THE EFFECTS OF WORK RATE UPON JOB SATISFACTION

Stephen Wollack

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Approved by Doctoral Committee

Patricia C. Smith Adviser
Department of Psychology

Raymond J. Barker
Graduate School Representative

Charles J. Cranny
D. H. Smith

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ABSTRACT

Many jobs require workers to function at a rate of work which differs from their preferred rate. Often, this condition is a result of a mechanical process. The principal hypothesis in this research is that discrepancies from a person's preferred rate of work are associated with dissatisfaction. An inverted-U relationship was predicted between these discrepancies and job satisfaction. Discrepancies in the direction of above-normal work rates were predicted to be associated with fatigue, while below-normal rates were thought to be associated with boredom.

Each of two tasks, assembly and inspection, were performed by a different group of 40 workers, who were hired specifically for this study. After a four-day period of learning, a base rate was obtained representing each worker's average or "preferred" rate of work. On the fifth day of work, each S was assigned to a compulsory rate based upon his preferred rate. Written measures of job satisfaction, fatigue, and boredom were obtained after the work period.

None of the analyses with respect to the stated hypotheses was significant. However, when perceived work rate rather than actual rate was used in the analyses with pooled groups, the results were consistent with the predictions made for actual rate of work, satisfaction, fatigue, and boredom. Measures of perceived work rate were found to be only moderately correlated with actual rate of work. A statistical interaction between satisfaction and actual and perceived rate was suggested as one reason for these moderate correlations. Subsequent analysis confirmed this hypothesis.

One serious limitation of this study was that the direction of causality could not be established for the relationship among the variables. Additional research addressed to the question of causality was suggested by the author. The implications of job satisfaction as a determinant of perceived work rate were discussed, and it was concluded that such a finding, if confirmed, would be an important contribution to industrial psychology.

To The Memory Of My Father.

Solomon Wollack

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THE EFFECTS OF WORK RATE UPON JOB SATISFACTION

Stephen Wollack

Bowling Green State University

Increased job mechanization frequently has resulted in some loss of control by the worker over his work pace. The extent to which a worker is able to control his work pace is one variable which seems to be related to job satisfaction. This study was intended to determine whether a relationship can be demonstrated between an individual's preferred rate of work on a specific task (self-pace), the rate of work as dictated by the task (assigned-pace), and job satisfaction. An assigned-pace condition is said to exist for any task in which the worker must maintain a fixed work rate. Production-line jobs often make this demand of the worker. F. H. Allport (1933) took note of the personal costs which may be associated with an imposed, compulsory rate of work:

Social standardization thus means the thwarting of biological individual differences in function, and an acute problem for those who are trying to adjust their deviating personal characteristics to the system. Machine industry, which pushes the institutional mode up to the highest point in order to conform with a standardized pace of the machinery, is an extreme example. The worries and tensions which workers experience in their efforts to adjust their individual differences to this standard requirement play their part in the familiar occupational neuroses [p. 247].

Although mechanized operations are frequently associated with the assigned-pace condition, job mechanization does not necessarily imply a fixed rate of work. Moreover, the self-paced condition does not always apply to non-mechanized tasks. This may be particularly true in situations where work is arranged sequentially among workers, and the successful completion of the task requires an interdependent relationship among individuals performing specialized functions. For example, an assigned-pace condition may exist for a team of workers laying railroad ties.

The present study was addressed specifically to one major question regarding assigned-pace tasks: Are discrepancies from self-pace associated with dissatisfaction?

Regarding this question, for any specific assigned-pace task, there may exist an optimal level of worker self-pace which is associated with relatively high satisfaction. A worker whose level of self-pace exceeds the pace demands of the job may report feelings of understimulation or boredom by the work. Moreover, too low a level of self-pace for a particular job may result in fatigue and dissatisfaction. If individuals on assigned-pace jobs prefer to work at rates which

are close to their self-pace, then the highly self-paced worker should prefer a job which requires a substantial level of pace, while deriving less satisfaction from a job which permits only a limited pace level. On the other hand, for workers of low self-pace, a job requiring high pace may be viewed as overly demanding and dissatisfying. A "fit" between the job applicant's level of pace and the pace demands of the job would, therefore, result in maximal job satisfaction. If the discrepancy hypothesis is valid, there would be important implications with regard to the placement of workers upon assigned-pace tasks.

Virtually no previous research has been done regarding the proposed problem. Some evidence which suggests that compulsory rates of work may be dissatisfying was provided by Walker and Guest (1952) in their survey of assembly-line workers in the automotive industry. Substantial dissatisfaction was reported by workers as a result of the mechanical pacing of the assembly operation. Studies by Walker and Marriott (1951) and Marriott and Denerley (1955) reveal similar attitudes among workers regarding mechanized assembly jobs.

A number of studies relevant to the present research were done some years ago by investigators in Germany in which the effects of compulsory work rates upon production were examined (Graf, 1930; Düker, 1931; Flachsbart-Kraft, 1932; Krieg, 1933; Koch, 1933; Bornemann, 1938). In these experiments, Ss were required to work under controlled rates of work which ranged from very slow rates to rates well above their normal pace. Unfortunately, while the experimental manipulations used in these studies were quite similar to that of the present research, very little useful information can be obtained from the German studies. These investigations of compulsory work rates dealt exclusively with the quantity and quality of output, while effects upon attitude were almost entirely ignored. Moreover, the method of analysis was primarily clinical in its orientation, and generalizations were frequently based upon the observation of very limited numbers of Ss.

