Ayllon (1963) successfully used withdrawal of reinforcement to control food stealing behavior in a female schizophrenic. Whenever she stole food, she was removed from the dining room. During the first two weeks she stole at more than two-thirds of all meals. After learning that stealing resulted in missing her meal, the stealing was rapidly eliminated.

In another clinical study, Barrett (1962) found the interruption of music was more effective than presentation of noise in reducing a patient's tics from over 100 per minute to 15-30 per minute. Many other studies have found similar results (Risley and Wolf, 1966; Wolf, Risley, Johnston, Harris and Allen, 1967; Hamilton, Stephens, and Allen, 1967; Sloane, Johnston, and Bijou, 1968; Burchard and Tyler, 1965; Tyler and Brown, 1967).

There are several different procedures which can be designated withdrawal of reinforcement, i.e., ongoing reinforcement can be interrupted for a period of time; increments of the reinforcer can be subtracted; or the subject may be withdrawn from the opportunity to obtain reinforcement. Quite clearly, individuals in Deci's contingent pay condition received more rewards for task performance than no-pay subjects and non-contingent pay subjects. The withdrawal of pay rewards easily corresponds to subtraction of increments of reinforcers; thus, decrements in response
rate would be expected for contingent pay subjects but not for other groups. Additionally, the individual may perceive himself as being removed from the opportunity to obtain a reinforcer, a situation known to operant theorists as a "Time Out" (Ferster and Skinner, 1957). It is entirely possible that the actual presence of the experimenter in the Deci studies (the dispenser of rewards) may have functioned as a discriminative stimulus. When the experimenter was no longer there, it could have been equivalent to a light in a Skinner box being extinguished to indicate the reward dispenser is no longer in operation. In this case, also, it would be expected that performance responses would decrease drastically or cease entirely during the non-observed period. In the no-pay condition, the person himself dispensed all rewards so that removal of the experimenter should not have changed level of performance. Similarly, persons in the non-contingent pay condition, while they did receive pay, received no rewards directly related to performance other than the ones they administered themselves. When the experimenter left the room, it was expected that their performance would remain constant also.

One potential inconsistency with the reinforcement withdrawal hypothesis centers around the drop in observed intrinsic motivation for the experimental group in period three. As seen in Table 2 this drop went below the original baseline for the experimental group in the first session.
This seems to confirm a reduction in intrinsic motivation since the same reinforcers are apparently present the first and third sessions. Perster and Perrott (1968) explain this occurrence by the use of "disruption." They state that aversive stimuli (withdrawal of reinforcement) "which can condition and suppress operant behavior will generally disrupt or suppress a wide range of unrelated behaviors in a variety of situations...positively reinforced behavior, weakened by the emotional disruption from the aversive stimulus may, in turn, be not as successful in producing its maintaining reinforcements; hence the performance may become still weaker. This weakening could distort the form of the performance or reduce its frequency, or both."

On the basis of the preceding studies, a new study was designed in order to better understand what happens to performance and satisfaction when intrinsic and extrinsic reinforcers are combined. On the basis of learning theory it was hypothesized that a combination of reinforcers would serve to increase performance and satisfaction, but that a withdrawal of reinforcers would produce a decrease in performance and satisfaction. It was suspected that the amount of increase or decrease would depend in part on the frequency of reinforcement.

Reinforcements may be given either continuously or intermittently based on some elapsed time (interval schedules) or some requisite number of correct responses (ratio
schedules). Both interval and ratio schedules may be fixed, with reinforcement occurring after a given time or number of responses, or variable, with the amount of time or number of requisite responses varying within a given interval. In all, Ferster and Skinner (1957) have identified thirteen schedules of reinforcement.

The use of different schedules have been shown to produce quite different results in terms of performance. Continuous reinforcement produces rapid learning, but also rapid extinction if reinforcement should be withdrawn. With variable intermittent schedules, response rates tend to be high and less subject to extinction. Fixed intermittent schedules produce lower response rates than variable intermittent schedules, and also are more subject to extinction. A summary of these effects as presented by Behling, Schriesheim, and Tolliver (1973) may be seen in Table 3.

Studies thus far have tended to focus on the continuous reinforcement schedule (Deci, 1971, 1972a, 1972b, 1972c) but in fact this type of schedule is probably less used in industry than some of the intermittent schedules such as fixed interval. It is possible that each change in reinforcement schedule would interact differentially with intrinsic motivation, which because of its very nature, is thought to be only administered on a continuous schedule.

A 2 x 4 x 3 factorial design was planned which would examine effects and interactions of high and low interest


<table>
<thead>
<tr>
<th>Type of Reinforcement</th>
<th>Schedule of Reinforcement</th>
<th>Effect on Behavior When Applied to Organism</th>
<th>Effect on Behavior When Removed from Organism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Reinforcement</td>
<td>Fastest method to establish a new behavior</td>
<td>Fastest method to extinguish a new behavior</td>
<td></td>
</tr>
<tr>
<td>Intermittent Reinforcement</td>
<td>Slowest method to establish a new behavior</td>
<td>Slowest method to extinguish a new behavior</td>
<td></td>
</tr>
<tr>
<td>Variable Intermittent Reinforcement</td>
<td>More consistent response frequencies</td>
<td>Slower extinction rate</td>
<td></td>
</tr>
<tr>
<td>Fixed Intermittent Reinforcement</td>
<td>Less consistent response frequencies</td>
<td>Faster extinction rate</td>
<td></td>
</tr>
<tr>
<td>Positive Reinforcement</td>
<td>Increased frequency over preconditioning level</td>
<td>Return to preconditioning level</td>
<td></td>
</tr>
<tr>
<td>Negative Reinforcement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Punishment Omission</td>
<td>Decreased frequency over preconditioning level</td>
<td>Return to preconditioning level</td>
<td></td>
</tr>
</tbody>
</table>

(Behling, Schriesheim, and Tolliver, 1973)
tasks across four payment conditions (CRF, VR2, non-contingent pay, and no pay). The experiment was divided into three time periods with measures of satisfaction and production quantity and quality gathered following each performance segment. As in the Deci research, baseline data were gathered following the first time period with the experimental manipulation of pay occurring during the second time period. Effects of withdrawal of reward on performance and satisfaction were examined in the third time period.

Hypotheses.--On the basis of the literature reviewed, six hypotheses were generated:

\[ H_1: \] Performance for contingent pay groups (CRF and VR) will be greater at T2 than performance of non-contingent pay groups (NCP) or no-pay groups (NP).

\[ H_2: \] Performance for VR groups will exceed performance of any other groups during T2.

\[ H_3: \] Performance for CRF will drop significantly at T3 and will be lower than performance of any other group.

\[ H_4: \] Satisfaction will be higher for CRF and VR at T2 than for any other group.

\[ H_5: \] Satisfaction will be lower for CRF and VR at the end of T3 than for NCP or NP groups.

\[ H_6: \] Persons working at the interesting task will have higher satisfaction than persons working at the dull task.
CHAPTER II

GENERAL PROCEDURE AND DESIGN OF THE EXPERIMENT

Subjects
One hundred twenty subjects were drawn from the introductory psychology subject pool at Ohio State University during the winter and spring quarters, 1974. Of these, sixty subjects were male and sixty were female.

Tasks
Two tasks were designed to examine the effects of monetary payment on performance and satisfaction; one of these tasks was designated a high interest task (I) and the other, a low interest task (D). Pretest data indicated that on a seven point scale with 1 = very dull and 7 = very interesting, the high interest task received a mean rating of 6.10 and the low interest task received a mean rating of 2.39.

High Interest Task
In the high interest task subjects were given a two page summary sheet descriptive of four types of mental disorders, and were allowed ten minutes to read and study the sheets carefully. Subjects then received a total of
45 case studies, 15 cases distributed in each of three 15-minute periods. These cases were illustrative of various types of mental disorders. All cases were taken from abnormal psychology textbooks, and each case was descriptive of only one type of disorder. Subjects were asked to read and diagnose as many of the case studies as possible in the 15-minute period, paying attention to both quantity and accuracy. (Exact instructions may be seen in Appendix A). In most instances the cases were illustrative of one of the four types of abnormalities listed on the summary sheets. Approximately 20%, however, were examples of other abnormal behavior. In those instances, subjects were asked to write "none of the four" as the diagnosis. Subjects were requested to place each case outside the door as it was completed to facilitate scoring. All cases and the two page summary sheet may be seen in Appendix B.

Low Interest Task

Subjects in the low interest task condition were given a total of 30 pages taken from Foundations of Abnormal Psychology (London and Rosenhan, 1968), ten pages in each of three 15-minute periods. Subjects were asked to make a line with a blue felt marker through every word containing seven letters or more. The passage chosen was a chapter on the concept of learning theory as an explanation of abnormal behavior. (This passage may be seen in
Appendix B). It was chosen primarily because both the style of writing and the content did not easily lend itself to introductory material, but demanded a rather sophisticated knowledge of psychological principles on the part of the reader. It was assumed that this would decrease the possibility of subjects having a high interest in the task due to the content. All subjects were told to work as quickly but as accurately as possible, since they would be scored on both quantity and accuracy. (The exact instructions may be seen in Appendix A). As in the high interest task, subjects were asked to place the sheets outside the door as each page was completed.

**Experimental Manipulation**

In addition to being randomly assigned to either the high or low interest group, subjects were also randomly assigned to pay conditions within these interest groups. Four pay conditions were established:

1. Continuous reinforcement groups (CRF)
2. Variable reinforcement group (VR)
3. Non-contingent pay group (NCP)
4. No pay group (NP)

All groups participated in the first time period with no mention of pay being given in order to establish baseline data. At the beginning of T₂, subjects in CRF, VR, and NCP groups were told that some money was available to pay subjects as a result of the study being funded by
the Department of Mental Health. Members of the CRF groups were told they would receive 25¢ for each page turned in which was correct. VR group members were told they would receive 50¢ for each of the pages turned in which was correct and which had been designated ahead of time as a "money page." (In reality, CRF group members received 25¢ for every page completed in $T_2$; VR members received 50¢ for approximately every other page completed.) Money was given as each page was completed. MCP members received $2 at the start of $T_2$ for "helping out." For persons in the NP groups, no mention was made of money. The exact instructions read are contained in Appendix B.

**Instruments**

Following each 15-minute performance period, subjects were given a questionnaire designed to measure job satisfaction and to supply manipulation checks. The major satisfaction scale used was the job attitude scale of the Job Description Index (Smith, Kendall, and Hulin, 1969). This scale consists of 18 items, each item requiring a "yes" response if the item was characteristic of the task, a "no" response if it was not characteristic, and "?" if the respondent was unsure. Standard scoring procedures were used. Internal consistency of the work scale has been determined by Smith, Kendall, and Hulin as being .84 using a random split halves correlation with a Spearman-Brown correction. Convergent and discriminant validities of JDI
have been shown to be high and exceed that of many other rating scales. These may be seen in Smith, Kendall, and Hulin, 1969: 67.

In addition to the JDI, a ten item Likert-type questionnaire was included to get additional information on degree of interest, meaningfulness, etc. Both the satisfaction scale and the questionnaire are included in Appendix C.

Productivity measures for the high interest task consisted of (1) the number of cases diagnosed and (2) the number of cases incorrectly diagnosed. For the low interest task, the productivity measures consisted of (1) the number of words containing seven letters or more for every page or part of page completed (quantity) and (2) the error rate consisting of words marked having six or fewer letters and words unmarked having seven or more letters.

**General Procedure**

Subjects were randomly assigned to one of eight conditions prior to the start of the experiment:

(1) **HCRF** - high interest task, contingent pay, continuous reinforcement schedule

(2) **HVR** - high interest task, contingent pay, variable reinforcement schedule

(3) **HNCP** - high interest task; non-contingent pay

(4) **HNP** - high interest task, no pay

(5) **LCRF** - low interest task, contingent pay, continuous reinforcement schedule
(6) LVR - low interest task, contingent pay, variable reinforcement schedule

(7) LNCP - low interest task, non-contingent pay

(8) LNP - low interest task, no pay

Subjects were greeted when they arrived and taken to a waiting area. Before starting the study, experiment cards were signed for all subjects. It was anticipated that the receipt of credit might be a contaminating variable in this study due to its use as an extrinsic reward for participation. By giving credit at the beginning of the study and assuring subjects their performance would in no way jeopardize the credit received, it was expected that any contamination would be held constant across all conditions.

After experiment cards had been signed, the instructions were read to the subjects. (These may be seen in Appendix A.) All subjects receiving instructions at the same time were in the same task condition, but not necessarily in the same payment condition. Subjects were then placed in separate rooms and given the task.

Each performance period was 15 minutes in length. Following each performance period the experimenter entered each room, collected remaining task materials, and administered the questionnaire. As much time was given to complete the questionnaire as was needed. When all subjects had finished, the questionnaires were collected and new task materials given. After collecting
questionnaires in $T_1$, but before the start of $T_2$, additional instructions were read for groups receiving pay. (These instructions may be seen in Appendix A.) No additional instructions were given between $T_2$ and $T_3$.

Following collection of questionnaire data at the end of $T_3$, subjects were debriefed concerning the nature of the experiment, and all questions were answered.
CHAPTER III

RESULTS

Scale Reliabilities

Scale reliabilities were computed for the Job Attitude Scale of the Job Descriptive Index (JDI) using the Kuder Richardson formula 8. As seen in Table 4, reliabilities for the satisfaction measure were quite high for each time period ranging from .903 to .907. Item test correlations were generally high with only three of 18 items having correlations < .35, i.e., "on your feet," "frustrating," and "hot." This scale was allowed to stand without using item deletion for fear it would affect the established validity of the instrument. Item-test correlations for the JDI are given in Appendix D.

Table 4
SCALE RELIABILITIES*

<table>
<thead>
<tr>
<th>Instrument</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>JDI</td>
<td>.907</td>
<td>.907</td>
<td>.903</td>
</tr>
</tbody>
</table>

*Computed using K-R 8
Planned Comparisons

Nine orthogonal planned comparisons were calculated for each of the task conditions to determine answers to the following questions:

A. Quantity of Output

1. Do the groups receiving pay in $T_2$ (CRF, VR, and NCP groups) have higher quantity of output in $T_2$ than the no-pay (NP) group?

2. Do groups receiving contingent pay in $T_2$ have higher quantity of output in $T_2$ than the NCP group?

3. Do NCP + NP have higher quantity of output in $T_3$ than groups which have had their pay withdrawn?

B. Quality of Output

4. Do the groups receiving pay in $T_2$ have higher quality of output in $T_2$ than the NP group?

5. Do groups receiving contingent pay in $T_2$ have higher quality of output in $T_2$ than the NCP group?

6. Do NCP + NP have higher quality of output in $T_3$ than groups which have had their pay withdrawn?

C. Satisfaction

7. Do the groups receiving pay in $T_2$ have higher satisfaction in $T_2$ than the NP group?
8. Do groups receiving contingent pay in $T_2$ have higher satisfaction in $T_2$ than the NCP group?

9. Do NCP + NP have higher satisfaction in $T_3$ than groups which have had their pay withdrawn?

**Quantity of Output**

Table 5 indicates that for high interest task groups, no significant differences in quantity of production occurred. However, for low interest task groups, those subjects receiving pay in $T_2$ had significantly higher quantity of output than the no-pay group ($t = 2.53$, $p < .05$).

**Quality of Output**

Comparisons of quality of production at $T_2$ revealed significant differences only for groups working on the low interest task. It was found that groups receiving contingent pay (CRF and VR) had significantly higher quality of output than non-contingent pay and no-pay groups ($t = 3.56$, $p < .05$).

**Satisfaction**

Groups receiving pay in the high interest condition did report different satisfaction scores than the group receiving no pay. However, this difference was in the direction opposite to what was predicted, with the no-pay group reporting significantly higher satisfaction than the
Table 5
PLANNED COMPARISONS AMONG MEANS

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Quantity</th>
<th>Quality</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Interest Task</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRF + VR + NCP vs. NP (T₂)</td>
<td>N.S.</td>
<td>N.S.</td>
<td>( t = -3.51^* ) (2-tailed)</td>
</tr>
<tr>
<td>CRF + VR vs. NCP (T₂)</td>
<td>N.S.</td>
<td>N.S.</td>
<td>N.S.</td>
</tr>
<tr>
<td>CRF + VR vs. NCP + NP (T₃)</td>
<td>N.S.</td>
<td>N.S.</td>
<td>N.S.</td>
</tr>
<tr>
<td><strong>Low Interest Task</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRF + VR + NCP vs. NP (T₂)</td>
<td></td>
<td></td>
<td>( t = 2.53^* )</td>
</tr>
<tr>
<td>CRF + VR vs. NCP (T₂)</td>
<td>N.S.</td>
<td>N.S.</td>
<td>N.S.</td>
</tr>
<tr>
<td>CRF + VR vs. NCP + NP (T₃)</td>
<td>N.S.</td>
<td></td>
<td>( t = 3.35^* )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( t = 3.56^* ) (2-tailed)</td>
</tr>
</tbody>
</table>

**p < .001**  
*p < .05*

All t-tests are one-tailed unless otherwise indicated.
groups receiving pay \( (t = 3.51, p < .05) \). No satisfaction differences were noted at \( T_3 \).

For low interest task groups those groups receiving pay reported significantly greater satisfaction in \( T_2 \) than the group receiving no pay \( (t = 6.98, p < .001) \). It was also found that the CRF and VR groups together had greater satisfaction in \( T_3 \) than NCP and NP groups combined \( (t = 3.56, p < .05) \).

**Analysis of Variance**

Analyses of variance were computed using a repeated measures design of 2 levels of task X three time periods X four pay conditions with separate analyses being performed for each of the three dependent variables, quantity, quality, and satisfaction. For output quantity and quality, only within-group differences were examined due to the difference in tasks and measures.

**F Test - Output Quantity**

As shown in Table 6, the only significant interaction effect was Time X Task \( (F = 120.46, p < .01) \). Due to the repeated measures design in which the same subjects participated in all three time periods but in only one of the pay and task conditions, the proportion of variance accounted for was impossible to ascertain.
Table 6

ANALYSIS OF VARIANCE FOR TREATMENT CONDITIONS ON QUANTITY
(within groups only)

<table>
<thead>
<tr>
<th>Source</th>
<th>Error Term</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (T) X Task (J)</td>
<td>ST(JP)</td>
<td>2</td>
<td>570798.40</td>
<td>285399.20</td>
<td>120.4618</td>
<td>.01</td>
</tr>
<tr>
<td>Pay (P) X Task (J)</td>
<td>S(JP)</td>
<td>3</td>
<td>29829.95</td>
<td>9943.31</td>
<td>0.4204</td>
<td></td>
</tr>
<tr>
<td>T X P X J</td>
<td>ST(JP)</td>
<td>6</td>
<td>8219.13</td>
<td>1369.85</td>
<td>0.5872</td>
<td></td>
</tr>
<tr>
<td>ST(JP)</td>
<td></td>
<td></td>
<td>224</td>
<td>530702.90</td>
<td>2369.21</td>
<td></td>
</tr>
<tr>
<td>S(JP)</td>
<td></td>
<td>112</td>
<td>2649088.00</td>
<td>23652.57</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
F Test - Output Quality

Table 7 indicates that again the only significant interaction occurred between Task and Time (F = 4.65 p < .05).

F Test - Satisfaction

For satisfaction, significant main effects occurred for both Time and Task (p < .01). By using the estimated variance for these variables, it was found that the difference in task accounted for 45.5 times as much variance as the time variable (Table 8), showing differences related to task interest.

Manipulation Checks

Manipulation checks regarding pay were included in the third part of the questionnaire. Examination of this data showed the manipulation was successful in 83% of the cases, i.e., subjects receiving pay checked the appropriate item and subjects receiving only experimental credit refrained from checking "pay" items.

The manipulation check for interest was taken from responses to item number 8 of SAT. The high interest task received a mean rating = 6.03 on the seven item scale; the low interest task rating was 3.94. Although the rating for Task D was higher than expected on the basis of pre-test data, the difference was still statistically significant (t = 3.36, p < .05).
Table 7
ANALYSIS OF VARIANCE FOR TREATMENT CONDITIONS ON QUALITY
(within groups only)

<table>
<thead>
<tr>
<th>Source</th>
<th>Error Term</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (T) X Task (J)</td>
<td>ST(JP)</td>
<td>2</td>
<td>1132.72</td>
<td>566.36</td>
<td>4.6473</td>
<td>.05</td>
</tr>
<tr>
<td>Pay (P) X Task (J)</td>
<td>S(JP)</td>
<td>3</td>
<td>1290.92</td>
<td>430.31</td>
<td>1.2487</td>
<td></td>
</tr>
<tr>
<td>P X T X J</td>
<td>ST(JP)</td>
<td>6</td>
<td>101.35</td>
<td>16.89</td>
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<tr>
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<td>224</td>
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<td>121.87</td>
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<tr>
<td>S(JP)</td>
<td></td>
<td>112</td>
<td>38595.72</td>
<td>344.60</td>
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### Table 8

**ANALYSIS OF VARIANCE SUMMARY FOR TREATMENT CONDITIONS ON SATISFACTION**

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<th>Source</th>
<th>Error Term</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
<th>$\hat{\sigma}^2_a$</th>
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<td>29466.80</td>
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<tr>
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<td>1.43</td>
<td>8.50</td>
<td>0.48</td>
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<td>255.89</td>
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\[
\frac{\hat{\sigma}^2_J}{\hat{\sigma}^2_T} = 45.58
\]
Hypotheses

Hypothesis 1

This hypothesis stated that performance for groups receiving contingent pay during the second time period would be greater than performance of groups receiving non-contingent pay or no pay. This hypothesis was not confirmed for high interest task groups. As seen in the planned comparisons and analysis of variance, performance quantity was not significantly higher for the contingent pay groups. Productivity rose in $T_2$ for all groups regardless of pay. These changes have been graphed in Fig. 2 and Fig. 3 as $Z$ scores.

The extent of these changes in quantity of production may be more readily assessed by transforming the raw data into standard scores with means $=50$ and standard deviations $=10$. This has been done in Table 9. For the interesting task condition, the greatest amount of change from $T_1$ to $T_2$ occurred for the group receiving no pay followed by the non-contingent pay group. This is not what would have been predicted by either operant theory or cognitive evaluation theory. The explanation for this occurrence may reside in the fact that quantity of production had a moderately high inverse correlation with quality of output ($r = -.6094$). It could be, therefore, that groups receiving pay were simply spending more time per item in order to be as
Fig 2  Quantity of Output for Treatment Conditions

High Interest Task

* Converted to standard scores

--- = CRF
----- = VR
---------- = NCP
------------- = NP
Fig. 3 Quantity Output for Treatment Conditions

Low Interest Task

*Converted to standard scores
<table>
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<th></th>
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<td>54.0</td>
<td>59.3</td>
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<td>+5.3</td>
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<tr>
<td>NCP</td>
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<td>48.0</td>
<td>52.3</td>
<td>+5.8</td>
<td>+4.3</td>
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<tr>
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<td>51.6</td>
<td>55.1</td>
<td>+8.5</td>
<td>+3.5</td>
</tr>
<tr>
<td>NCP</td>
<td>44.3</td>
<td>53.8</td>
<td>57.5</td>
<td>+9.5</td>
<td>+3.7</td>
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<td>54.0</td>
<td>+9.1</td>
<td>+3.5</td>
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</table>

* Converted to standard scores: mean = 50; SD = 10

**Actual means and SDs are included in Appendix E
accurate as possible. This is especially likely given that subjects were told pay was contingent on accuracy.

Additionally, it could have been the case that groups receiving contingent pay were more interested in the task, therefore, they spent longer on each item. This possibility was tested using a t-test between means for reported interest of contingent vs. con-contingent and no-pay groups at T₂. Results showed t = .03, which was non-significant. (Group responses may be seen in Appendix F.)

For persons assigned to the low interest groups, standard scores in Table 10 show partial support for the hypothesis. Groups receiving pay whether contingent or not showed significantly greater quantity of output than the group receiving no pay. The CRF group manifested the greatest change in quantity from T₁ to T₂. However, the VR group, whose performance was predicted to be the highest, actually had the smallest change from T₁ to T₂. As was the case with the interesting task groups, all groups working on the dull task exhibited an increase in performance from T₁ to T₂.

Greater increases in quality of output were expected for contingent pay groups than for non-contingent or no-pay groups because subjects were told pay was contingent on accuracy as well as quantity of output. These performance data have been graphed in Fig. 4 and Fig. 5. It can be seen that at T₂ quality decreased for all groups in both
Table 10

QUALITY OF OUTPUT FOR TREATMENT CONDITIONS*

<table>
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<tr>
<th></th>
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<th>T₂</th>
<th>T₃</th>
<th>T₂-T₁</th>
<th>T₃-T₂</th>
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<td>CRF</td>
<td>66.1</td>
<td>57.6</td>
<td>52.8</td>
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<td>31.3</td>
<td>49.2</td>
<td>-28.1</td>
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<td>NCP</td>
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<td>43.5</td>
<td>50.6</td>
<td>-10.3</td>
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<td>31.3</td>
<td>47.2</td>
<td>-20.7</td>
<td>+15.9</td>
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<table>
<thead>
<tr>
<th></th>
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<th>T₂</th>
<th>T₃</th>
<th>T₂-T₁</th>
<th>T₃-T₂</th>
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<td>-10.3</td>
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* Converted to standard scores: mean = 50; SD = 10

** Actual means and standard deviations are included in Appendix E.
task conditions. By examining the data, it is seen that the group having the highest increase in errors at T₂ is the VR group. Once again, this is in the direction opposite what was predicted. Therefore, it appears as if the VR group did not sacrifice quality for quality.

However, it appears as if this possibility may be a viable explanation for what happened with the other groups. In the interesting condition, CRF which manifested the lowest change in quantity of output at T₂ does have the lowest increase in error rate at T₂. In the low interest condition, the same pattern occurs with CRF maintaining the highest quality.

To examine this hypothesis more closely, correlations were computed between quantity and quality for each of the groups in each time period. As seen in Tables 11 and 12, quantity and quality do seem to be inversely correlated, with correlations between quantity and quality for the high interest task = -.7059 at T₂. For the low interest task, r = -.5129 at T₂. Correlations by group are included in Appendix G. The relationships between quantity, quality, and satisfaction have been graphed in Figures 6-13.

Hypothesis 2

This hypothesis stated that performance for the VR groups would exceed performance of any other groups at T₂. As indicated earlier, this hypothesis was not confirmed. There were no significant differences in quality or quantity
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</table>
Fig 6: Quantity, Quality, and Satisfaction Interaction for CRF

High Interest Task

*Converted to standard scores

QA = Quality

T1, T2, T3 = Time Periods

+-3.0, +-2.5, +-2.0, +-1.5, +-1.0, +-0.5, 0.0, 1.0, 1.5, 2.0, 2.5, 3.0

= Satisfaction

= Quantity

= High Interest Task

= Time Periods

= Standard scores

= Converted to

= Fig 6: Interaction for

= High Interest Task

= Quality

= Quantity

= Time Periods

= Standard scores

= Converted to

= Fig 6: Interaction for

= High Interest Task

= Quality

= Quantity

= Time Periods

= Standard scores

= Converted to
Fig 7 Quantity, Quality, and Satisfaction Interaction for VR
High Interest Task

*Converted to standard scores

--- = Quantity
----- = Quality
---- = Satisf.
Fig 8  Quantity, Quality, and Satisfaction Interaction for NCP

High Interest Task

* Converted to standard scores

--- = Quantity
----- = Quality
------ = Satisf.
Fig 9  Quantity, Quality, and Satisfaction Interaction for NP*

High Interest Task

*Converted to standard scores
Fig 10 Quantity, Quality and Satisfaction Interaction for CRF

Low Interest Task

"Converted to standard scores"
Fig 11 Quantity, Quality and Satisfaction Interaction for VR^*
Low Interest Task

* Converted to standard scores

_____ = Quantity
----- = Quality
-.--- = Satisf.
Fig 12 Quantity, Quality and Satisfaction Interaction for NCP

Low Interest Task

* Converted to standard scores
Fig 13 Quantity, Quality, and Satisfaction Interaction for NP*
Low Interest Task

*Converted to standard scores
of production among groups in the interesting task condition. In the dull task, the VR group had the lowest change in production quantity from \( T_1 \) to \( T_2 \) and one of the highest increases in error rate.

**Hypothesis 3**

The prediction in the third hypothesis was for CRF performance to drop lower at \( T_3 \) than the performance of any other group. Planned comparisons showed a combination of CRF and VR at \( T_3 \) had quantity output which was not significantly different from that of NCP and NP groups. Rather than drop, quantity increased for all groups at \( T_3 \) with the CRF group in the interesting task condition increasing the greatest amount. For the dull task, CRF increased only minimally, .01 SD.

Quality decreases for CRF were expected and did occur. In Table 10 it can be seen that CRF was the only group in the interesting task condition which had a decrease in quality at \( T_3 \). However, despite this decrease, CRF still maintained fewer errors than any other group. This difference was not significant.

In the low interest condition, all groups decreased in quality of production with CRF dropping least, followed by VR. Planned comparisons showed these groups to have significantly higher quality production than NCP and NP.

One possibility for this occurrence may have been
that subjects were unaware for quite some time of the removal of rewards. It was expected that CRF would discover this first followed by VR. It is possible that an initial burst of high quality and high quantity production at the start of the third time period while it was assumed reward contingencies were still operating was enough to keep mean productivity high even if a severe drop occurred later. The length of the time periods would have served to facilitate this. In longer performance sessions this could have been more adequately tested.

A second possibility for this could be that through learning and familiarity with the task, less effort could be expended and yet productivity would stay the same or increase slightly.

**Hypothesis 4**

It was predicted in this hypothesis that satisfaction would be higher for VR and CRF at T₂ than for groups not receiving contingent pay. This hypothesis was tested using planned comparisons and was not supported for groups in the high interest task. In Figs. 14, 15 and 16 satisfaction changes across time have been graphed. While CRF satisfaction was higher than that reported by VR and NCP groups, it was the only group to show a decrease in satisfaction at T₂.

By examining the amount of change in reported satisfaction scores from T₁ to T₂ it can be seen that for the
Fig. 14 Satisfaction Scores for Treatment Conditions

* Converted to standard scores

High Interest Task

- CRF
- VR
- NCP
- NP
Fig 15  Satisfaction Scores for Treatment Conditions

Low Interest Task

*Converted to standard scores

--- = CRF
----- = VR
-------- = NCP
------------ = NP
Fig 16  Satisfaction Scores for Treatment Conditions

High and Low Interest Tasks

*Converted to standard scores
interesting task group, the greatest amount of positive change in satisfaction occurred for the group receiving no pay (see Table 13). The differences among all groups at T₂ in terms of change in satisfaction scores, however, was minimal, the greatest change amounting to only .16 SD.

For the dull task groups, satisfaction was significantly higher for VR + CRF than for NCP + NP (p < .001). This hypothesis was therefore supported for the dull task but not for the interesting task.

**Hypothesis 5**

The prediction that satisfaction would be lower for CRF and VR at T₃ than for the other groups at that time was not supported. In the high interest task, drops in satisfaction scores did occur for CRF and VR at T₃ but the largest drop of all was for the group receiving no pay. In the low interest task the largest changes in satisfaction were reported by CRF and VR, but despite this, the contingent pay groups reported significantly higher satisfaction scores during this time period than the other groups.

This again may reflect a problem with the length of performance sessions. Drops for the contingent pay groups did occur and had the time periods been longer, these drops might well have gone below scores of the other groups.

Alternatively, the subjects completing the questionnaire at T₃ may have been responding to the exercise as a whole, rather than merely the last time period. It is
Table 13
SATISFACTION REPORTED BY TREATMENT CONDITIONS

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<th>$T_3$</th>
<th>$T_2 - T_1$</th>
<th>$T_3 - T_2$</th>
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<td>23.80</td>
<td>23.73</td>
<td>19.20</td>
<td>-0.07</td>
<td>-4.53</td>
</tr>
<tr>
<td>NCP</td>
<td>21.73</td>
<td>21.80</td>
<td>20.73</td>
<td>+0.07</td>
<td>-1.07</td>
</tr>
<tr>
<td>NP</td>
<td>18.67</td>
<td>16.33</td>
<td>15.67</td>
<td>-2.34</td>
<td>-0.66</td>
</tr>
</tbody>
</table>

* Mean = 39.68; SD = 8.86
** Mean = 21.59; SD = 10.19
likely that they would be happy to receive some money for the experiment even though money was not received throughout.

**Hypothesis 6**

Analysis of variance was used to test the hypothesis that persons working on the interesting task would have higher satisfaction than persons working on the dull task. This hypothesis was confirmed ($F = 115.15, p < .01$). These differences may be clearly seen in Fig. 16.
CHAPTER IV

CONCLUSIONS

This study was conducted in order to examine the effects of intrinsic and extrinsic reinforcements on satisfaction, quantity and quality of performance. It was hypothesized that if pay and task interest interacted in a manner suggested by learning theory, that this interaction would be manifested by higher quantity or quality of performance and/or higher satisfaction.

Significant differences in performance were not found for groups receiving pay while working on an interesting task. One possible reason for this phenomenon may be that in this study intrinsic and extrinsic reinforcements were actually in conflict with each other. Subjects were told that pay was to be based on accurate productivity, but in fact, a number of persons believed pay was given regardless of quality. In a manipulation check, 83% of the subjects believed what they were told by the experimenter. However, in the CRF conditions, approximately 33% believed they were paid regardless of accuracy. These subjects probably believed that working as quickly as possible produced the greatest amount of money, whereas working more
slowly and accurately produced the greatest intrinsic pleasure. To predict performance under these circumstances, it would be necessary to discover which reinforcement was the most valent for the subject. To overcome this problem, future studies should actually reinforce only accurate performance.

Satisfaction differences did occur with the group receiving no pay reporting higher satisfaction than groups which received pay. The differences in scores were not great but could be an indication of an important effect of pay in this kind of task which should be taken into account when devising pay for performance systems. However, it was found that subjects working on the high interest task reported greater satisfaction than subjects assigned to the low interest task.

Low interest task groups receiving contingent pay manifested higher quality performance at T<sub>2</sub> and greater satisfaction at T<sub>3</sub> than other groups. Groups receiving any type of pay had higher quantity of output during the second time period.

In reaching conclusions from this study it is well to keep in mind certain factors which may limit the kinds of generalizations which may be made. First, the three 15-minute time periods may have been too short a period to reveal some differences in the dependent variables under study. If the study had been conducted over a period of
several weeks, for example, long-term differences due to treatment effects could be exposed.

Another possible source of variance is the actual amount of money given. The amounts of pay earned may be seen in Table 14. These differences not only make comparisons among groups difficult but may have contributed to an overpay or underpay situation for certain groups which could help explain the differences in quantity and quality at $T_2$.

Table 14

Average Amount of Money Earned per Group at $T_2$

<table>
<thead>
<tr>
<th></th>
<th>CRF</th>
<th>VR</th>
<th>NCP</th>
<th>NP</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>$1.85</td>
<td>$2.00</td>
<td>$2.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Interest Task</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>$1.53</td>
<td>$1.67</td>
<td>$2.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Interest Task</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Equity theory, for example (Adams, 1963), would predict that if a group being paid on a piece rate system, e.g., CRF, felt underpaid, quantity would increase and quality would decrease. As seen in Figs. 2-5, these results actually occurred.

Based on the graphs for quantity of production (Figs. 2 and 3) it appears as if significant learning is
taking place between $T_1$ and $T_2$. These results may be
generalizable only to the learning stage of a task. This
was one of the criticisms leveled against the Deci (1971,
1972a, 1972b) work by Foster and Hamner (1974), and it was
hoped that by choosing relatively easy tasks, time needed
for learning would be minimized. However, every task, no
matter how simple must involve a stage in which the parti-
cipant becomes familiar with what he is to do. The length
of the time periods in this study seem to be too short to
discount this potential explanation for results, and it
therefore leaves open the criticism that these data may be
generalizable only to the learning stage of tasks.

Additional factors which may limit the generaliz-
ability of these data include the sample size and composi-
tion. Sample size was only 120 with 15 subjects per cell.
This in itself may have contributed to the lack of signifi-
cant findings since only very strong effects would have
reached statistical significance.

Also, there might be some question regarding the
external validity of the study, not only because of the
small sample size, but also because of its composition. The
subjects were college students who had to participate in
experiments to complete a course requirement. To the
extent that these students differed from the work force to
whom these results have applicability, external validity
is jeopardized.
In summary, most of the research which has been conducted on pay for performance has focused on jobs which are not highly motivating in themselves. For this type of job performance based pay does seem to increase quantity and quality of output and satisfaction. In the more interesting task, however, results were not so clear cut. It was not found that quality decreased as a result of pay for performance, a finding other researchers had reported. Neither was it found that pay for performance would create an increase in productivity, which would be predicted by expectancy theory and operant theory. The job satisfaction felt by individuals being paid for interesting work decreased, and it may well be that this variable is the key which ties a number of inconsistent research findings together. More research must be done on the effects of pay on long-term satisfaction before we will know the answer.
REFERENCES


Turner, A. N. and Lawrence, P. R. Industrial jobs and the worker: An investigation of response to task attributes.


Watson, J. B. Psychology as the behaviorist views it. Psychological Review, 1913, 20, 150-177.


Wood, M. T. Power relationships and group decision making in organizations. Unpublished manuscript.

APPENDIX A

SUBJECT INSTRUCTIONS
A. Subject Instructions - High Interest Task

The need for persons to work in the field of mental health is continuously expanding. Recently, it has been proposed by many professionals that persons can be trained in the basics in a very short period of time, and that these persons, when working with professional psychologists can be of immense help in providing therapy. We are interested in discovering if individuals with less training than is normally required might do well in some types of diagnosis also. What you do today will aid us in making such an evaluation.

I have here a list with descriptions of four abnormal mental conditions. When I finish, read the terms and descriptions over carefully and study them. Your task will be to read a number of case studies which have already been diagnosed by clinical psychologists. On the basis of the information given in the case studies and by referring back to your list of terms, make what you consider to be the correct diagnosis. Your responses will be compared both for accuracy and for number of cases attempted with persons just starting a Ph.D. program in clinical psychology, and with clinical psychologists who are currently working at mental institutions, so work as quickly, but as accurately, as possible.

You will have 15 cases to work on in each of three 15-minute periods. As you finish each study, write your
diagnosis on the line provided at the bottom of the page. In most cases, the correct diagnosis will be one of the four conditions listed on the terminology sheet. In a few instances, however, the symptoms in the case study will not clearly be any one of the four, but will appear to be some other type of mental disorder. In these cases, write "None" or "none of the four" on the line for the diagnosis. After completing the diagnosis, look at the clock in front of you and write the time on the line provided at the bottom of the page. When you have done this, place the case study outside the door where I will collect it. Do not wait until you have finished all the pages you can in the time period, but place each page outside as soon as it is finished. You may not be able to complete all 15 cases in the time period, but work as quickly and as accurately as possible, being sure to read each case all the way through before attempting a diagnosis.

At the end of each 15-minute period, you will be asked to complete a short questionnaire about the cases you have completed in that time period. The questionnaire will not be a test, but will give you a chance to tell us how you feel about this kind of training exercise, both the good things and the bad things, as the time progresses.

Here is the list of terms. You will have about ten minutes to read them over. Are there any questions?
B. **Subject Instructions - Low Interest Task**

The need for accurate early diagnosis of mental patients is crucial today. Increasing numbers of persons are unable to cope with the stress and problems which accompany everyday life. With modern techniques of therapy, help may be given once an accurate diagnosis is made, and if the diagnosis of potential trouble comes early, a major illness may be averted.

One of the most troublesome types of diagnosis to make is the early diagnosis of schizophrenia, a severe disorder in which the person fails to differentiate reality from fantasy. It has been found that in some types of schizophrenia, one of the first signs of trouble is a shortened attention span, and a slowing down of normal abilities, particularly a loss of reading ability. Persons likely to suffer from schizophrenia become less able to differentiate patterns of words, particularly to differentiate long from short words, several months before the illness appears serious.

We are working on a method of early diagnosis for these individuals predisposed toward schizophrenia in which the person is asked to indicate length of words in a reading passage. We now need to establish test scores or norms against which schizophrenic individuals' responses can be compared. We have the passages which we are giving to normal college students as well as schizophrenic patients.
Your responses will be used to set the "normal" range for responses. You are not being used in an attitude experiment to see how you react upon being told you are a schizophrenic; this will not happen.

I will give you ten pages of material to work on in each of three 15-minute periods. With the blue marker, draw a line through every word with seven or more letters; this includes names and hyphenated words as long as the total number of letters is seven or more. As you finish each page, look at the clock in front of you and write the time of completion at the bottom of the page where it says "Time Completed." Disregard the line that says "Number of Words" as it is used for something else. As you finish each page, place it outside the door where I will collect it. Do not wait until you have finished all ten pages, but place each page outside as soon as it is finished. You may not be able to complete all ten pages in the 15-minute time period, but work as quickly and as accurately as possible.

At the end of each 15-minute period, you will be asked to complete a short questionnaire. This will not be a test, but will give you a chance to tell us how you feel about what you are doing as the time progresses, and how we can improve working conditions for the next group of persons. Are there any questions?
C. Subject Instructions prior to T₂. High Interest Task

CRF-This study is funded through the Department of Mental Health. One of the stipulations they put on the use of the money was that we have to spend a certain proportion of it paying people who are helping us as subjects. We gave a lot of thought to ways of paying people, and finally decided that the fairest way of doing it would be to pay you based on your performance here. So starting with this next set of studies, we will give you 25¢ for each study you turn in which is correct. OK? This is really on the level; I won't come back and take the money away as part of the experiment.

VR-This study is funded through the Department of Mental Health. They became interested in what we were doing and asked us to test some of their case studies also, as they were thinking of starting a training program similar to ours. One of the stipulations they put on the use of the money was that we have to spend a certain amount of it paying people who helped us as subjects testing their studies. So, starting with the next set of studies, you will receive 50¢ for each one of the Department of Mental Health studies you turn in which is correct. So it will be fair to everyone, we have mixed their studies in randomly with the Ohio State studies for which you receive experimental credit. OK? This is really on the level; I won't come back and take the money away as part of the experiment.
NCP-This study is funded by the Department of Mental Health. One of the stipulations they put on the use of money was that we have to spend a certain proportion of it paying people who are helping as subjects. We gave a lot of thought to ways to paying people and we finally decided that the fairest way of doing it would be to give everyone the same amount. With the amount of money available, this comes to $2.00 per person. So here is your $2.00. OK? This is really on the level; I won't come back later and take it away as part of the experiment.

NP-No instructions were given.
D. **Subject Instructions prior to T2** - Low Interest Task

**CRP** - This study is funded through the Department of Mental Health. One of the stipulations they put on the use of the money was that we have to spend a certain proportion of it paying people who are helping us as subjects. We gave a lot of thought to ways of paying people and finally decided that the fairest way of doing it would be to pay you based on your performance here. So starting with this next set of pages, we will give you 25¢ for each page you turn in which is correct. OK? This is really on the level; I won't come back and take the money away as part of the experiment.

**VR** - This study is funded through the Department of Mental Health. One of the stipulations they put on the use of the money was that we have to spend a certain proportion of it paying people who are helping us out as subjects. We gave a lot of thought to ways of paying people and finally decided that the fairest way of doing it would be to pay you based on your performance here. The way we will do this is as follows: A number of pages were drawn at random. These pages were declared to be "money pages." For each one of these pages you turn in, providing it is accurate, you will receive 50¢. OK? This is really on the level; I won't come back and take your money away as part of the experiment.

**NCP** - This study is funded by the Department of Mental Health. One of the stipulations they put on the use of the money was that we have to spend a certain proportion of it
paying people who are helping us as subjects. We gave a lot of thought to ways of paying people and we finally decided that the fairest way of doing it would be to give everyone the same amount. With the amount of money available, this comes to $2.00 per person. So here is your $2.00 OK? This is really on the level; I won't come back later and take it away as part of the experiment.

NP-No instructions were given.
APPENDIX B

TASKS
A. DIAGNOSTIC TERMINOLOGY

1. Obsessive-Compulsive Reactions - These states are typified by the intense, irrational repetition of thoughts (obsessions) or acts (compulsions). The patient frequently is tormented by recurrent thoughts of illness, impulses to commit crimes or other anti-social acts, and sexual ideas that evoke anxiety and guilt. In addition to such obsessive thoughts, he may carry out a variety of compulsive acts such as dressing, eating and sleeping in some precisely defined manner by which he attempts to avoid intense anxiety.

2. Schizophrenia - This is a severe mental disorder characterized by general disorganization of the personality and marked distortion of reality. The patient's emotional life, thought processes, and behavior are all grossly disturbed and every phase of personality is affected. Symptoms of schizophrenia include:

   (1) Emotional disturbances such as inappropriate or no emotions
   (2) Withdrawal from the real world as indicated by a loss of interest in people and events and in some cases complete immobility
   (3) Absorption in an inner fantasy life which may include distortion of time and place
   (4) Delusions and hallucinations - particularly delusions of persecution or grandeur and auditory hallucinations (hearing voices)
   (5) Bizarre behavior such as peculiar gestures or movements that make no sense to an observer but are usually closely related to the schizophrenic's fantasy world
   (6) Disturbances of thought indicated by word associations that seem senseless to others; incoherent and disconnected speech; "made-up" words.

3. Conversion Reactions - These take the form of physical ailments like pains in different parts of the body, paralysis of limbs, blindness, deafness, or muteness, or even malfunctions of internal organs like kidneys or genitals. Conversion reactions are distinguished from deliberate simulation of illness in that the individual actually believes himself to be physically afflicted. These reactions may also be distinguished from physical disorders because (a) no organic malfunction can be identified to account for the patient's symptoms (b) conversion reactions often leave the patient with some voluntary control of a kind that makes his behavior inconsistent with that of an indi-
individual who has a truly organic disorder (c) these patients frequently appear unconcerned about their illnesses. These reactions usually result from anxiety; the patient finds physical and behavioral symptoms that allow him to avoid the anxiety producing situation and effectively reduce his anxiety to a level of comfortable tolerance.

4. **Manic-Depressive Reaction** - Patients suffering from this disorder show marked swings in mood from normal to depression, normal to mania or he may alternate between mania and depression. The depressive phase may be "agitated" during which time the patient shows tense excitement such as wringing his hands or gnashing his teeth, or "retarded" characterized by total inactivity or withdrawal from others. Delusions are present and are concerned with the patient's guilt and worthlessness, with the feeling that it is justly deserved and that he will never recover from it.

The manic phase may differ by degree of severity ranging from acute to delirious, but in any case is characterized by apparent high spirits and a degree of grandiose self assertiveness which seems oblivious to social pressures. In the delirious state, speech may become so swift and wild it is incomprehensible, with a rapid flight of ideas from one thing to another. The patient may be completely disoriented, not knowing or caring where he is, not knowing what is going on around him, insanely wild. He may be alternately shouting, screaming, singing, breaking things, pacing up and down, ripping his clothes apart, urinating on the walls, or throwing or smearing his excreta about the room wildly. Beneath the outward appearance of elation is a profound sense of depression.
B. High Interest Task

Case 1

K. F., a girl of 13, was admitted to the hospital with the following complaints: partial paralysis of the left leg, extreme nervousness, and a marked loss of appetite. She had been in good health until nine months prior to her admission when her symptoms first appeared. She reported that her leg suddenly gave way and felt numb and as if needles were pricking it. She was put to bed and subsequently was put on crutches. Things seemed to improve gradually until she had another "spell," whereupon she was admitted to the hospital. In the hospital she indicated a fear of putting any weight on her leg, but it was noted that she had full use of it while lying down. During psychotherapeutic interviewing, she told a story of a parental triangle situation. When reporting this incident for the first time she became extremely agitated and emotional. She said that three years earlier her mother and a roomer in their home had fallen in love. One night she heard the two of them talking about going away and taking K. F. with them. A few days later her mother and the man actually eloped together, only to separate temporarily until they could find an adequate living place in an adjacent state. K. F.'s father and sisters subsequently discovered the mother, who was temporarily living with her sister until the lover could find a permanent home. The mother was persuaded to return and there followed a violent series of charges and countercharges between the two parents. By the time K. F. was aware of the significance of this situation a divorce seemed imminent. K. F. and her sisters would spend evenings crying and praying together. Meanwhile the mother and father continued their nightly quarrels. When one of K. F.'s sisters threatened to commit suicide, the parental situation seemed to improve. By this time the roomer had returned to town and had taken up his domicile across the street, whereupon K. F.'s father threatened to shoot him if he ever came on the premises. However, the family situation continued to improve.

In discussing the intervening period between this incident and the onset of her paralysis, K. F. said she found any recollection of the situation difficult to think about. She became seclusive and melancholy, busying herself at home with housework and at school with her studies, but she only wanted to study and feared recess. She said she would become strongly apprehensive when the time for recess approached. It is of some significance to note that her second attack came just before recess time.

Diagnosis ______________________ Time Completed ________
Case 2

Billy R., 15, was referred for psychological help while being held in custody for the theft of a bicycle and automobile parts. He had a history of previous thefts and other difficulties. He had always been an aggressive child. In the first grade he was sent home from school several times because he disregarded the teacher's requests and frequently hit other children. At the age of twelve he was apprehended in school taking money from some of the girls' purses. No formal charges were made at that time and he did not get into any further difficulties at school.

There never had been any harmony in Billy's life. His father married his mother because she was expecting a child. Both parents rejected Billy from the start. There was some talk of offering him for adoption. Billy's father was dominating, strict, and unaffectionate. He never took any real interest in his son. The mother was a submissive and nervous person. She cried easily and was moody for long periods. There was constant bickering between the parents. A younger sister was the father's favorite.

As early as age three Billy began to get into trouble. He was defiant and frequently manifested severe temper tantrums. At five he started taking pennies and nickels for ice cream and candy. From time to time he stole articles of one type or another. Later he began stealing bicycles and auto parts and selling them.

A study of Billy's behavior indicates that he always felt very insecure and inadequate. He showed his resentment by aggressive behavior even in early childhood. On the basis of his feeling of rejection he unconsciously developed the attitude that "nobody is going to hurt me anymore, and I no longer care whom I hurt."

Diagnosis ____________________ Time Completed ________
Case 3

Sonny B. is a 17 year old boy who was sent to the Psychiatric Clinic after he used improper language on the telephone to the mother of a young girl he had called. The mother, who answered the phone, referred to him as "half-boy, half-girl." Sonny became enraged, and used obscene language in denouncing her.

When seen at the clinic, Sonny was a rather small, slenderly built man with very marked effeminate features and mannerisms. He spoke in a rather high and feminine voice, and his hands fluttered about in an effeminate way as he talked. He admitted to a history of transvestite behavior for a period of years, often appearing on the street dressed as a young woman. He has appeared at private parties as a female impersonator, and has engaged in striptease acts. Sonny said the performances are somewhat disgusting to him, since he dislikes exposing his body publicly to other males. He takes part in the shows only because he is paid for his act. He commented that while everyone tells him he looks and acts like a woman, he does not think he looks like one. He admitted, however, that he feels deep inside as a woman. He would really like to be a woman, and when he dresses in feminine clothing he feels as if he is a completely different person.

Sonny has three sisters, one of whom he described as being bisexual and having emotional attachments both to men and women. He volunteered that his second sister is a prostitute, but that his third sister is "O.K." His earliest and fondest memories are those of living in his grandmother's home where he was treated as a girl. He was permitted to play only with girls until he was thirteen, and his most cherished toys were dolls.

Diagnosis ____________________ Time Completed ________
Case 4

T. I. B.'s excessive cleanliness first showed itself at the age of 13 when it was noticed that he washed his hands many times during the day. Later he began to bathe frequently. Many times he stayed two or three hours in the bathtub. On a number of occasions he daubed iodine on this hands and face. He told his parents that he had scratched himself and wanted to prevent infection. In addition to iodine, he had bought mercurochrome and other antiseptics for use in "emergencies." He also used a boric acid solution to wash his eyes every evening. The parents stated that he refused to play ordinary games with other children because he did not want to soil his hands. When asked to explain his concern regarding cleanliness, he stated that he realized that he washed more than other boys, but that in his case there were real reasons. He believed that his skin was of such a texture that it retained dirt and grime, and he therefore was forced to wash and scrub himself.

No amount of persuasion was successful in deterring the boy from this until his original conflicts began to be solved. He stated that he had been greatly worried about his guilt regarding his previous activities with other boys. His parents discovered that he took part in sex play and punished him. They had frequently lectured him on the evils of "immoral" behavior and on one occasion, when he was nine, made him sign a pledge never to smoke or drink even beer. They also told him how some terrible diseases result from masturbation.

He stated that he had "sworn off" masturbating on many occasions, and after each time he masturbated he felt thoroughly ashamed of himself. He also believed that he was deficient in character and will power because he could not stop. He stated, "I know it's a dirty habit and if anyone finds me out they will think terrible things about me." After many interviews and much discussion, he began to change his attitude regarding the immorality of his past behavior and the possible consequences of his supposed moral transgressions. His excessive cleanliness gradually decreased and he was able to take part in the activities of other boys without feelings of unpleasantness from soiling his hands and clothes.
R. W. S. volunteered for the army to "cure myself." After 16½ months of service he entered the psychiatric hospital after having failed in an attempt to obtain a cadaver for "experiments in restoring life." The patient's story of his past life, when checked by social service investigation, turned out to have been a complete fabrication. He stated that he was an orphan who had "been on my own" since age 3. He told a long story of many beatings and hardships of life on the road. He said that he had finally become associated with the Ringling Brothers circus, first as a trapeze artist and then as a female impersonator. He stated that he had written many "true" stories about homosexuality and had published them in leading magazines. According to his story he had been on the point of signing a Hollywood contract when his "nervousness" became so bad that he joined the army, because "that's where the best doctors in the world practice."

From the social history it was established that he had been a well-behaved youngster, who had given no trouble until he was a junior in high school, when he was arrested for impersonating a female and sent to the reformatory for two years. When he was released from the reformatory, he apparently lived a vagabond life until his entry into the army.

In appearance the patient was a short, thin person who talked constantly during the interview and expressed considerable irritability if he was interrupted. He frequently wrinkled his face up in odd grimaces, and laughed in an incongruous manner. He stated that people had been trying to kill him for at least eight years. For the past five years, according to his statement, he had been gradually changing into a woman, and he will soon be able to have children. His whole appearance and manner of behavior are so feminine as almost to be a burlesque. On mental test problems his answers showed poor attention and an inability to maintain a direction of action long enough to complete the simplest sort of task.

Diagnosis ___________________ Time Completed ________
Case 6

At the time of admission the patient walked with his head down and was very slow in his bodily movements. He was meek and passive, and on several occasions tears ran down his cheeks. He was confused and poorly oriented as to place but was in contact with reality. It was difficult for him to talk, and no information could be secured from him. Informants dated the onset of the illness to a time about seven years previous. At that time the patient's mother underwent an appendix operation. The patient seemed then to be moody, quiet, and preoccupied with his own thoughts. He seemed easily distracted. This continued for four to five years. The patient's father then became severely ill, and at the same time his crops failed and his cattle died. The patient began to show more severe reactions; on some occasions he would be almost normal, while at other times he was greatly depressed. His appetite decreased and he began spending a great deal of time in bed. He was worried and discouraged. He never got around to carrying out any of his plans. He always was tired and had no initiative. As time went by he became more seclusive and took little interest in activities around him. He often sat around and stared off into space as if he were preoccupied. The outstanding symptoms were his depression and discouragement. Mood swings from normal behavior increased in both number and intensity. At times he would become restless and pace the floor, but most of the time he would sit around and stare off into space. He became extremely depressed and sometimes became completely mute, and would not speak to anyone. Eating ceased, and he was finally hospitalized.

Diagnosis ___________________ Time Completed _______
Case 7

E. C., a 17 year old girl, became convinced that her father and other people were trying to kill her. She felt extreme terror and showed it by such disturbed behavior that her father called an ambulance and she was taken to the hospital. The patient felt she was being taken to her death. When she arrived at the hospital she was exhausted yet wildly excited and resistive, her mind raced furiously. She was put in a small room which had only a mattress on the floor. She screamed, pounded on the door, tried to climb out of the window. She thought she saw fumes entering through small openings in the wall, was certain she was being gassed. She thought she was in Hell. She feared the mattress and kept walking in circles around it until she was so faint she could not stand. She slept not at all, stared out of the window, was certain a scandal had been made of her doings and that this was widely published. She thought her mother was in an adjoining room, since she heard her voice calling to her. At dawn, E. C. entered a day hall with other disturbed patients. This, she felt, was surely purgatory. She was dazed and afraid to talk, believing she would be heard elsewhere through the radio. She searched for members of her family, certain they must be present since she continued to hear them calling to her. She screamed repeatedly when she could not locate them and made tremendous efforts to get out through every door.

Diagnosis ____________________________ Time Completed _______
Case 8

"I had been feeling sort of tense all day—nothing out of the ordinary. My hands had been perspiring, and my head felt a little full and tight, and I didn't feel so comfortable and relaxed and in contact with people as I often do now.

I wasn't really prepared for what happened during the evening. I was sitting around with a small group of friends talking casually about this and that, when somebody mentioned something about homosexuality. Suddenly I began to sweat hard and my heart began to race; I could feel it pounding uncomfortably. I lost contact with everyone there and could pay attention only to myself and what I was feeling. I knew it was that homosexual business that had triggered it off, and I tried to get my mind off it, to tell myself not to be silly—there was nothing to be scared about.

By sheer will power I seemed to get control of myself, but I realized that I was more nervous now, even though I was talking with the group and trying to appear relaxed and at ease. I'm sure I looked relaxed enough and that no one knew what I was feeling inside. Somehow, I was afraid now of being afraid again; I was getting more and more anxious that someone was going to mention homosexuality again and set me off once more. To make a long story short, someone did and it really got me going. My heart began to race and pound; I began to sweat and felt as if I couldn't get enough air into my lungs. I can't quite describe that to you; it was as if something were expanding inside my chest and crowding everything else there out of the way.

I don't know what I was afraid was going to happen. It was partly a fear that the other people there knew what was going on inside of me and that I'd make a fool of myself. But somehow during all of it I knew that people couldn't really know what I was feeling, and they really wouldn't care if they did. But that didn't help; this unnamable terror just seemed to take hold of me and I had the feeling I just had to get out of that room. I had to move; I had to do something; I couldn't sit there any longer. I really can't tell you what I was scared of; not knowing was one of the worst parts of the whole thing. Well—I didn't move. I just sat there sweating it out, and pretty soon things began to quiet down. For the rest of the evening I was sort of tense, but I did not have any more of those terrible, panicky feelings."

Diagnosis ___________________ Time Completed _______
Case 9

A. N. was sent to the army general hospital from a field command for observation and treatment of a suspected brain tumor. He had complained of blinding headaches, dizziness, and a buzzing sound in his left ear. A neurological examination was essentially negative, although differences in the strength of reflex movements was noted, those on the right being weaker. Ophthalmoscopic inspection by the first physician who examined him seemed to indicate signs of increased intracranial pressure. A tentative diagnosis of a tumor on the auditory nerve was formulated, and the patient was scheduled for examination and operation by the neurosurgery department.

As a more or less routine procedure the patient was also seen by the psychiatrist and the psychologist. The psychiatrist noted that the patient was an immature-appearing "happy-go-lucky" boy of nineteen, who described his symptoms dramatically but with little apparent emotional involvement. The psychological examination included an intelligence test and the Rorschach (ink blot test). The intellectual level was "average adult," and no scatter was apparent on the subtests. (By "scatter" is meant the variation in test performance from one part of the intelligence test to another; scatter is often observed in individuals with some organic or psychotic impairment of thinking.) The Rorschach showed no organic signs, but did indicate the presence of anxiety. A recheck of the neurological examination and an examination of the patient by the eye clinic gave normal findings. The past history of the patient showed that a sister had died of a brain tumor, and that it had been located on the auditory nerve, giving much the same symptomatic picture as was presented by the patient.
Case 10

Frances P. was an unmarried typist, aged twenty-four. She was trying to control erotic fantasies which she could not repress. Her counter-measures put into practice the advice often given to adolescents who are struggling with sex problems, "Think of something else!" Walking to work was an activity that permitted erotic fantasies to emerge easily. So each time Frances stepped on or off the curb at a corner she made herself think of a different person. This kept her mind busy preparing for the next intersection. If she ran out of persons she allowed herself to change streets and start the list over again.

As this behavior became entrenched, it made Frances shun company to avoid having to explain her preoccupations and her zigzag course as she changed streets. She needed to concentrate upon the task of having names ready in time for the next block. The device failed, however, to eliminate all her erotic fantasies, it tended to sustain rather than to reduce her anxiety, and it kept her from the company of others.

In time the countermeasure generalized to other activities. As Frances dressed and undressed she found that she had to think of a different person with each article of clothing that she put on or took off. Later this became necessary for each mouthful of food, and for each act in washing dishes, doing laundry, and other housework. It began creeping into her office work, as she opened or sealed envelopes, filed away or got out letters, inserted paper and carbon in her typewriter, etc. Ultimately the countermeasure had to be applied to the details of typing—a different person at first for each new page, then for each new paragraph and line, and finally for each word. The girl had to give up her job.

Diagnosis Time Completed
Case 11

The patient, 29 years of age, was admitted to the hospital because he had been found unconscious and having convulsions. He was aroused within ten minutes and shortly thereafter had another attack which endured for eight minutes, but during which the pulse was full and regular. He returned quickly to consciousness, but his left arm was numb and the left handclasp was weak. The following day he was "nervous, weak, tearful, and quite restless."

On admission to the hospital, he complained that he could not gain his strength and had frequent "nervous spells." The history revealed that he had always been a moderately "nervous" individual who concealed his emotions and made every effort to cover up his timidity and fearfulness. His mother had frequent "nervous spells" and a quick temper. His father died after three years in a hospital, following a paralysis of the left side which was accompanied by strange behavior, including one or two efforts to kill his wife. The patient had been afraid that his life would follow the pattern of his father and believed that his symptoms might represent an illness similar to his father's.

Physical, neurological, and routine laboratory examinations were essentially negative. The neurologist reported that there was insufficient evidence to give the diagnosis of epilepsy to the patient's symptoms. Mental examination showed an ingenuous, suggestible individual who seemed more concerned with the dramatic features of his illness than with its medical significance. He greatly overestimated his abilities and minimized or obscured any personality trait which might be considered unfavorable. While in the hospital he showed no improvement.
Case 12

A 30-year-old college instructor was hospitalized soon after claiming that he was a "pope" and demanding that he be treated accordingly. "I've been made a pope and left to shift for myself," he complained. On inquiry, it became apparent that his delusions had begun two years earlier while he was a graduate student in a major university. He had been studying hard and living a life of social isolation in a desperate and unsuccessful attempt to earn a Ph.D. degree. One day he experienced "a delicious cold feeling inside" followed by a feeling that everything inside him was aflame, as if his heart had "opened up." This ecstatic feeling lasted for about six hours and he regarded it as the most wonderful experience of his life. He interpreted it as a religious call and for some months considered entering a seminary.

Meanwhile he became aware that he was being singled out for additional and special attentions. An airplane flew over his apartment several times and he decided that he was being buzzed. Grandiose ideas of reference appeared and he thought he heard strangers on the street making remarks such as "There goes the big shot" and "There goes number one." He applied for a number of teaching positions but was accepted at only two colleges which he regarded as inferior; he concluded that his correspondence was being censored and that he was being discriminated against unjustly.

In spite of his paranoid ideation, his intellectual performance was unimpaired and his abnormality was not recognized so that he was able to teach for more than a year. One day, however, he thought he recognized a nun in a teaching order as someone he had known a few years earlier and had regarded as very attractive. She was "too beautiful to have her talents covered by the robes of her order." He perceived her as a victim of circumstances like himself, condemned to "teach in the sticks." He did not speak to her but began to ponder how he might have her released from her vows so that he could marry her. He felt that she was being guarded very closely to prevent him from doing so. He decided that he was a pope who had the power to grant her a dispensation from her vows, and that their marriage would follow. His behavior now became increasingly bizarre.

On admission to the hospital he was serious and unsmiling and his manner was stiff and formal. The interviewing psychiatrist characterized him as conscientious,
ambitious and "intense." Asked what three wishes he would make if he could have anything he wanted, he replied:

(1) To get married to a girl who is a nun.

(2) People are calling me pope, and I'd rather have training to be that than remain a college instructor.

(3) ...One of the things that galls me is that I haven't got a doctorate--I've got more than enough credits piled up but I haven't been permitted to register.
Case 13

Philip, aged 32, was happily married and had two children. He was one of a corps of accountants maintained by a large Midwestern railroad. One Sunday, while attending church services with his wife and children, he was inexplicably overwhelmed by a fear that he was going insane. The more he attempted to pray or give his attention to the services, the more oppressed he became. He interpreted these phenomena as part of the process of losing his mind. Fellow churchgoers, thinking he was ill and in danger of fainting, urged him to leave the church and helped him to a chair in the vestibule. He soon began to feel better and by the end of the services was sufficiently recovered to take the streetcar home with his family. Once outside in the fresh air, he felt better and breathed a sigh of relief at finding himself still sane after so close a brush with the "hideous monster of insanity."

Everything went fairly well during the week, though he felt somewhat shaken. On the following Sunday, the family once more set out for church. As they approached the edifice, Phillip began to experience feelings of uneasiness and fear that he might again undergo the experiences of the preceding Sunday. Once inside the church, he again became oppressed by the feeling that he was going insane and knelt down hurriedly in the back and soon bolted for the door. After one more experience of this kind on a third Sunday, he resolved to stop going to church in the interests of his sanity.

Some weeks later when working at his books in his office on the thirteenth floor of a large building, he again became paralyzed with fear that he was losing his mind and was sent home by the office manager who thought he was ill. Later on, these incidents increased in number and intensity. He knew no basis for his fear, nor could he assign any for the paralyzing attacks of fear that seized him ever more frequently.

Diagnosis__________________________ Time Completed ________
Case 14

On admission to a hospital, a 26-year-old man complained, "I cannot take an order unless I get mad." His history showed that he was always considered "nervous and high-strung" as a child; that he was punished more than the average child; that most of his people considered him the "black sheep" of the family; that, when excited, he stuttered and stammered; that he walked and talked in his sleep; that he feared the dark up to the age of 19; that he had frequent bad dreams and nightmares; that he was hot-tempered and inclined to get into fights; that he felt as though nobody cared for him; that he was uncomfortable in crowds; that all of his symptoms became worse when he was "accused of a buddy's death;" that he completed the eighth grade at the age of 17; that he learned with difficulty and was in constant trouble with his teachers; that he ran away from home frequently; and that he was in frequent difficulty with the police.

Physical, neurological, and routine laboratory examinations were essentially negative. Mental examination showed he was tense, tremulous, hostile, sullen, and resentful. His interest and attention were entirely centered on the imagined wrongs suffered while in the military service. Speech was clear, coherent, and relevant, delivered in short clipped tones. He expressed extreme hostility toward the armed service and toward certain individuals in it.

There was no record of previous illness. He had combat duty in New Georgia. According to the patient's own statement, "I had at least fifteen court-martials and I have had three remitted."

Diagnosis ______________________ Time Completed _______
Case 15

The family history of this patient was noncontributory except the mother was high strung and nervous. The patient was an only child. Infancy was normal. She began school at 6 and in due time completed high school and normal school with an excellent record. As a child she was shy but had many friends. She was not a leader. Ordinarily she seemed congenial and happy, but manifested a "vicious temper" when crossed. Upon graduation from normal school she cared for her mother, who was ill and confined to the home, for about two years. She taught as a substitute teacher for several months.

About this time the parents noticed a change in the patient. She became nervous and irritable. She developed a critical and fault-finding spirit toward her mother, whom she had previously adored. Medical examination disclosed that she was suffering from hyperthyroidism and operative measures were advised. However, the parents sent her to California for a rest and change in environment. On one occasion she suddenly became very agitated, screamed, and cried. Further medical advice was sought, and she underwent a pelvic operation for "cystic ovaries and retroversion of the uterus." Immediately after this surgery she became acutely disturbed. She screamed, tore off her bandages, and became highly resistive. When she returned home, she grew gradually worse, lost interest in everything, could not concentrate, became extremely impulsive, talked in a rambling, incoherent manner, became extremely silly with apparently unmotivated laughter, and would frequently cry and scream. She refused food, was restless, agitated, and unmanageable so that she could no longer be cared for at home and was committed to a hospital. She continued to be resistive, negativistic, agitated, impulsive, destructive, and untidy. The following monologue illustrates her disordered stream of speech at this time:

"When was I born? April 1, 1915. I have a pair of roller skates. We take exercise. I went in the front door and out the back. I took a bath, lady. I studied physiology. They taught me to eat lots of milk."

To the accompaniment of silly giggling, she continues:

"Lady with the white dress" (meaning the physician) "my grandfather was drowned in a well. So was my grandmother. I was vaccinated for smallpox. I had a blood test taken, lady!"

Diagnosis ___________________ Time Completed ________
Case 16

A student was referred to the counseling service of the university by his academic advisor because of failing marks in a foreign language, grades which were at variance with A and B grades in his other studies. The student stated that he was not particularly worried about the poor grades, since "there's nothing I can do about it." He elaborated by explaining that the language class came at a late afternoon hour, and that since the first week of the school year he had been developing blinding headaches at about that time and had been unable to attend most of the class meetings.

Further interviews disclosed little concern for the headaches; he had not complained about them to the student health center nor to his own physician. He seemed to regard the whole situation as somewhat unfortunate, but he did not exhibit normal concern about either the language grades or the headaches. Study of his case showed a long history of difficulty with grammar and languages, dating back to junior high school. Since he had never learned the essentials of English syntax, he found the foreign language extremely difficult. When the connection between headaches and the feelings of frustration and insecurity with respect to the language was pointed out to him, he merely laughed and said it sounded as if that might be the case, but "it would take more than that to convince him."

Diagnosis __________________________ Time Completed _______
J.D.N. volunteered for the Army during one of his episodes of "bumping" about the country, volunteering largely because he didn't have anything else to do and had not been able to hold a job in civilian life and also because he thought that his many inventions would be of value to the Army. After six months of being observed as odd, inefficient, lacking in common sense, dirty, careless, unable to transmit orders, lacking in personal pride, tough, loud, mean, lacking endurance, bragging and talking to himself, he went AWOL for six months. It was also noted that he wet the bed, occasionally told fantastic stories, and drank excessively. During these drinking episodes he would become mean and dangerous and other soldiers were afraid of him at these times. He suddenly returned from AWOL, bumming his way back to his home station after war was declared, stating that he wanted to help his country. After two months in the guardhouse, during which time the above-noted behavior traits became more than the guards could stand, he was referred for psychiatric examination.

His past history reveals that he was raised by his grandmother who was showing signs of senile decay during the patient's childhood. The patient had been rejected by a mother and father who were criminals and drunkards. During his childhood, the patient showed many morbid fears of people, being injured while playing, animals, etc. He took an immediate dislike to school and was a continual truant. The children would call him "that queer guy, Johnny."

When he was 15, he was placed in an industrial school. He remained there 1½ years and completed, under duress, a sixth grade education. The social service report from this school states that the authorities there considered him "crazy." When he was released from the school, he started his life of vagabond independence, wandering around the country getting into many kinds of trouble. At one time he spent 15 days in jail for stealing his grandmother's clothes and her supplies from the relief agency. He worked one day for WPA but was fired. His sexual history is told with much enthusiasm and is extremely chaotic, with a history of much overt homosexuality and innumerable graphically described perversions.

Direct examination reveals a bizarre and woolly-haired person who is untidy, silly, and illogical. He rattles on at great length about being able to invent practically anything and particularly new types of bombs and shells. He is a bundle of morbid fears of spiders, high places, lightening, people, injuries, etc. He appeared to be having vivid hallucinations during the interview.

Diagnosis __________________________ Time Completed________
Mrs. S., a 34-year-old married woman without children, had spent ten years living in the home of her husband's parents despite her continued desire to live in a home of her own. She spent three months working at a summer resort after telling her husband before she left that she would leave him permanently if he did not provide a home of their own. Two weeks prior to her leaving, a visiting relative had reported her to be downcast, irritable and in tears over her husband's failure to do anything about moving. Upon her return from summer work she became involved in preparing for a town festival and spent little time at home. Just prior to her admission to the hospital she had gone to see her husband at his local lodge to see if he was there. When she encountered him, she smiled and left. Instead of going home she went to the local hotel and made the owner play cards with her until midnight. She then insisted he take her for a drive around town to look for her husband. When she arrived at home early in the morning she was laughing and singing, overactive and talkative, jumping from one topic to another. At 2:15 A.M. she heard a fire whistle blow, jumped into her robe and slippers and ran outside. When her husband finally found her hiding behind the door in another building it took him an hour to get her home. In a few minutes she was out again, walking up and down the streets, laughing and singing. Her husband finally got her home to bed by 6 A.M. but half an hour later she was up and about again. All the following day she talked, laughed and sang. She hit her husband in the face saying, "I told you this would happen!" On the following day her husband took her for a ride in their car. She playfully threatened to jump out while the car was in motion. All the next night she was up walking around the house with a dust mop, talking and singing. The next morning she was admitted to the hospital. During the following week her verbal behavior revealed her conflicting attitudes toward her husband and her continued unhappiness and anxiety. She said she would have a baby, conduct an orchestra and was an expert at bridge. Some weeks after her admission she returned home to spend a night with her husband. She quarreled with him and returned to the hospital next day in a tense, overactive and overtalkative condition. Following this episode she slowly recovered but had periods of irritability and anger.

Diagnosis_________________________ Time Completed ______
Case 19

Miss M. was referred to the university psychology department for a determination of auditory thresholds by a local otologist. She had complained of a persistent buzzing and ringing in her ears for the past five months. The symptoms had progressed to the point where they interfered with her work as a stenographer, since often she could not accurately hear dictation. Tests of pitch and loudness thresholds, however, showed no real loss of acuity. A series of interviews, aimed at tracing the psychological situation in which the symptoms developed, disclosed the following pertinent information. Approximately six months previous she had gone to a party at a friend's mountain cabin, and while more or less under the influence of alcohol and a moonlit night had engaged in a rather abortive attempt at sexual intercourse. The next day she experienced a panicky fear that she was pregnant and, after hurried consultation with some of her intimate girl friends, began to take large doses of quinine sulphate.

She continued this medication for two weeks, remaining in a state of fearful agitation. The quinine produced unpleasant symptoms of nausea and ringing in her ears. Her regular menstrual period then occurred, and she gradually recovered her normal spirits. Unfortunately the man who was a party to the original incident was an office associate and a frequent escort to dances, shows, and other parties. A mild "petting" experience with this man about a month after the original incident was followed by feelings of nausea and a return of her auditory symptoms, which became chronic and persistently annoying enough to prompt her to seek medical advice.

Diagnosis ___________________________  Time Completed ____________
Case 20

Macbeth

Act V  Scene I

Doctor: What is it she does not? Look how she rubs her hands.
Gentlewoman: It is an accustomed action with her, to seem thus washing her hands: I have known her continue in this a quarter of an hour.
Lady Macbeth: Yet here's a spot.
Doctor: Hark! She speaks; I will set down what comes from her to satisfy my remembrance the most strongly.
Lady Macbeth: Out, damned spot: Out, I say:—one, two: why then 'tis time to do't.—Hell is murky—Fie, my lord, fie: A soldier, and afraid? What need we fear who knows it, when none can call our power to account?—Yet who would have thought the old man to have had so much blood to him?
Doctor: Do you mark that?
Lady Macbeth: The Thane of Fife, had a wife; where is she now?—What, will these hands ne'er be clean?—No more of that, my lord, no more o' that: you mar all with this starting.
Doctor: Go to, go to: you have known what you should not.
Gentlewoman: She has spoke what she should not, I am sure of that: heaven knows what she has known.
Lady Macbeth: Here's the smell of blood still: all the perfumes of Arabia will not sweeten this little hand, Oh, oh, oh.
Case 21

M.R. was described as a rather dull and melancholy individual. One morning she was found in a deep sleep long after her usual time for awakening. After about twenty hours she arose, but was in an "unnatural state." She had no memory for any of the prior events of her life. To all intents and purposes she was like a newborn who for the first time saw the light of day. The totality of her behavior consisted of a few verbal utterances. She had to be taught all over again the use of language. She recognized no one and had not the slightest notion that she had ever existed prior to the moment of her awakening.

However, she learned rapidly about her environment and how to read and write. She never considered the members of her immediate family anything more than mere friends.

In her new personality her disposition was described as quite different. Instead of being melancholy and dull she was cheerful and happy, buoyant and social. A formerly retiring and taciturn individual she was now merry and full of humor. She loved nature and would arise early in the morning and spend all day in the woods and fields. This stage continued for five weeks when again, one morning after a long sleep, she awakened and was again her original self. She recognized her family as though nothing had happened in the intervening time. She had no recollection of the period through which she had just passed. Again after a few weeks, she awakened and resumed her second personality just where she had left off. The lapse between these two states seemed to her like the mere passage of a night. When informed of what had happened she was not depressed but cheerful. These alternations continued in intervals of various lengths for the next fifteen years. At the age of thirty, she resumed the second personality and remained permanently in that condition for the rest of her life.

Diagnosis _____________________ Time Completed _______
Case 22

"I don't recognize my body. The other day, I lay in bed, and I actually felt petrified. My head feels like wood. When I strike my head, it seems feelingless—I have to feel myself to know it's me. I have no illusions, but everything seems so unreal. In the beginning I had different sensations go through my head but now it's a blank. It feels like a vacuum. Sometimes in bed, I raise my leg and look at it. Yes, it's me, but it doesn't seem like me. At times, I wish I had some anxiety, so that at least I could "feel" something that was normal. It may seem funny to you, but I am happy when I sneeze; it's something real. I'm even envious of people who have headaches, because those are real.

Only my dreams seem real to me. I dream of business deals, of people I meet, and they seem real to me, in my dreams—so it seems when I awake—but when I'm awake the real world seems unreal.

I look at people and they seem so small, so insignificant. I went to church and people were like shriveled-up little creatures. And I couldn't pray as I used to, with fervor. Now my prayers are just the repetition of words; I have no feeling in them. Then at times, my brother-in-law looks so large and powerful to me, because he can get up in the morning and go to work, and all I can do is lie there in bed, and feel like wood. When I try to have intercourse with my wife, she seems so immense, so big and strong, and I feel so weak and puny. (The patient was six feet tall and weighed 210 pounds—his wife, five feet, two inches, weighed 122 pounds.) The world seems so big and the people so small."

Diagnosis ____________________ Time Completed _________
Ralph W. was a law student who had been under constant pressure for several years. During each semester there had been the threat of failure. When he would manage to get by each term, the future only brought more threats of the same. At the time for graduation approached, the thought of the embarrassment of flunking out became more intensified. He was concerned not only with the disappointment this would be to his family, but with the years of his life he would have wasted.

At the time Ralph had entered the university as an undergraduate seven years before, his original aspirations had been to become a medical doctor. But the first semester in college soon led him to realize that courses in science were not his "forte" and he had better pursue another course of study. Throughout college, however, he had been a chronic worrier. When he was not worrying about failing an examination, he wondered about the difficulty of setting himself up in law practice if he ever did graduate. He wondered if he would ever win a case and how nervous he would get when it came to defending a client in court. Before graduation, he had pretty well decided to stay out of trial law.

In this setting of chronic anxiety, as the stress of final examinations approached, Ralph's reactions became intensified. He recalled that when he was in high school one of the examining physicians had mentioned a slight heart murmur, but consequent medical examinations had failed to substantiate this earlier observation. The night before his final examinations Ralph had what he thought was a heart attack. He knew he had a bad heart and thought he was going to die. He called for help and was taken to the university infirmary where an examination showed only that he was in a heightened emotional state.

Subsequently, Ralph had a number of attacks. They were usually unpredictable. He never knew when they would come and he would avoid crowds for fear he might faint or suffocate on the spot. Although medical examinations had assured him that there was nothing wrong with his heart, he nevertheless persisted in his fears.

Ralph managed to take and pass his final examinations, but on commencement day his family realized he was in a state of intense anxiety. He said he was worn out, his face was drawn, and he was irritable and jumpy. He would tell people off at the slightest provocation.

Diagnosis __________________ Time Completed ________
A young girl, age 20, who had been employed as a nurse, was admitted to the hospital in a restless, agitated condition. A few minutes later she was smiling and happy. She spoke in a simple, childish way, said she wished someone would do an operation on her head and make her well. She said she worked in various hospitals but would not continue steadily at her job because she seemed always to be working in a maze. She admitted hearing voices and they annoyed her dreadfully. She behaved in such an excited manner and made so much noise that she had to be removed to a private room. Gradually her excitement subsided, but she continued hearing many voices. She explained she had two voices; the one with which she was speaking was called her "top voice" and what she said with this voice was true; but there was a second voice, her "under voice," and this she believed was what her listeners heard which replaced her "top voice." Consequently people got false ideas about what she said since they believed the "under voice." She also believed the doctors used her as a "medium" to affect other patients.

As her condition deteriorated, she would wander about in a restless, aimless way. She would clutch the visiting physician by the arm. Her speech gradually became incoherent; her sentences being composed of detached words and phrases which had no relationship to each other. An example is as follows:

"Losh, I don't know what it is you see--she says--I don't know. I'm sure. There's Cinderella. There is much better play than that. I don't know, I said. He is an awful idiot. O dear, God, I'm so stupid. That's putting two and two together--saying I really don't know, saying Cathie, and so I observe and flowers. An orange, and shoe laces. They like may hair bobbed and I'm so stupid. Contrary Mary. Statues at Copeland and Lye's. Oh, I said, 'Yes, yes, yes. I'd go off to sleep immediately afterwards I said, 'I know quite well.' 'Nothing,' I said. I forget all that I saw next."

A sample of her letter writing shows further the process of deterioration:
"Der Sir,

I have just had dinner. I ate my dinner the monkey and I feel better change I. Nurse is alway making the tea. Betsy's nurse. Wearing for a cup of tea. Bathing patient.
(Ogalvive)
Your
I j g u
gins Druce
Yours
sincerely,

P.R.
Mrs. L. T. was a young married woman, 27, who lived in a small Midwestern town. She was president of her garden club, worked in the P.T.A., taught a Sunday School class, and played golf every Thursday afternoon. Her health had always been excellent, and she had never shown signs of emotional instability although she had mood fluctuations that were mild and at most went from a sort of sadness to a pressure of activity sufficient to accomplish the tasks expected of her in her personal and community life.

One morning she found it necessary to drive to a neighboring town to do a small errand in connection with her church work. After completing the errand, she started back home, feeling unusually happy and light-hearted. The thought flashed through her mind, "What a nice day to go on a trip," and then, "I've enough money in my pocketbook (she had been collecting funds for her church) to take me anyplace at all." At the next crossroad she turned her car, and without knowing or caring where the road led, started driving at a high rate of speed, her feeling of joy and release mounting. She drove all the rest of that day and all through the night, stopping only for gasoline, not feeling fatigued and not worrying about home or her husband. Somehow she managed to reach Chicago without meeting the police. She stopped her car in the middle of a busy Loop street, and with the ignition keys in her hand, walked to the curb and stopped a man, saying, "Hey, sexy, want a good car? Here." She then handed him the keys. She disappeared in the crowd, made her way to a department store and created a scene in the women's clothing section by wildly insisting on being served ahead of other customers and then stepping out of a dressing room clad only in her undergarments. When the clerks attempted to detain her and call the police, she attacked, pulling hair and screaming. By the time the police arrived, she had disappeared with one of the store's coats on.

Her next stop was a cocktail lounge in a small hotel where she made amorous advances to the bartender, and interpreted his air of cool neutrality as a rebuff. She hurled a glass at the bar mirror shouting obscene remarks. She was taken to the police station where she attempted to tear off her remaining garments, tried to make love to the police, wanted to be made a policewoman, insisted that she was the "spirit of youth," howled obscene comments about the police surgeon's ancestry, laughed hysterically, talked wildly of suicide, and attempted to reveal the intimate details of her marital love life.

Diagnosis ____________________ Time Completed ________
Eliot H., a college student, went to a telephone booth to call up a wealthy girl whom he had recently met to ask her for a date. He spent an hour there, anxious and indecisive, unable to put the coin in the slot and unable to give up and go home. Each time his hand approached the telephone, he anxiously withdrew it because he felt that telephoning her might ruin his chances with her. Each time he withdrew his hand he seemed to be throwing away a golden opportunity. Every positive argument for telephoning her he matched with a negative argument for not doing so. He went into all the ramifications of his ambivalent motivations. He imagined to himself what the girl and the members of her family--whom he scarcely knew--might think of his attentions to her; and then he had to picture to himself what they would think if he neglected her.

His whole future seemed to Eliot to hang on the outcome of this little act. Had he any right to put his coin in? If he did so would the girl respond favorably? If she did, what would happen next? Eliot fantasied every conceivable consequence as he sat there sweating in the booth, consequences to him and to her, on and on into remote contrasting futures. He was helplessly caught in a dilemma, as he had been caught before hundreds of times. The more he tried to be sure of what he did, the more things he imagined going wrong, any one of which might ruin everything. In the end he gave up the anxious debate and went home, exasperated and worn out. Later he became convinced that in not making the call at that particular time he had missed the chance of a lifetime for winning security and happiness.
A 16-year-old boy was brought to the hospital by his parents because of unusual behavior. The boy's early history was not significant. He was always active and interested in things and never showed any tendency toward daydreaming or solitary activities.

During the previous winter, he had become increasingly active. He was in his last year of high school, since he had taken more than the usual course throughout. He had begun to talk of college. He had written dozens of schools, obtaining information, and had talked about all the things he wanted to do, settling on a different professional career almost every day. He then suddenly dropped the idea of college and talked about taking up flying and this had occupied his attention for some weeks.

About a month before admission he told his mother that he was sure that he was sick, and asked her to take his pulse. Because he showed no evidence of physical illness, his family laughed at him. Without any further warning, he disappeared from home one night. He was found the next day in a town some miles away and said he had slept in a tree all night. When he was brought to the parents' home he was very overactive, would start to say or do something but would never complete it. He began to lose all interest in his personal appearance, refusing to wash and change his clothes. He began to develop peculiar actions, strut ting about and declaring he was Hitler and Mussolini, and imitating various characters in the comics.

After two weeks of this behavior, he suddenly cleared up and became apparently normal for a period of two weeks. He then had a recurrence of his previous behavior and was brought to the hospital. His activity there was constant. He talked continually, showing a very marked flight of ideas and distractibility. He was so lithe that it was difficult to restrain him, and he took large doses of sedative without any visible effect. He would appear to be thoroughly restrained and at rest, but after a few minutes he would be found out of bed, the bed stripped and the clothes scattered all about the room. On one occasion he completely took the bed apart, even removing the coils and bed springs. He was always cheerful and would willingly do what he was asked, only to assume his old behavior again in a moment. He refused to keep anything on him and was naked most of the time.

Diagnosis __________________________ Time Completed ___________
Mrs. X and her husband were driving with several other people to attend a plowing contest. Riding in the back seat, she complained of feeling car-sick and her husband suggested that they change places and she drive. She drove until a warning signal at a railroad crossing indicated an approaching train. She stopped, but the car behind failed to see the signal, ran into her car and pushed it onto the tracks. Her car stalled and she was unable to start it. At the last moment she yelled for everyone to jump out. Her husband and his sister, both in the back seat, were unable to get out in time. The sister-in-law eventually recovered but her husband was killed instantly.

For a day or two after the accident, the patient seemed numb and in a state of shock. However, by the time of the funeral she appeared to have recovered her spontaneity and two days later suddenly became quite euphoric. She stated that her husband was far happier with the angels than with her. She bought a new car and drove it so recklessly that friends and neighbors became concerned. She bought a tractor and truck, new clothes, an electric blanket, new beds for her family, a new furnace and insulation for her house. She bought a freezer for her sister and beds for a neighbor. When asked how she could pay for everything she said she was going to get $100,000 from the man who had pushed her car onto the tracks. For the next several days she was talkative, laughed a great deal, told crude jokes, called herself the "Merry Widow," acted self-importantly and uninhibitedly called people to account. She phoned people at such unusual hours as 5 A.M. to come visit her or to suggest that she visit them. She lost control of her temper and threw a butcher knife at one of her children. She struck a three-year-old nephew and then promised to take out a large life insurance policy on the child because he did not cry. She was too busy to eat properly and too active to sleep at night. Two weeks after the death of her husband, her relatives puzzled by her potentially dangerous behavior had her committed to a hospital.

On arrival she was vivacious and animated but very angry at being hospitalized. She drew up a list of people whom she planned to sue and another of people to whom she intended to give a thousand dollars each. She wrote a letter to tell a female friend that she was stupid and was not to visit her again; another to a bachelor whom she had decided to marry; and another to the son of a patient to tell him his mother was not being looked after properly.

Diagnosis __________________ Time Completed _______
Frank was always a rather unstable and unreliable personality. These character deficiencies became more pronounced as years passed by. He was third of a family of three children, all physically normal. Frank's brother and sister have become successful and capable citizens. The entire family were devout Catholics. Frank decided at the end of high school that he would like to be a priest and joined a well-known congregation. After two years he transferred to another organization and in a few years dropped all study for the priesthood. He married soon after. Two children were born of this marriage. His wife, a rather simple and naive sort of person, soon learned that she was married to a man capable of the most irresponsible, unpredictable behavior and unbelievable infidelity.

He was physically attractive and biologically perfect. He was intelligent and likable. He had earned an A.B. and an M.A. and was intellectually capable of more advancement. He was a smooth and convincing talker. Soon after taking a position in his home town, his wife and mother were horrified to learn he had passed numerous worthless checks. They spent everything they had to protect him. He took a traveling salesman's job. In a short time he had married four girls in four different towns and given them all his correct home address. His home was swamped with wires and letters of love and complaint from his scattered wives. He wrote more bogus checks. He participated in shady deals. He neglected his wife and children. Finally friends and relatives forced him to leave home and go West.

One day he unexpectedly appeared at the home of an acquaintance in a Western town. In a short time his newly acquired friends were holding thousands of dollars worth of bogus checks. An old aunt had a few thousand dollars left by her husband to care for her until death. One night he borrowed the money and, in a few days, spent it all on wild schemes. He left the old lady penniless. Soon social agencies complained that he had abandoned his wife and two children. In the meanwhile he was planning another marriage. He borrowed his intended wife's car and hurriedly visited his four wives scattered around Midwestern towns. His forgeries and other dishonest dealings began to catch up with him. His first wife sued him for divorce. It seemed apparent that he would soon be arrested so he deemed it advisable to leave, and did so. However, at his new destination his first worthless check landed him in jail from which he wrote piteous, unavailing pleas for help. He was soon released, left town, and started another train of marriages and forgeries.

Diagnosis _____________________________ Time Completed _____
A 37-year-old woman was admitted to the clinic with complaints of strong urges to steal, although the items taken were of little value (pencils, pens, and small amounts of money). She expressed no guilt in connection with her stealing but was disturbed over the intensity of her urges. A fear of electricity, especially electric light sockets, had also developed and with it a need to check and recheck whether various lights and electric appliances had been turned off. She also had to check that all doors were shut and reported washing her hands and genitals many times each day in order to be sure that they were clean. Whenever one of these thoughts or actions ceased another took its place. On one occasion she felt that her behavior was under the control of some external force, but this transient delusion of influence persisted only briefly. Sometimes she felt depressed but her depression was not severe enough to be considered psychotic and there were no thoughts of suicide.

Her history revealed a lifelong pattern of severe emotional deprivation and stress. She was the product of wealthy but unstable parents. The father was syphilitic and had many attendant physical and emotional problems. The mother was afflicted with severe tuberculosis which resulted in frequent and prolonged hospitalizations. During these times, the patient usually stayed in a boarding home. In addition, the mother suffered from migraine headaches and was described as nervous, high-strung, quarrelsome, friendless, overly strict, and not close to her children. Some of her actions were quite bizarre; for example, she did not wash for long periods of time and invariably used a wash basin as a toilet. The mother was so cruel and harsh in her discipline that the patient came to hate her and to pray for her mother's death. She was often told by her mother that she was weak, stupid and ugly.

The patient's sexual experiences included being left in a boarding home in which she shared a single bedroom with the landlady and three other boarders, with the landlady entertaining men at night. Once she shared a room with an older girl who introduced her to mutual masturbation and stealing. After returning home she would stay awake at night until her parents went to bed. If either parent went to the room of the other she would scream and cry, and this resulted in severe reprimands or punishments by the mother. At 13 she began to masturbate and to have migraine headaches for the first time. When she later confessed her masturbating practice to her mother she was told the practice would result in insanity, that she would never be clean again and that she was just like her diseased father.
Hugh W. was a 43-year-old business man, father of four children, when he was brought to the psychiatric clinic by his wife. She said he was deeply depressed and could not work. He said he was a disgrace to his name and was better off dead. He complained of depression, failure, and loss of self-respect. He sat slumped in a chair with his chin resting on his chest. He looked like a sick man of sixty years instead of a man of 43. After his first statements, he spoke only in response to questioning and his statements were brief, sometimes inaudible. His wife said he had never recovered from his mother's death five months previously. She had died of cancer and at the time of the discovery of the disease, Hugh was stunned and wondered why it had not been discovered earlier. He first blamed the doctors, then himself. He said if he had paid more attention to her, made her have medical check-ups, it never would have happened. Following her funeral, Hugh remained extremely melancholic. He was unresponsive to his family and chronically tired. Sex interest disappeared. Hugh's wife accepted all this as expressions of normal grieving of a favorite son over the loss of his mother. However, as time went on Hugh did not get better. He was usually silent at dinner; when he did talk, his conversation was forced and everyone felt uncomfortable. One evening Hugh left the house but was brought back. He said he had reached the end of his road. He was as good as a murderer. He was worthless and not good enough to stay in the same room with his wife. At this point she brought him to the clinic. At the clinic he moved slowly, his head was bowed and his body stooped. He ate and slept little. His delusions of self-depreciation and unworthiness became intensified. He told his wife to take the children and start a new life somewhere else. He began to develop slight persecutory delusions saying that everyone hated him and he felt he had been dishonest and would be put in prison.

Diagnosis _____________________ Time Completed ________
Case 32

P. R., a married 38-year-old man, was admitted to the hospital in a state of great excitement. When his wife had left, the patient bounded down the hall, threw his medication on the floor, leaped up on a window ledge and dared anyone to get him down. When he was put in a room alone where he could be free, he promptly dismantled the bed, pounded on the walls, yelled and sang. He made a sudden sally into the hall and did a kind of hula dance before he could be returned to his room. His shouting continued throughout the night, and showed in its content the ambivalent attitudes which the patient maintained toward his hospitalization: "What the hell kind of place is this? A swell place? I'm not staying here. I'm having a hell of a good time. Oh, I'm so happy. I have to get going. My gray suit please, my gray coat please, my gray socks, all gray on their way, going to be gay. I'm going out as fast as I came in, only faster. I'm happier than I have ever been in my life. I'm one hundred percent better than normal."

The following morning, after almost no sleep, the patient was more noisy and energetic than ever. He smashed the overhead light with his shoes and ripped off the window guard. He tore up several hospital gowns, draped himself in a loincloth made of their fragments, said he was Tarzan, and gave wild jungle cries to prove it. "I've tasted tiger's blood!" he roared. "I'm a success and I'm the man for the boss's job. I've made a killing and this time I will keep on going." He made amorous remarks to the nurses, accused them of flirting with him and announced loudly, "At the present time I am not married; but my body is not for sale, regardless of the price."

Diagnosis ______________________ Time Completed_______
S. E. was admitted to the hospital from the city jail, where he had been serving a sentence for "peddling without a license." The jail physician had recommended psychiatric observation after the patient had told him a story of being the Swedish ambassador to the United States who was traveling around the country in disguise to study "conditions." In appearance, S. E. was untidy and disheveled, a small man who appeared to be about 45 years of age. He stated his age to be "six thousand and twelve," and said that he was the owner of the whole "continent of Sweden under God." He claimed that the medicine he was selling from door to door was made from "the innermost private essences of time without end, amen." For over a thousand years, according to the patient, evil men had been trying to get his secret of perpetual life and even now were "operating on him." He said that he had discovered a super-radio with which he could tell where his enemies were, and that at the proper time he would "order the armies into action" and give his whole fortune of several billion dollars to the support of "genuine Swedish Christianity." He maintained that he was not bothered by being placed in jail or being taken to the hospital, because his "super-ordered powers" would enable him to walk out through the thickest walls at any time he chose.

Diagnosis ___________________ Time Completed ________
Ramona M. was the 42-year-old wife of a Minnesota business man and the mother of three children. Her symptoms appeared suddenly. She was serving the family dinner one evening when she dropped a dish on the table and smashed it. The accident appalled her. While clearing up the fragments she was seized with an unreasonable fear that bits of glass might get into her husband's food and kill him. She would not allow the meal to proceed until she had removed everything and reset the table with fresh linen and clean dishes. After this her fears, instead of subsiding, reached out to include intense anxiety over the possibility that she herself and her children might be killed by bits of glass.

The patient's fears and rituals did not stop with this. Ramona developed an irresistible need to examine minutely every piece of glass ware that she handled. If anything had the slightest chip in it she threw it away; and she had to carry it to the trash can herself to make sure that it went out of the house. Then she would hunt for the missing chip which, of course, she could rarely find. She had read somewhere that copper pots and aluminum pots were not safe for certain kinds of cooking. Her worries now included their use. She remembered that her wedding ring had some copper in it as well as gold. First she took it off whenever she cooked or washed dishes; then she lost it.

Meanwhile she heard about other things which raised new fears and touched off further compulsive countermeasures. These included the danger of a spread of virus disease from toilet to kitchen, the dangers of lye and pesticides, and of the chemical and organic fertilizers used on the lawn. Eventually all potential poisons of every kind had to be isolated from cooking utensils and dishes by storing them in the garage—even the cleaning fluids and scouring powders needed for everyday washing and cleaning.

These endless precautionary rituals drove the family almost frantic. Yet they brought Ramona no lasting peace. Her list of potential dangers kept growing until she simply did not have enough attention to bestow upon them all. If she was not certain that she had or had not done something in a certain way, she would have to rehearse her steps to make sure, or else begin all over again.

Diagnosis ___________________ Time Completed________
O. A., prior to his hospitalization, had his life ordered in the most minute detail. He arose in the morning precisely at 6:50, took a shower, shaved and dressed. His wife had breakfast ready precisely at 7:10 and followed a menu which he worked out months in advance. At exactly 7:45 he left for the office where he worked as an accountant. He came home precisely at 5:55, washed and read the evening paper, and had dinner precisely at 6:30, again as per menu. His schedule was equally well worked out for evenings and weekends, with a movie on Tuesday, reading on Wednesday, rest on Monday and Thursday, and bridge on Friday. Saturday morning he played golf and Sunday morning and evening he attended church. Saturday evening usually involved having guests or visiting others. He was fastidious in his dress. Each shirt had to be clean and unwrinkled, his suit pressed every two days, and so on. His demands, of course, also included his wife who was inclined to be easy-going and was upset when he "blew up" at the smallest variation from established routine.

By means of this carefully ordered existence the patient managed to make a reasonable successful adjustment until he became involved in a business deal with a friend and lost a considerable sum of money. This proved too much for him and precipitated a severe anxiety reaction with considerable agitation and depression necessitating hospitalization.

Diagnosis__________________________ Time Completed _______
Case 36

F.K. is a 50-year-old married man who developed a marked contracture of his left hand, and a partial paralysis of his arm. He held his arm bent in front of him, as if it were in a sling, and his fingers were curled inward toward the palm of his hand. He could raise his arm to the level of his shoulder, and there was a slight movement in his fingers.

The symptoms came on suddenly, and though he consulted numerous specialists, he did not respond to treatment and the symptoms remained unaltered. It was at this point that he was referred for psychological treatment.

The psychological evaluation of F.K. revealed that he was a well-to-do executive, that he was married to an attractive and considerably younger wife, and that while he seemed anxious to be cured of his disorder, there was nevertheless a remarkable casualness about it, and one sensed that the patient took a certain pride in it. He displayed his hand and arm with some satisfaction, demonstrating the lack of feeling by touching his lit cigarette to the back of his hand to show he felt no pain.

In the interviews it was found that F.K.'s young and attractive wife was fond of parties and nightclubs, while the patient merely wanted to come home at night, have dinner, read his paper, and go to bed. The difference in age and interests resulted in serious conflict. Finally, the wife began going out without her husband. It was at this point that the symptoms appeared.

The paralysis served a number of purposes. It gave F.K. a good excuse for staying home at night while it also forced his wife to spend more time with him at home in the evenings. Moreover, the paralysis brought the patient the sympathy and attention of friends and relatives. Previously, being a rather colorless and uninteresting person, he had been overshadowed by his attractive and vivacious wife. Now he was the center of things. Finally, because the patient was jealous of his wife and suspected her infidelity, he used his symptoms as an excuse to come home from his office at any hour of the day. Sometimes he would return home, complaining of his arm, an hour after leaving in the morning.

Diagnosis ________________ Time Completed ________
Case 37

E. D., 60, was admitted to the hospital because he was depressed, ate insufficiently, and believed that his stomach was "rotting away." The patient is described as a friendly, sociable individual, not quarrelsome, jealous, or critical, and possessing a sense of humor. He was considered even-tempered, slow to anger, tender-hearted and emotional.

At 55 the patient suffered from a depression when he was obliged to resign his position. This depression continued for about nine months, after which he apparently fully recovered. He resumed his work but after two years suffered from a second depression. Again he recovered after several months and returned to a similar position which he held until two months before his admission. At this time he began to worry for fear he was not doing his work well, talked much of his lack of fitness for his work, and finally resigned. He spent Thanksgiving Day at his son's in a neighboring city, but while he was there he was sure that the water pipes in his own house would freeze during his absence, and that he and his family would be "turned out into the street." A few days later he was found standing by a pond, evidently contemplating suicide.

He soon began to remain in bed and would sometimes wrap his head in the bed clothing to shut out the external world. He declared he was "rotting away inside" and that if he ate, the food would kill him. He urged the family not to touch the glasses or towels he used lest they become contaminated. On arrival at the hospital he appeared older than his years. He was pale, poorly nourished, dehydrated, with his lips dry, cracked and covered with sores. His facial expression and general bearing suggested a feeling of utter hopelessness. He was self-absorbed and manifested no interest in his environment. When urged to answer questions, there would be a long delay before attempting to answer but he would finally speak briefly, hesitatingly, and in a low tone. In explaining his presence in the hospital he said he realized he had been sent by his family because they believed he would be benefited by the treatment, but added, "I don't know how they can send me here when they have not the means. My wife cannot pay for me and by this time she must have been put out of the house."

After several months the patient began to improve. Sometime prior to his being released he commented, "There's
a good deal of life in the old horse yet." A month later he passed into a mild overactive state. He became alert, animated, talkative, exuberant in spirits, and confident in manner. This continued for about two months when he settled down into what seemed to be his normal mood and state of activity. After a few weeks he was discharged but several months later he again showed signs of depression and hanged himself before arrangements for recommitment had been made.
A former Hollywood cameraman had been drafted into the army much against his will and with a very great loss of income and status. He was assigned to an Air Force training center as an instructor to aerial photographers. One afternoon, while demonstrating the proper placement of arc-lights for the best effects in taking motion pictures, he complained that the brightness of the lights hurt his eyes. Within half an hour he reported that he was unable to see and was led to the station hospital. Examination showed his pupils to have normal reflex reaction to changes in light intensity. When a moving object suddenly approached his eyes, he would blink, yet claim that he had seen nothing. He spent a month in a general hospital without improvement. On the day he came before the medical board and was informed that he would receive a medical discharge from the service he first reported that he could dimly perceive the outline of objects; by the time he was ready to leave the hospital for Hollywood his vision was practically normal again. The personal gain from symptoms was obvious in this case to the point of casting grave doubts on the validity of his symptoms. A series of interviews under hypnosis, however, showed that many of the determinants of his symptoms were quite independent of his army experience, and that the army had served merely as a precipitating factor to an illness that would possibly have occurred under other conditions equally frustrating.
A landlady in a small college town complained to the university authorities that one of the students rooming at her house spent so much time in the bathroom that other roomers were suffering considerable inconvenience. An interview with the student disclosed that he felt his hand-washing must be completed before he could go out of the house, or before he could study, or before he could retire in the evening. He had first to soak his hands for ten minutes, alternately in hot and cold water, then vigorously brush them with a stiff brush and strong soap, soak them for another ten minutes, and repeat the washing procedure. He could give no adequate reason for his behavior, but he knew from painful experience that if he did not carry out the sequence he would be restless, uncomfortable, and anxious.

The symptoms had started only within the past year, although he said he had always been afraid of "germs" and, even as a small boy, had never been comfortable on camping trips or doing any kind of work that involved dirt. During the war, he had been an enlisted man in the Quartermaster Corps and had been assigned to the Graves Registration service. His group had performed their somewhat grisly duties in an area where battle losses were high and where many badly dismembered and mutilated bodies had to be searched for identification and then buried. While the patient had reacted strongly against such work, he had managed to perform his duties without incident. It was after his return to the United States and at about the time of his discharge from the Army that the handwashing began. Further interviews revealed that the patient suffered from intense feelings of guilt during his army experiences because he was in such "safe" work, and each time he assisted in the recovery of a body and in a burial he became more impressed with "the unworthiness of people who were not engaged in the actual fighting."

Consciously he tried to reassure himself by noting that the disagreeable nature of his own work was in some way an atonement for his "avoidance of duty." In spite of this rather obvious fact he came out of the army with a strong feeling of guilt. Out of this background the hand-washing appeared as an apparent attempt to dissipate anxiety, to "cleanse himself of guilt."

Diagnosis ___________________ Time Completed ________
A. J. was always extremely shy and, as a small child, would run away and hide when visitors came to the house. He had one or two boy friends but as a teenager he never associated with girls and did not enjoy school parties or social functions. He had few interests and did not engage in sports. His school record was mediocre, and he left high school at the end of his sophomore year. The principal felt that he "could have done better" and remarked about his "queer" and seclusive behavior. Shortly before leaving school his shyness increased considerably. He expressed fears that he was different from other boys and complained that the other children called him names. He became untidy, refusing to wash or wear clean clothes.

After leaving school A. J. worked at a number of odd jobs but was irregular in performing his duties and never held any one job longer than a few weeks. He finally became unemployable and stayed home, becoming more and more seclusive and withdrawn from community and family life. He would sit with his head bowed most of the time, refused to eat with the family, and when visitors came would hide under the bed. He further neglected his appearance, refusing to bathe or get a hair cut. He occasionally made "strange" remarks and frequently covered his face with his hands because he felt he looked "funny."

The psychiatrist who interviewed the boy when he was brought to a local mental hygiene clinic at the age of 17 noted frequent grimacing and silly and inappropriate smiling but found that he was correctly oriented in terms of time and place and could answer questions coherently in a flat tone of voice. He complained of having recurring thoughts but denied any hallucinations or delusions. He expressed a wish for help so that he could go back to work.
Case 41

The patient was hospitalized at the age of 18. During the preceding year there had been a gradual disintegration of personality evidenced by inappropriate laughing and giggling, bizarre conversation and failure in school.

She was the eldest of four children, having a brother and two sisters. Her mother stated that the patient felt loved and wanted by her parents and was her father's favorite. The patient's school work was good and she had many friends until a traumatic event occurred when she was 17. Her father, who had been drinking excessively, attempted to rape her next younger sister. The attempt was interrupted by the younger sister who reported it to the patient; in turn, the patient reported it to her mother who called the police. The father was jailed for three weeks and then released. He was not permitted to return to his family and went to work in another city.

The patient's illness began soon after the father's departure. As described by the patient's mother, "She started to worry about a year ago. My husband left and she began to think about him all the time. She used to talk funny—funny things like she would hear an airplane and stand on the kitchen table looking at the ceiling. She would look out of the kitchen window at children who were playing at school about a mile away and ask if the other children could see her. She would stay away from school and wouldn't help with the housework but stood outside staring at nothing. She would say, 'I don't know whether I am a boy or a girl. Do you think I will ever get married and have a baby?' And she would say to me, 'You are staying young and I am growing old.'"

The sexual content of the patient's disturbance was intermixed with rivalry toward her mother as well as emotional dependence on her father. After he had been forced to live away from home, she went to see him but when she arrived he had left the city. She then started to complain of a cramp in her stomach and began to cry and laugh alternately. She would fall to the bathroom floor for no apparent reason. She stopped eating and had to be fed with a spoon.

In the hospital, the patient said, "Things don't work right in my mind the way they should and I know it definitely. It seems to me lately that whenever I read or write, well that is the whole question, it affects my mind. I sort of. I don't know what you call it, but when I think of one thing, I don't take it the way I should at the time. My mind seems to wander at the time—I don't hit the right target at the right time.

Diagnosis __________________ Time Completed _______
C.C., aged 21, had been a clerk in a downtown store since finishing high school four years before. She had never been physically strong. During infancy she had convulsions for a long time, was rather thin and anemic in appearance, and round shouldered.

Despite physical handicaps, she possessed a fairly pleasant personality. She had a married sister, aged 26, who had long been thought to be queer. The parents had been dead for years. The children were raised by an aunt and uncle. Nobody seemed to enjoy this substitute setup, and as soon as possible it was dissolved by mutual consent. Since that time (about four years), C. had been living alone in a cheap apartment. She had no friends and spent most of the time, when not at work, listening to the radio and reading cheap magazines. Of late, she had specialized in physical hygiene and body culture magazines and pamphlets.

This literary diet had been dictated by extraordinary interest in her health. She heard a lecture one evening given by a heart specialist, stressing the importance of health in a successful career. Two days after the lecture she was overcome while working and practically fainted. She became pale, weak, and agitated and complained about palpitation of the heart. She said her heart had begun to palpitate rapidly and loudly. All day long she was conscious of her heartbeat. The company doctor examined her carefully and found no evidence of heart trouble. He very simply told this to Miss C., but she still continued to worry and complain about her heart condition. In addition to this, she began to be troubled about her "malnutrition" and "hypothyroid condition." To help remedy the former, she began to eat voraciously. To improve her thyroid, she consumed foods with rich iron and iodine content as well as foods with high vitamin content.

She purchased some secondhand medical books dealing with the endocrine glands and now speaks, thinks, and reads of nothing else. Her extensive reading has led her (so she thinks) to understand more clearly to what extent she suffers from endocrine dysfunction.

She was extremely unhappy over it all. When she did talk, she spoke about her health constantly. She visited and talked with all the people she knew who have had endocrine troubles.
Case 43

This patient was a 21-year-old young man, single, who had a high school education. His mother was said to have had a "nervous breakdown." The present illness began from one to two years prior to admission and was characterized by an unusual interest in religion, worry, and a refusal to eat. He would go into a corner for hours to pray. The onset was gradual. Auditory hallucinations were in evidence, e.g., he thought he heard the Lord's voice. Speech was rambling and responses were delayed. He became unduly tense, consecrated all his waking hours to religion and to church activities. He spent most of the time praying and reading the Bible and expressed his life's desire of becoming a minister.

After the onset of his illness, his parents, despite his condition, allowed him to enter a college to study for the ministry. He was unable to concentrate on his studies, did not sleep, was slow in his classwork. He devoted all his time to "secret prayer." The dean of the college felt his influence detrimental to the other students and notified his parents of the patient's condition. He returned home and talked constantly about religion, expressed auditory hallucinations, and said he received messages from God. He was depressed and discouraged and spent hours writing religious tracts.

Prior to the onset of his present illness he had a good disposition, was cheerful, was never known to use profane words, and had no known bad habits. He was quiet, retiring, and serious-minded. He enjoyed swimming and out-of-door sports of a solitary nature. He kept company with the opposite sex and just prior to this illness became serious with one or two girls whom he met in his church work. On admission to the hospital, he was mild-mannered, quiet, and did not seem either depressed or elated. He was somewhat retarded in his responses. He did not associate with other patients, and when conversing spoke in a whisper.
Mary G. was a domestic science teacher aged 25. Her parents seemed always to have preferred her younger brother and her older sister and to have treated Mary as a child of little worth. The brother was born when Mary was three. He replaced her in the parent's bedroom and held first place in their hearts. She could always gain praise and attention by eating well, especially from her father who was a food faddist. She recalled no particular difficulties during latency except that she seemed always hungry. Before meals she sometimes felt lonely and deserted; after them she felt heavy and contented. In high school she took to cooking like a duck to water, and around this she shaped her future career in domestic science.

Mary entered adolescence as a fat girl. When she found herself passed up by the boys she tried going on a diet. This went against the grain with her; but what made it doubly difficult was that her father acted as though her refusal of food were a mortal sin. He had not treated her older sister this way. After a heavy meal Mary sometimes induced vomiting secretly in the woods near home, but this made her feel as if she "had broken all Ten Commandments." By the time she got to college she had achieved some loss of weight. But when she went on dates a new symptom appeared: she could not eat in the presence of her escort.

This was her confused and inconclusive situation when Mary was graduated from college and went to spend the long summer vacation with her now married older sister. The sister was near the end of her first pregnancy. Mary at once felt intensely jealous and unexpectedly attracted to her sister's husband. When a baby boy was born she disliked him from the start. She moved back to live with her parents as soon as she began her new job in her home town. She tried dating, but found herself angry and bitter toward men and still unable to eat in their company. When her parents went off on a trip, Mary regaled herself with enormous meals which she cooked and ate alone, completely satisfied. When they came back she decided to seek therapeutic help.
The patient became restless and talkative in January. Early in February he began to send checks to friends, sometimes even to strangers who, he said, might be in need. Ten days later he was sent home from the office where he was employed with the explanation that he was becoming overwrought. A few days after his suspension from work he was admitted to a private institution for mental disorders where he pretended to commit suicide by mercury poisoning. He then drew a skull and cross bones on the wall of his room. After three weeks he was taken home, but a few days later he was committed to a public institution where he bustled about the ward, giving the impression that he had important business to which he must attend.

Occasionally he would be seen lying on a bench, pretending to sleep, but in a few minutes he resumed his usual activity. He talked quickly, loudly, and nearly constantly. He was interested in everything and everyone around him. He talked familiarly to patients, attendants, nurses, and physicians. He took a fancy to the woman physician on duty in the admission building, calling her by her first name and annoying her with letters and with his familiar, ill-mannered, and obtrusive attentions. On his arrival he gave five dollars to one patient and one dollar to another. He made many comments and asked many questions about other patients and promised that he would secure their discharge. He interfered with their affairs and soon received a blow on the jaw from one patient and a black eye from another. He wrote letters demanding his release, also letters to friends describing in a circumstantial, inaccurate, and facetious way conditions in the hospital. His letters were interlarded with trite Latin phrases. He drew caricatures of the physicians and nurses and wrote music on toilet paper. He drew pictures on his arms; on one occasion he secured a bottle of mercurochrome and painted the face of another patient. When permitted to play the ward piano, he played piece after piece without stopping, improvising a great deal. A doctor rarely passed through the ward without being called by the patient, who would slap the physician on the back or shake hands effusively and talk until the door closed. At times during an interview his voice became tremulous, tears came to his eyes, and he sobbed audibly with his face buried in his arms. A moment later, however, he was laughing.

Diagnosis ___________________________ Time Completed _________
The earliest conceptions of psychopathology viewed it as the manifestations of evil spirits and demons that entered the victim's body and affected his behavior adversely. Treatment efforts, therefore, were directed toward exorcising the demonic spirits by performing various magical and religious rituals or by brutal physical assaults upon the bearer of the pernicious spirit such as cutting a hole in his skull. Hippocrates supplanted these ideas by relabeling deviant behavior disease rather than demonic manifestations. Wholesome diets, hydrotherapy, bloodletting, and other forms of physical intervention--some benign, others less humane--gradually and increasingly were used as treatments. This history you have already surveyed in the first section.

Although psychological methods gradually replaced physical procedures for changing deviant behavior patterns, medical notions of health and disease have long continued to dominate theories of psychopathology. They regard behavioral deviations as derivatives of symptoms of an underlying disease process. People who show atypical behavior are therefore called "patients" and are said to suffer from a "mental illness," which generally is treated in a hospital or medical clinic.

Most contemporary theorists and practitioners have adopted this disease model, but they regard the underlying pathology as psychological rather than neurophysiological in nature, that is, lacking physical properties that would permit direct observation and verification. In these theories the underlying disorder functions somewhat like toxic substances that produce symptomatic reactions; the inner disturbing agents are a host of unconscious psychodynamic forces and psychic complexes--ego-alien impulses; infantile images; Oedipal, castration, and inferiority complexes; ancestral unconscious and primordial images; latent instinctual tendencies; counterinstinctual energies; wills and counterwills--somewhat akin to the hidden demonic spirits of ancient times. These prevailing theories of psychopathology thus employ essentially an amalgam of the medical and demonological models, which have in common the belief that deviant behavior patterns are external manifestations of underlying pernicious agents.

Although the disease-demonic model has strongly influenced theories of human behavior and psychotherapeutic practice, remarkably little attention has been devoted to the definition of "symptom."
Categorizing a pattern of behavior as symptomatic of emotion disorders actually involves a complex set of criteria, most of which are quite arbitrary and subjective. Whether or not an act is considered normal or a symptom of disorder, depends upon whether certain social judges, or the person himself, disapprove of it.

The labeling of "symptoms" primarily involves the evaluative responses that a given behavior evokes from others rather than qualities of the behavior itself, so the same response pattern may be viewed as pathological or as normal behavior by persons whose norms and standards differ. Aggressiveness in children, for example, may be rewarded and regarded as a sign of masculinity and healthy social development by parents, while the same behavior is generally viewed by educational, legal, and other agents of society as a symptom of personality disorder. Similarly, persons who label themselves emotionally disturbed are often judged by others to be functioning at a normal level.

Certain properties of a behavior often invite labeling it a symptom of emotional disorder. Responses of high magnitude, for instance, generally have unpleasant consequences to others and are therefore more likely to be considered pathological than responses of low to moderate intensities are. A youngster who is continually wrestling and pushing other children may be viewed as exhibiting youthful exuberance; but if his physical aggression becomes more forceful and noxious, he will in all probability be regarded as emotionally disturbed. Although intense emotional responses may be reliably categorized, disagreements are apt to arise in labeling behavior of lesser intensity, and the line of demarcation between normality and abnormality varies with the judges tolerance.
The appropriateness of cognitive or social responses to particular stimuli is also often used in identifying symptomatic disordered behavior, just as it is a basis for judging genius. Appropriateness or correctness is generally determined by the degree of divergence from, or conformity to, some social norm of behavior in specific situations. Deviations from norms that do not inconvenience or interfere with the well-being of others are usually tolerated to some degree; deviations that benefit a society like many technological inventions and intellectual and artistic creations, may be encouraged and given generous material and social rewards. On the other hand, deviance that generates aversive stimulation (unpleasantness) for others elicits strong societal disapproval, is promptly labeled abnormal, and generally results in coercive pressures on the individual to control or to modify the noxious behavior.

The appropriateness criterion, however, poses problems when its judges subscribe to conflicting norms and disagree on what constitutes suitable social reactions. The conforming majority in our society may think the hippie, who refuses to strive for conventionally valued goals, exhibits maladaptive behavior.

Grossly divergent behavior patterns are most apt to be viewed as pathological by persons who do not share the same normative systems as the performers. If the social learning history of the behavior is known, however, there is no necessity for invoking an underlying disease process to explain the deviance. Litz, et al. (1958) report a case, for example, in which schizophrenic brothers believed that "disagreement" meant constipation. This clearly inappropriate expression was primarily a result of exposure to a relatively bizarre social learning situation rather than an expression of a "mental illness."
Behavioral deficits are frequently interpreted as symptoms of emotional disorder, particularly when they produce hardships for others. Intellectually adequate children, for example, who are incontinent, or who exhibit deficiencies in verbal and academic skills, and adults who are unable to meet social, marital, and vocational task requirements, all tend to be labeled emotionally disturbed. Moreover, it is generally assumed that the greater the deficits, the more extensive the underlying psychopathology. The arbitrary nature of the criterion for deficit or competence would become readily apparent if one were to vary the standard of competence in any particular situation. If the criterion were set at a very low level, practically all members of a society would be judged healthy and competent, whereas if exceedingly high standards were adopted, the vast majority would suddenly acquire psychopathology. In the latter case, therapists and diagnosticians would devote much time to locating the source of pathology within the individuals.

The presumed intent of an action also helps to determine whether others call it a symptom. If a person engages in disapproved deviant behavior that is successful in attaining commonly desired and valued goals, it is less probable that his acts will be regarded as emotional disease symptoms than if his deviant behavior has no apparent utilitarian value. Delinquents who strike victims on the head to extract their wallets expeditiously are generally considered semi-professional thieves who are using income-producing instrumental aggression responses. By contrast, delinquents who simply beat up strangers but show no interest in their victims' material possessions are supposedly displaying emotional aggression of a disturbed sort.

It should be noted that prosocial approval-seeking behavior such as athletic achievements or musical accomplishments is seldom labeled emotionally determined, non-utilitarian pathological behavior. Yet certain subgroups have learned to value and reward "stomping" more highly than violin virtuosity.

The dichotomy between instrumental and emotional aggression therefore, appears to reflect primarily differences in reinforcement conditions and the types of rewards sought, not basic differences in the purposiveness of the behavior itself.
Since some members of a society are likely to undergo very atypical learning contingencies, events which are ordinarily neutral or unpleasant for others may become strongly conditioned positive rewards for them. Because the puzzling behavior of these individuals may appear to have little or no instrumental value, it tends incorrectly to be explained by reference to internal psychopathological processes.

Certain properties of the person—age, sex, socio-economic, and ethnic background—also enter into the social judgment of deviant behavior. For example, behavior considered normal at one age level may be regarded as a symptom of personality disturbance at a later period, as in the case of enuresis. It is appropriate, in this connection, to repeat Mowrer's query: "And when does persisting behavior of this kind suddenly cease to be normal and become a symptom?" (1950, p. 474).

The differential cultural tolerance for acting like the opposite sex illustrates the role of sex-of-subject in the assignment of symptomatic status to deviant behavior patterns. The adoption of female apparel by males is supposed to indicate a serious psychological disorder requiring prompt legal and psychiatric attention. On the other hand, females may adopt masculine garb, hair styles, and a wide range of characteristically masculine response patterns without being labeled mentally disturbed. Since masculine behavior occupies a higher prestige and power position and is more often rewarded in our society than feminine behavior, the acquisition and maintenance of masculine tendencies by females is more readily understandable and, therefore, less likely to be interpreted as a disease process.

It is apparent from the foregoing discussion that the categorization of behavior as symptomatic of an underlying pathology depends upon the judges' normative systems; the social context in which the behavior occurs; its intention, frequency, and intensity, the age, sex, and social background of the person; and many other factors.
It is true, of course, that questions of value and social judgment also arise in the diagnosis of physical disorders. But the symptom-disease model is meaningful there because internal organic pathologies do in fact exist and can be directly verified independently of their peripheral correlates (symptoms).

In view of the demonstrated importance of stimulus control over behavior, the social learning taxonomy (classification) of psychopathology must attend to the interaction between behavioral predispositions (subject variables), on the one hand, and stimulus events on the other. This type of analysis can help both to explain the acquisition and maintenance of deviant response patterns and to guide therapeutic practices.

Although the specific behavioral problems of individuals may take many forms, their diverse manifestations can be reduced to social learning history and requiring different learning procedures for successful modification. The taxonomic schema presented below, however, is not intended to be exhaustive, nor are its classes without a certain degree of overlap. The categorization of any given case is further complicated by the fact that persons are typically exposed to diverse constellations of social learning experiences, which give rise to varying combinations of deviant behavior.

Some persons who are called maladjusted simply lack the requisite skills for coping effectively with the social, academic and vocational demands of their environment. Because of their behavioral deficits, not only may such individuals receive insufficient rewards to sustain what skills they already have, but they are also periodically subjected to negative reinforcement in the form of physical punishment, rejection, ridicule, loss of income, and other types of social and material rewards.
This demoralized condition is frequently reflected in low levels of responsiveness, apathetic, weak performances, or generalized behavioral impoverishment in extreme forms as exhibited by autistic children, chronic psychotics, and institutionalized persons.

Stable complex patterns of behavior are in part socially transmitted through observation of competent models, and they are then further developed and maintained by intermittent positive reinforcement (rewards administered only occasionally, not every time the behavior is performed). Consequently, inadequate modeling and insufficient or poorly managed reinforcements are likely to produce behavioral deficits. Under somewhat better environmental circumstances, deficiencies may be confined to only a few kinds of performances. Gross deficits, however, typically result from a reciprocal interaction between a mild behavioral deficit and a social environment that cannot provide much positive reinforcement.

The mere absence of a specific performance in itself does not necessarily indicate a learning deficit. An individual may have developed patterns of behavior appropriate to particular situations but suppressed or inhibited his responses after aversive conditioning. While the observed outcome is still a performance deficit, it must be distinguished from one produced by a learning deficiency, particularly when devising treatment programs.
People may possess adequate repertoires of responses that could be reinforced by the environment, but still behave inappropriately and therefore go unreinforced or even punished because they fail to respond discriminately to important stimuli. Thus, for example, a churchgoer who bursts into operatic areas in the middle of a sermon is apt to receive an extended "rest cure" in a psychiatric facility rather than appreciative bouquets.

During the initial phase of social development most stimuli except inherently noxious ones, exert little or no influence on behavior. However, specific performances can be readily brought under discriminative stimulus control if they are associated with consequences that differ with the presence or absence of particular stimuli. This process is most clearly illustrated in laboratory studies in which response to one stimulus, such as a green light, is regularly correlated with reinforcement, while responses to a second stimulus, such as a red light, are consistently unrewarded. Once the discrimination is learned, the organism responds only to the green light. Thus, by introducing discriminable stimuli that signify the contingencies of reinforcement, that is what will or will not be rewarded, a considerable degree of control has been achieved over the organism's behavior.

In more complex real-life situations, diverse response patterns are each associated with separate schedules and contingencies of reinforcement which, in turn, are correlated with different discriminative stimuli. Effective social functioning requires highly discriminative responsiveness, often to subtle changes in environmental stimulation. Some classes of deviant behavior primarily involve defective stimulus control, due either to faulty social training or to a breakdown of previously established discriminative behavior. This type of disorder and its modification have been studied in the laboratory by Ferster and De Myer (1961), who tried to increase the extremely narrow range of behavior characteristics of autistic children under laboratory conditions.

By performing a very simple response, such as pressing a key, children could obtain coins that served as general reinforcers; that is, they could be used to operate a variety of reinforcing devices including a pinball machine, a color wheel, a television set, a phonograph, an electric train, a picture viewer, an electric organ, a candy-vending machine with a separate light and coin slot in each column, and a trinket-vending machine.
The development of stimulus control was investigated by making the reinforcing devices operative only when a light was turned on: coins deposited when the light was off not only produced no reinforcers but even extended the machine's inoperative period.

During the early sessions, an autistic boy continued to deposit coins in the devices whether the light was on or not, thus giving no evidence of adapting even with the aid of an easily discriminable stimulus showing the conditions of reinforcement. After repeated exposure to the different reinforcement contingencies, a small degree of stimulus control began to emerge, but it was fully established only after many experimental sessions. However, when similar lights were used as discrimination cues in a more complex task, the previously developed stimulus control broke down completely, resulting in weakened performances and inappropriate responses accompanied by strong emotional reactions. Optimal learning conditions had to be instituted in order to restore and extend gradually the child's limited repertoire.

In marked contrast to the boy described above, a second autistic child, who was somewhat more advanced verbally and socially to begin with, adapted her behavior rapidly to the changing conditions of reinforcement signaled by the lights. Several control subjects who exhibited no serious behavioral disorders, likewise responded quickly and appropriately to the experimental conditions.
Students of psychopathology are unlikely to be interested in coin-depositing responses per se unless they happen to live near Nevada; nevertheless, results of the foregoing laboratory study of the stimulus control process have several important implications. First, the study demonstrates the degree to which certain individuals may remain completely out of touch with the conditions of reinforcement, even in a relatively simple environment with a high potential for positive reinforcement and distinct and reliable discrimination stimuli to facilitate adaptive behavior.

Second, repeated nonreinforcement of inappropriate responses may further impair existing stimulus control and also give rise to a host of deviant emotional responses. The latter finds are in accord with the results of a discrimination experiment on animals reported by Pavlov (1927) many years ago. In his study, a dog was repeatedly rewarded with food following the appearance of a circle, but was not rewarded on being shown other stimuli. After a conditioned response had been well established, the animal was shown successive ellipses which gradually approximated the shape of a circle. He remained undisturbed as long as the circle and the ellipse could be easily differentiated. However, when the differences between the figures were reduced to the point where he could no longer discriminate between them, the animal suddenly exhibited profound behavioral disturbances; the formerly quiet dog thrashed about violently, ripped the apparatus, and barked incessantly when removed from the experimental room. Subsequent tests revealed that his ability to make even simple discriminations was now destroyed and could be reinstated only through a lengthy reconditioning process. Moreover, reexposure to the difficult discrimination again produced the disturbed behavior.
Conventional theories of psychopathology generally assume that most forms of deviant behavior develop in aversive or traumatic conditions. Although this may be true in many cases, it is evident from the findings discussed above that grossly deviant responses can also be generated in an essentially benign and potentially rewarding environment, given defective discrimination functions.

The results reported by Ferster and De Myer on autistic children also reveal the limitations of traditional psychiatric typologies. Although the children who were studied differed markedly in the speed with which they adapted their behavior to the changing environmental conditions, both were nevertheless diagnosed as "autistic."

The psychiatric nosological system is difficult to justify in view of its limited reliability and the great behavioral differences among people in the same diagnostic classes.

Because of the importance of symbolic communication in social interactions, most human discriminative behavior is governed by verbal cues. Consequently, persons whose behavior is under defective verbal control will often make inappropriate responses which may have considerable negative consequences. As part of a research program to develop procedures for the modification of psychotic behavior, Ayllon and his associates provide numerous examples of behavior which is very poorly controlled by relevant verbal stimuli.
In one study, a group of schizophrenics with long-standing severe eating problems were totally unresponsive to meal announcements or to persuasive appeals. Prior to the treatment program, these people had been escorted by ward personnel to the dining room, spoonfed, tube-fed, and subjected to electroshock "therapy" and other forms of infantilizing and punitive treatment.

The research staff assumed that the nurses' coaxing, persuading, and feeding was an inadvertent form of positive reinforcement that somehow maintained the eating problems. If so, the same behavior would also tend to reduce the controlling properties of relevant verbal stimuli. All social rewards for ignoring the announcement of mealtime and for refusals to eat were therefore withdrawn; following meal call, the dining room remained open for thirty minutes and any patient who failed to appear during that time simply missed his meal. Under this new contingency, the patients quickly responded to the meal call within the time allotted. Several weeks later, access to the dining room was gradually reduced following meal call until eventually the patients responded in a socially appropriate manner.

It is interesting to note that delusional statements to the effect that the food was poisoned, or that God instructed the patients to refuse to eat, disappeared as soon as the patients began to feed themselves. These findings suggest that in some cases delusional responses may be a result rather than a cause of deviant behavior. By adopting a sick role, supported by delusional justifications, the patient may be more successful in compelling the attention and care of busy ward personnel who would otherwise respond in an intolerant and punitive manner. Indeed, the nurses frequently supported and rewarded highly infantile behavior on the assumption that the patients could not be mature and realistic because they were "mentally ill."

The classification and interpretation of objects or events in a given culture is precisely governed by the culture's language and conceptual system. Another form of defective verbal control is evident in cases where inappropriate labels are attached to objects and events. The earlier example of the sibling schizophrenics who believed that disagreement meant "constipation" illustrates this type of cognitive dysfunction. Similarly, the verbal labels of a person who insists that a bird has built a nest in his left molar are completely inappropriate to the actual physical environment.
Sufficient exposure to different reinforcement conditions correlated with different stimuli is obviously necessary for the establishment and maintenance of discriminative stimulus control. Even though different consequences are regularly correlated with particular stimuli, the desired control still may not be achieved because of the existence of faulty conditions. Thus, as revealed in the Ayllon studies, if failure to respond to a meal call produces positive social reinforcement and prompt response results in loss of attention, the relevant verbal stimuli (the announcements) attain discriminative value but do not acquire the right controlling properties. Similarly, much of the verbal behavior of parents has relatively little influence on their children's social responses. Requests, orders and directives are continuously issued but generally go unheeded as long as noncompliance is either overlooked or positively reinforced by increased parental attention. The parents' mounting anger usually serves as the cue that further noncompliance will be negatively reinforced. Under these conditions, only verbal behavior of high intensity (yelling) acquires reliable controlling properties.

Previously established repertoires can be reduced or even eliminated completely by high emotional arousal, as revealed in the experiments reported by Ferster and Pavlov. Additional corroborative evidence for this relationship is provided by Rosenbaum (1953) who found that, under threat of strong painful stimulation, people discriminated more poorly than under mild aversive conditions. A subsequent experiment further demonstrated that the loss in discrimination from the threat of strong noxious stimulation is greatest among persons who are predisposed to emotional arousal.

Some evidence is also provided by Rodnick and Garmezy (1957) that the loss of discriminative accuracy among grossly deviant people may partly result from the fact that, for this group, negative social reinforcers have powerful emotion-arousing properties. Whereas the generalization gradients (graphs of discrimination performance) for "normal" and schizophrenic subjects were similar under conditions of reward, the schizophrenics exhibited discriminative deficits under direct censure and even in response to pictures showing different degrees of maternal criticism.
Stimulus control may likewise break down under extreme conditions of deprivation or when there are marked changes in the social environment and in corresponding conditions of reinforcement. This fact may partly account for the common observation that persons admitted to a psychiatric hospital who initially exhibit highly deviant and disorganized behavior often subside and appear comparatively normal in a short period without any active therapeutic interventions. Removal from a stressful or otherwise unfavorable environment may produce such dramatic changes. The initial disorientation seen at hospital admission may be temporarily enhanced, on the other hand, by the fact that most of the discriminative stimuli which guide the individual's behavior in everyday life are absent, most of his previously rewarded behaviors are no longer appropriate to, or permitted in, the hospital setting, and new performances associated with different and unusual reinforcement contingencies are suddenly required. Even persons who are well equipped to adapt to rapid stimulus changes would experience some feelings of strangeness and disorganization if suddenly confronted with these conditions.

Another important class of deviant behavior reflects a converse problem arising from the fact that formerly innocuous and inappropriate stimuli have acquired the capacity to elicit highly intense emotional reactions. This category includes chronic muscular tensions, intolerable anxiety reactions, and other forms of overactivity of the autonomic nervous system. Such disorders are reflected in a wide variety of somatic complaints such as insomnia, chronic fatigue, gastrointestinal disorders, and respiratory and cardiovascular disturbances of a functional nature.
Most obsessive-compulsive reactions, behavioral inhibitions, phobic and other avoidant response patterns are similarly governed by conditioned emotional reactions, particularly while they are being learned. These types of disorder are brought under the control of previously innocuous stimuli through a process of aversive classical conditioning. This means that if a formerly ineffective conditioned stimulus (CS) occurs in conjunction with another stimulus which is capable of eliciting unpleasant autonomic responses, the former stimulus itself gradually acquires the power to evoke the same aversive emotional response patterns.

Laboratory studies of asthma illustrate how psychosomatic reactions such as asthmatic attacks can be conditioned in the laboratory. Noellpp and Noellpp-Eschenhager (1951, 1952), for example, demonstrated that after repeated pairing of induced asthmatic attacks with an auditory stimulus, many of the animals in the study exhibited symptoms of bronchial asthma to the auditory stimulus alone. Similar conditioned stimulus control of human asthmatic attacks is demonstrated in a carefully controlled experiment by Dekker et al. (1957). Two patients suffering from severe bronchial asthma inhaled nebulized allergens to which they were hypersensitive. After repeated inhalations of this allergen extract, which served as the unconditioned stimulus for asthmatic attacks and automatically produced them, inhalation of a neutral solvent, which initially produced no respiratory changes, now elicited attacks of asthma.
In later phases of the experiment, inhalations of pure oxygen and even the presentation of the inhaling mouthpiece, both formerly neutral stimuli, had acquired the power to provoke severe asthmatic attacks that were undistinguishable from those induced by the allergen itself.

In the experiment described, asthmatic responses were conditioned to such inappropriate stimuli as the inhalation apparatus simply through contiguous association. It is not surprising, therefore, that the analyses of asthmatic behavior made by Dekker and Groen (1956) showed an extremely varied array of highly specific stimuli eliciting attacks in the group of patients studied; these stimuli included the sight of dust, radio speeches by influential politicians, children's choirs, the national anthem, elevators, goldfish, caged birds, the smell of perfume, waterfalls, bicycle races, police vans, and horses, just to mention a few. Once the critical eliciting stimuli had been identified in a particular case, Dekker and Groen were able to induce attacks of asthma in the laboratory simply by presenting the conditioned stimuli themselves or even pictures of them.

It is particularly interesting that the investigators observed that intense emotional arousal by itself failed to produce asthmatic reactions, whereas exposure to specific conditioned stimuli provoked marked respiratory dysfunction. This observation is corroborated in a study of the conditioning and extinction of asthmatic responses in animals. Asthma-like attacks, which readily occurred in the presence of conditioned stimuli, could not be induced by means of emotion-provoking procedures involving loud noises, painful stimulation, and electric shock. In view of these findings, one would expect that neutralization of such specific eliciting stimuli through desensitization methods would be highly effective in the treatment of asthma, but that reduction of general emotional disturbances might not have much impact on the respiratory disorder.
Although other forms of human psychosomatic disorders have not as yet been subjected to systematic experimental investigation almost every form of physiological response that an organism is capable of making has been classically conditioned to innocuous stimuli at one time or another. These have included eyelid reflexes, salivary responses, galvanic skin responses, respiratory changes, cardiac responses, electroencephalogram alpha rhythm, gastrointestinal secretions, and vasomotor reactions. External stimuli like signal lights and buzzers have been used most in classical conditioning experiments, but Russian researchers have recently demonstrated interoceptive conditioning, in which changes in the activity of internal organs serve as the signal stimulus (CS). Evidently any discriminable stimulus, whether external or internal, can acquire the capacity to elicit autonomic responses.

Many of the attitudes and emotional responses which people have towards specific objects are not direct results of the pairing of affective experiences with the objects themselves. Some people, for example, may fear snakes without having had any direct frightening experiences with reptiles. Similarly, some people are strongly aroused emotionally at the sight or mention of unpopular minority groups or nationalities, even though they may have had no personal contact. These types of reactions are frequently learned by higher order classical conditioning, in which a stimulus, once learned, serves as the basis for further conditioning. For example, the Staatses have shown that the names of different nations, the names of persons, and even nonsense syllables that had been associated with words having negative connotations, like "bitter," "ugly," "failure," subsequently tended to be viewed as unpleasant.
A study by Das and Nanda (1963) further reveals that higher order conditioned stimuli, once learned, are capable of being generalized to still other situations.

While many emotional response patterns are undoubtedly acquired by direct experience, both first order and higher order conditioning may occur in the case of human learning even without direct stimulation through vicarious conditioning.

The process of vicarious classical conditioning and the influence of emotional arousal on vicariously acquired responses is shown in a laboratory study. In this experiment, groups of adults observed a single individual who underwent aversive conditioning experiences in which a buzzer sounded at periodic intervals; shortly thereafter he acted as if in pain from an ostensible electric shock. The performer, however, merely feigned pain cues (an arm jerk away from the source of the "shock," wincing) and no shock was actually administered. After repeated pairings of the buzzer (CS) and the performer's pain responses, the observer's conditioned psychogalvanic responses to the buzzer alone were measured in order to test for the acquisition and extinction of emotional responses. Prior to the vicarious conditioning phase of the experiment, the groups of observers had been subjected to different degrees of emotional arousal manipulated both psychologically and physiologically by means of varying doses of epinephrine, a sympathetic stimulant.

The results of this experiment provide clear evidence that emotional responses can be transmitted vicariously. Although the observers had not been subjected directly to the aversive stimulation, they nevertheless endowed the formerly innocuous buzzer with emotion-provoking properties because they had observed another person undergoing painful experiences. In addition, the degree of vicarious conditioning showed a nonlinear graphic relationship to the observer's level of emotional arousal. Vicarious responses increased when arousal ranged from low to moderately high, but further increases in arousal were accompanied by progressive decreases in vicariously conditioned responses.

Most stimuli encountered in natural situations are highly complex; that is, they contain a variety of stimulus dimensions, some of which are related and others irrelevant to the existing reinforcement contingencies. If a person happens to attend primarily to the irrelevant dimensions and subsequently generalizes responses on the basis of them, a great deal of inappropriate or maladaptive behavior may occur.
It is apparent from the foregoing discussion that emotional responses can be brought under the control of relatively complex stimuli. The fact that new stimulus events can become vicariously as well as directly linked to emotional behavior further adds to the complexity of the classical conditioning process. Moreover, once conditioned stimuli have acquired eliciting power, their capacity is transferred or generalized to other sets of physically similar stimuli, to cues related semantically and even to highly dissimilar stimuli that have been regularly associated with them in the person's social learning history. It is not therefore surprising that conditioned emotional responses are often overgeneralized, or generalized on the basis of irrelevant cues, resulting in a chronically unpleasant state of autonomic overactivity.

The discussion so far has been primarily concerned with inappropriate stimulus control of autonomic responses, which are important components of emotional states. After a stimulus has acquired aversive properties, its presentation elicits not only strong autonomic responses, but also efforts to escape and avoid the resultant noxious stimulation. Any response that successfully terminates the aversive state or removes the threatening stimulus will become firmly learned because of the positive reinforcement it receives.

The acquisition of fear-motivated behavior and its extreme persistence even under benign environmental conditions is clearly exemplified in a study by Miller (1948). Rats were given electric shocks in a white compartment of a shuttle box and learned to escape by running through an open door into a black compartment. The once neutral cues of the white compartment rapidly acquired emotion-provoking properties, and the animals continued to run from it long after the shock had been completely discontinued. Escape from the conditioned aversive stimulus (the white compartment) thus reinforced the running. The animals were then placed in the white compartment with the door closed; they could open it by rotating a wheel. Wheel turning was rapidly learned and maintained by the fear reduction that occurred each time they escaped the white chamber. When conditions were changed so that wheel turning no longer released the door, but pressing a bar did, the former response was quickly extinguished and the latter became strongly established. The conditioned aversive stimulus thus sustained a series of avoidance responses, in spite of the fact that there was no longer any basis in reality for emotional reactions once the shock had been completely discontinued.
A rodent psychiatrist observing these winded animals dashing through compartments, turning wheels, and pressing bars to avoid a subjectively real, but objectively non-existent, danger would undoubtedly diagnose a serious psychological disorder in these animals.

The examples of aversive conditioning given so far have all involved independent environmental stimuli like lights, bells, and chambers. Mowrer (1960) has made an important distinction between "place avoidance" and "response inhibition" in terms of where the fearful conditioned stimuli are located. In place avoidance, an individual performs responses designed to escape or avoid an external noxious stimulus. If an individual has been repeatedly punished for a particular pattern of behavior, however, the response itself and its cognitive representations gradually acquire the capacity to arouse emotion. Since some of these cues occur early in the response sequence, the very initiation of the act and even thinking about it can come to acquire aversive properties. To avoid this unpleasant experience, individuals learn to suppress the act altogether, and the suppression becomes established through positive reinforcement. Walton and Mather (1963) provide numerous examples in which obsessive-compulsive rituals had become conditioned in this way to sexual or aggressive thoughts and behavior.

Response inhibition and the anxiety-eliciting function of response-correlated stimuli described in the previous paragraph tend to be assigned a prominent role in psycho-dynamic interpretations of neurotic behavior, but it should be recognized that external discriminative stimuli, especially social ones, are more typically critical sources of anxiety. Conditioned emotional responses and avoidant acts may, in fact, be elicited by the mere presence of stimuli that signify past traumatic experiences even when the person does not actually engage in the tabooed behavior. The transfer of anxiety-eliciting power to innocuous external stimuli is illustrated in a case reported by Walton and Mather (1963) of a woman who suffered from incapacitating obsessions about being dirty and elaborate hygienic compulsions. The obsessive-compulsive behavior began with her severe guilt and feelings of "dirtiness" because of sex relations in a love affair with a married man. Eventually, a wide range of external stimuli related to urogenital activities and all forms of dirt became aversive to her.
It is important to bear in mind that fantasied consequences are no less real, or less aversive, to the people who fear them than those associated with external aversive stimuli. Indeed, the intensities of emotion arousal generated by such cognitive activities often exceed those evoked by environmental events. It should also be noted that cognitions can be established, strengthened, and extinguished according to the same principles of reinforcement that govern overt responses. The failure of such subjectively experienced threats to come to fruition, undoubtedly serves as the important mechanism maintaining many classes of psychotic behavior.

Given the conjunction of fictional rewards and punishments and a powerful internal reinforcing system, a person's behavior is refractory to environmental control even in the face of powerful external punishments and blatant disproofs of his beliefs.

Deviant behavior can also be generated and maintained indefinitely by accidental contingencies involving actual or fictional reinforcements. Whenever a reinforcing event occurs, any irrelevant behavior already in progress is automatically strengthened. The fortuitous connection in time between an act and its subsequent reinforcement thus increases the likelihood that it will be repeated and again adventitiously reinforced. This type of behavior can eventually come under the control of its reinforcer as precisely and powerfully as if there were, in fact, a causal relation between the two sets of events.

The latter phenomenon was first observed by Skinner (1948) in an experiment in which pigeons received food at regular intervals regardless of what they had been doing during periods between reinforcements. Under these conditions, an amusing variety of nonsensical responses were firmly learned—merely because they happened to occur by chance in close proximity to the reinforcement.
The new pigeon habits included hopping from side to
side, turning the body counterclockwise, tossing the head
upward repeatedly, attenuated pecking movements, turning
two or three times between reinforcements, and pendulous
movements of the head and body. In one case, a bird hopped
from side to side more than ten thousand times before this
stereotyped response pattern was extinguished!

The power of adventitious reinforcement in maintaining
human deviant behavior is similarly revealed in the operant
conditioning experiment of Ferster and De Myer (1961) refer-
red to earlier. One of the autistic children happened to
climb over a food reinforcing device just before the machine
delivered food. From then on, the child persisted in
ritualistic climbing over the tops of the machines between
presses of the lever—the only response actually necessary
to produce the food. In the absence of knowledge about the
accidental contingency responsible for the child's apparently
strange behavior, elaborate hypotheses might readily be
generated by psychodiagnosticians about the symbolic signi-
ficance of this peculiar symptom.

The discussion has so far focused on how irrelevant
responses become accidentally involved in response chains
associated with rewarding consequences, but the phenomenon
probably occurs even more often under aversive conditions,
as evidenced by the widespread performance of superstitious
rituals designed to prevent "bad luck," that is, prospective
negative outcomes. In more extreme and socially debilitating
forms, such rituals are represented by obsessive-compulsive
disorders.
The extreme persistence of behavior learned under aversive conditions is due largely to the self-reinforcing character of avoidance and escape responses. In the first place, successful avoidance provides immediate reinforcement from the diminution of the aversive stimulation. Second, avoidance tends to be self-perpetuating even when it is no longer realistically justified, as shown by Miller (1948), since prompt or complete avoidance of a formerly noxious situation effectively prevents the organism from reappraising its current status. These types of responses can be rapidly eliminated if the avoidant act can be prevented from occurring in the face of the threatening stimuli under new conditions which are either harmless or positive experiences.

In experiments with animals, after avoidance responses have been well established, the noxious stimulation typically is completely discontinued and the animals' behavior has no effect one way or the other on whether it is resumed. On the other hand, in human social interactions, a person's own behavior especially in anticipation of others' responses, is generally instrumental in provoking counterreactions which may confirm or reinforce his original maladaptive behavior. By contrast, an individual whose anticipatory responses are of a more positive character will undoubtedly encounter greater warmth and friendliness from others.
Experimental analysis by Rausch (1964) of sequential interchanges between the antecedent acts of one child and the subsequent acts of another reveals that the proportion of friendly and hostile behavior which children receive from their peers depends largely on their own antecedent behavior. The fact that a person, to a large extent, constructs his own chain of social reinforcement contingencies through his anticipatory behavior presents another major obstacle to the elimination of avoidant habits even under favorable conditions.

Strong response predispositions not only have social stimulating power, but also influence the perception of interpersonal cues. Most social reactions tend to be somewhat ambiguous, so that a variety of interpretations are possible. This is particularly true of negative responses; firm rejection of frank disapproval tends to be inhibited or expressed in indirect and nonverbal forms. Consequently, nonverbal cues are typically regarded as more reliable than verbal stimuli; that is, actions come to speak louder than words. Since it is often difficult to know precisely what nonverbal cues mean, one tends to respond to new social events and the behavior of others in accord with prior experiences. There is, in fact, considerable laboratory and clinical evidence that people often seize upon very minimal cues as signs of rejection, disapproval, or disinterests; they may go to great lengths to avoid, to deny, or to redefine cues that contradict their beliefs; and they may even do things that provoke from others the necessary confirming experiences to sustain their beliefs. In view of these diverse maintenance mechanisms among humans, it is not surprising that avoidance repertoires are exceedingly resistant to modification without carefully planned relearning experiences.

It is widely assumed that conditioned autonomic reactions, which presumably form the basis of an anxiety drive state, provide the motivation for avoidant behavior and that their reduction reinforces it. Findings from laboratory investigation of avoidance learning in animals whose sympathetic nervous systems have been surgically excised suggest that autonomic feedback plays only a limited role in escape-avoidance behavior and that other physiological systems, particularly the higher brain center, may be more important.
In this experiment, feedback functions of the autonomic nervous system were curtailed, and the animals were then trained to avoid an intense shock by jumping over a barrier from one compartment of a shuttlebox to the other. A light served as the main conditioned stimulus. Following avoidance learning, the shock was discontinued in order to see how long it would take to extinguish the jumping response in the presence of the light alone.

A group of unoperated dogs, which served as the comparison group, underwent the same experimental conditions. In addition, two dogs underwent the autonomic blocking procedures and the test for extinction after the avoidance response had been well established.

The results disclose that autonomic deprivation had only a partial effect on the learning of avoidance responses and that its effect occurred mainly in the initial phase of learning. Sympathectomized animals took longer than the controls to escape shock, required significantly more trials to learn their first avoidance response, and tended to extinguish more rapidly. However, the speed of extinction in the animals deprived of normal autonomic functioning after learning the avoidance did not differ from that of the normal controls. Moreover, no consistent relationship was found between the avoidance-learning pattern and the portion of the autonomic nervous system that was blocked.
The fact that all the sympathectomized animals eventually acquired stable avoidance responses suggests that autonomic responsiveness may facilitate the learning of avoidance but does not seem to be a necessary condition for its establishment. The maintenance of already existing avoidance responses is apparently even less dependent upon autonomic feedback. Similarly, the findings of Black (1959) that avoidance responses during extinction persisted long after the related autonomic responses had been extinguished further indicate that avoidant patterns may be maintained without the support of conditioned emotional responses.

It would appear from the studies discussed above that classically conditioned autonomic responses may initially govern the motivation and reinforcement of avoidance behavior. Once instrumental responses are acquired, however, they are probably activated directly by external stimuli and central neural processes rather than by autonomic arousal. Indeed, autonomic responses and accompanying feedback are typically much slower than those of the skeletal response system; consequently, avoidance behavior is typically executed before autonomic reactions could possibly be elicited! This factor alone places serious limitations on autonomic responses as continuing instigators and reinforcers of avoidance repertoires. As has been frequently observed in learning experiments, once an avoidance response pattern has been learned, it becomes highly stereotyped, it is rapidly elicited, and its autonomic and skeletal accompaniments which indicate emotional arousal are markedly diminished or totally absent. In light of these considerations, currently popular theories of psychopathology that consider most deviant behavior motivated by an underlying anxiety drive require revision. A more plausible idea, consistent with recent research finding, would highlight the direct eliciting function of conditioned stimuli and their correlates in the central nervous system.
Alcoholism is one class of behavior disorders. Psychosocial theories have generally emphasized the symbolic value of alcohol in gratifying "oral" or "passive-dependent needs," but little attention has been paid to the pharmacological properties of alcohol which, under certain conditions, make it a powerful positive reinforcer.

One set of experiments that has direct bearing on the reinforcing qualities of alcohol concerns its effects on the autonomic nervous system. In these studies subjects' physiological responses are measured before and after ingestion of alcohol. The findings generally show that alcohol in small doses has no consistent effects, but it can result in substantial reduction in emotionality when taken in moderate or large quantities.

It is sometimes argued that learning principles cannot adequately explain alcoholism because the long-range social and physical damage from chronic drinking far outweigh its temporary relief value. This argument overlooks the fact that behavior is controlled by its immediate, rather than delayed, consequences; and it is precisely for this reason that persons may persistently engage in immediately reinforcing, but eventually self-destructive behavior.

Further evidence for the emotion-reducing properties of alcohol is provided in experiments with animals designed to study disinhibitory effects and extinction of conditioned avoidance responses. Suggestive findings regarding the conflict reducing effects of alcohol were reported by Masserman and Yum (1946) in a study of cats that learned to perform complex manipulations to secure food but inhibited these responses after they had been subjected to electric shock at the goal. Administration of small doses of alcohol, however, promptly restored the responses designed to obtain food. In addition, the cats developed a preference for milk cocktails containing five percent alcohol to plain milk during the series of shock trials, but reverted to their original preference for nonalcoholic drinks after the aversive conditioning was discontinued and all emotional responses were extinguished.

Results of numerous studies are consistent with the findings that moderate doses of alcohol produce rapid extinction of fear-mediated behavior and reduce the rate of responses designed to postpone the occurrence of aversive stimuli. Moreover, the capacity of alcohol to reduce emotional behavior is similar to that of drugs that depress the central nervous system.
A few experiments involving human subjects have also demonstrated the disinhibiting effects of alcohol on verbal expressions of sex and aggression in social drinking situations. Among humans, however, the same dose of alcohol may have diverse effects in the types of responses inhibited, in the degree of response inhibition, and on social stimulus conditions which, in part, serve to define and to control appropriate behavior.

Findings from experiments using a forced alcohol regimen in which the animals' entire fluid intake is restricted to solutions containing various concentrations of alcohol, reveal that alcohol per se has no strong inherently reinforcing properties. In these experiments, animals consume small nonintoxicating amounts of alcohol, but they readily revert to other fluids when they become available. The positive reinforcing value of alcohol is substantially enhanced, however, under conditions of aversive stimulation.

The research cited provides ample evidence that excessive alcohol consumption is maintained through positive reinforcement deriving from its depressant and anesthetic properties. The reduction of autonomic and other distressing emotional responses is the significant reinforcing event. Consequently, persons who are repeatedly subjected to aversive stimulation would be more prone to consume anesthetic doses of alcohol than persons who experience less stress, once they have acquired some taste for liquor to begin with.
Prolonged and heavy use of alcoholic beverages produces alterations in the metabolic system which provide the basis for a second maintaining mechanism that is quite independent of the original functional value of alcohol. That is, the withdrawal of alcohol causes very unpleasant physiological reactions including tremulousness, nausea, vomiting, marked weakness, diarrhea, fever, hypertension, excessive perspiration and insomnia. After the person thus becomes dependent on alcohol, he is compelled to consume large quantities of it both to alleviate and to prevent distressing physical reactions. Since the ingestion of intoxicants promptly terminates these "withdrawal symptoms," drinking is automatically and continuously reinforced. At this stage, the major part of the alcoholic's time and resources are devoted to maintaining continuous self-intoxication.

Although reduction of aversiveness and other positive reinforcements which typically accompany social drinking may account adequately for the maintenance of inebriety, an adequate general theory of alcoholism must use additional social learning principles since, obviously, most persons who are subjected to stressful experiences do not become alcoholics. It has been customary to name a varied array of internal determinants such as neurotic personality disturbances and underlying pathologies as the critical conditions which give rise to alcoholism. But the inadequacy of theories of alcoholism which emphasize the role the personality traits and internal dynamics becomes readily evident when we examine the marked cultural and subcultural differences in the incidence of alcoholism. If one accepts the theory that a "neurosis" is instrumental in the development of chronic inebriety, he would be forced to conclude that Jews, Mormons, Moslems, Italians, and members of other cultural groups with similar exceedingly low rates of addictive drinking, are lacking in neurosis, oral deprivations, self-destructive tendencies, latent homosexuality, indulgent mothering, inadequacy feelings, and the other dynamics that supposedly maintain alcoholism. If so, then these pernicious conditions must be highly prevalent among the Irish, who surpass all other ethnic groups in chronic alcoholism. Perhaps the most striking evidence that alcoholism primarily represents a learned pattern of behavior rather than a manifestation of some predisposing underlying pathology is provided by the extraordinarily low rates of alcoholism among Jews, who almost certainly experience no less, and in all probability more, psychological stress than members of ethnic groups noted for their inebriety.
These ethnic and subcultural differences in the use of intoxicants point to the importance of prealcoholic social learning of drinking behavior in the development of alcoholism.

The social learning variables take several forms. At the most general level they are reflected in the cultural norms associated with the use of alcoholic beverages. There is considerable evidence, for example, that the consumption of alcohol is significantly influenced by the drinking mores of given social groups. Members of cultures which are highly permissive toward the use of intoxicants, or even consider drinking desirable, display a higher incidence of drunkenness than persons reared in cultures that, for religious or other reasons, demands sobriety. Similarly, within heterogeneous cultures such as our own, the prevalence of chronic intoxication varies with the types of social learning conditions that are associated with class status, religious affiliation, racial and ethnic background, occupation, and area of residence.

Although cultural and subgroup mores obviously play an influential role in determining the extent of excessive drinking normative injunctions alone do not explain either the relatively low incidence of addictive drinking in social groups that sanction alcoholic beverages, or the occurrence of chronic alcoholism in cultures prohibiting or condemning intoxicants.

Cultural and subgroup mores are largely transmitted through the modeling of socializing agents; consequently, one cannot assume that members of a particular social group undergo equivalent learning experiences. Studies of the family background of alcoholics generally reveal an unusually high incidence of familial alcoholism. It might be argued that these data provide support for a genetic interpretation of alcoholism, but in reality the pattern of drinking behavior being modeled and the stimulus conditions that characteristically elicit alcohol consumption are more important than whether or not family members do any drinking.
A. QUESTIONNAIRE

I. Please circle the number on the scale that represents the way you feel about the characteristic being rated. Low numbers represent small amounts and high numbers represent large amounts. For each item only circle one number.

1. The importance of this task
   Very Little 1 2 3 4 5 6 7 Very Much

2. Your feeling of the meaningfulness of this task
   Very Little 1 2 3 4 5 6 7 Very Much

3. Your feeling of accomplishment resulting from the task
   Very Little 1 2 3 4 5 6 7 Very Much

4. The utilization of your skills and abilities in this task
   Very Little 1 2 3 4 5 6 7 Very Much

5. The degree of difficulty of this task
   Very Little 1 2 3 4 5 6 7 Very Much

6. The amount of effort you put forth for this task
   Very Little 1 2 3 4 5 6 7 Very Much

7. Your success on the task
   Very Little 1 2 3 4 5 6 7 Very Much

8. Your interest in the task
   Very Little 1 2 3 4 5 6 7 Very Much

9. Your feeling of satisfaction from working on the task
   Very Little 1 2 3 4 5 6 7 Very Much

10. How much did you like this task?
    Very Little 1 2 3 4 5 6 7 Very Much
II. Please indicate whether or not the following words correctly describe your task by writing "yes" in the blank next to the word if you feel it is an accurate description, "no" if it is an incorrect description, and "?" if you are unsure.

_________ Fascinating   _________ Useful
_________ Routine        _________ Tiresome
_________ Satisfying     _________ Healthful
_________ Boring         _________ Challenging
_________ Good           _________ On your feet
_________ Creative       _________ Frustrating
_________ Respected      _________ Simple
_________ Hot            _________ Endless
_________ Pleasant       _________ Gives sense of accomplishment

III. Place a checkmark by those things you would mention if you were describing this experiment to someone else.

_________ It was a really interesting task
_________ It was a difficult task

_________ You got paid money regardless of how well you performed on the task

_________ It was a boring task
_________ You were denied experimental credit

_________ You were paid money according to how well you performed on the task

_________ It was a simple task

_________ You received experimental credit for participation

_________ It was a meaningful task

_________ It was a waste of your time
APPENDIX D

ITEM-TEST CORRELATIONS OF JDI

WITHIN THREE TIME PERIODS
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<th>T₂</th>
<th>T₃</th>
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<td>11. Tiresome</td>
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<td>12. Healthful</td>
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<td>13. Challenging</td>
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<td>14. On your feet</td>
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<td>15. Frustrating</td>
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<td>16. Simple</td>
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<td>17. Endless</td>
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<td>18. Gives sense of accomplishment</td>
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APPENDIX E

GROUP RESPONSES TO TEN ITEM QUESTIONNAIRE
A. Group Responses to Ten Item Questionnaire at Tₐ. (N = 1.20, n = 15)

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<th>Accomplishment</th>
<th>Utilization</th>
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APPENDIX F

MEANS AND STANDARD DEVIATIONS OF GROUPS ON QUANTITY, ERROR RATE, AND SATISFACTION

186
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C. Group Means and Standard Deviations on Satisfaction Scores

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APPENDIX G

INTERCORRELATIONS OF QUANTITY, QUALITY,
AND SATISFACTION AMONG GROUPS
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2. CORRELATIONS AMONG QUANTITY (Qn), QUALITY (Qa) AND SATISFACTION (S)

FOR VARIABLE REINFORCEMENT CONDITION - HIGH INTEREST TASK

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NON-CONTINGENT PAY CONDITION - LOW INTEREST TASK

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FOR NO-PAY CONDITION - LOW INTEREST TASK

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