Hypotheses

I. For assigned-pace tasks, a curvilinear relationship (inverted-U) exists between discrepancies from self-pace and satisfaction with the task. Satis-

faction will be maximal when these discrepancies are small and will decrease as the size of these discrepancies increases.

II. For assigned-pace tasks, discrepancies from self-pace will be related to boredom. Positive discrepancies (self-paced rate > assigned pace) will be associated with greater boredom than negative discrepancies.

III. For assigned-pace tasks, discrepancies from self-pace are related to fatigue. Negative discrepancies (self-paced rate < assigned pace) will be associated with greater fatigue than positive discrepancies.

Method

Subjects

Eighty Ss, both male and female, from the Bowling Green area were employed on an hourly basis at a local factory, the Midwest Stamping and Manufacturing Company. Although the facilities of this factory were used in the study, regular employees of Midwest were not used as Ss. Instead, Ss were hired as part-time employees specifically for the purpose of this research.

Tasks

Two tasks were investigated in the study, an inspection task and an assembly task. Forty Ss were assigned randomly to each of the tasks. Although the entire study was conducted at Midwest Stamping, the tasks were furnished by another Bowling Green firm, Marathon Special Products, a company manufacturing small parts for the electronics industry. The inspection and assembly tasks were selected for this investigation primarily because they represent highly repetitive countable operations with short cycle times. Moreover, it was thought that relatively little learning time would be required for the performance of these tasks. Both tasks were continuous operations with regular cycle times, and an attempt was made to minimize the psychological effects of the completion of batches or work lots.

The assembly task. The assembly job was composed of two highly similar tasks which were treated as a single task in the analysis. Of the 40 Ss performing the assembly task, 20 were assigned to the job of putting screws into terminal blocks. The terminal blocks used in the present study are small interlocking units made of plastic. A metal connector had been riveted inside of each block. The assembly job consisted

of driving two screws into each connector with an air-driven screwdriver. The blocks, which were fitted into a wooden fixture, were assembled in units of five.

The remaining 20 Ss in the assembly operation were given the job of putting screws into very small metal connectors which were to be used in the assembly of terminal blocks. Two screws were set into each connector by hand and were placed into a plastic fixture for assembly. For the smaller variety of connectors used in this task, spiral ratchet screwdrivers were used rather than the air guns. Although the average cycle times differed somewhat for the two assembly operations, the data from these tasks were pooled on the basis of two considerations (1) the two tasks seem to represent only a minor variation of the same job and (2) the learning curves for these tasks were highly similar. Moreover, the difference in cycle time was not regarded as important, since the principal experimental manipulation depended upon establishing a base rate for each individual S rather than computing a base rate from the performance of the entire group.

The inspection task. The inspection task required S to check the screws in the terminal blocks for degree of torque. As in the assembly task, each unit of work was composed of five blocks which were set into a wooden

fixture. After the blocks were placed into the fixture, S was required to tighten each screw with a conventional screwdriver prior to testing for degree of torque. A hand-held torque-limiting wrench which had been pre-set to the desired level of torque was used to test each screw. Turning the torque wrench in a clockwise direction produced a clicking sound when the desired torque had been reached.

Instructions for performing tasks. For both the inspection and assembly tasks, Ss were instructed to perform each operation in the manner specified by the experimenter in order to eliminate possible differences in rates due to daily variations in the strategy which they might have used for performing the tasks. Specifically, Ss were instructed that they should not depart from the specified instructions nor seek more efficient ways of performing their jobs.

Description of the Experimental Sessions

The five experimental sessions were conducted on consecutive days. Each session was three hours in length; however, working time was only two and one-half hours. In each session, there were three 50-minute work periods separated by two five-minute rest pauses.

The remainder of the session was used for instructions, practice, or obtaining written measures.

Prior to the first work session, S was instructed regarding the required method of performing the task. All Ss were asked to work at a comfortable rate of work, and were specifically instructed not to "race." Instructions were followed by a 10-minute period of practice. The three 50-minute work periods followed. After each work period, measures of output were obtained. No instructions or practice were given during the second, third, and fourth days of work. On the fifth day, a period of instruction was required to explain the experimental manipulation. Paper and pencil measures of attitude were obtained at the completion of the work period.

Layout and Apparatus

All Ss worked at benches which were separated by partitions in order that no S could observe another's rate of work. Each table top had a chute through which completed units could be dispensed into a basket. At the base of each chute a lever-operated Durant counter was mounted for the purpose of counting the completed units. The face of the counter was covered to prevent S from obtaining feedback about his work rate.

The assembly of terminal blocks required an air-driven screwdriver which was mounted overhead. A tray of screws was located on each table. Units were stored in a bin located on each S's right. To assemble the terminal blocks, five units were placed into a moveable wooden fixture which was positioned between two wooden parallels. The parallels were used to immobilize the fixtures during the time that the air gun was in use. Assembled units were counted by S and dispensed through the chute. All of the materials for the connector assembly were arranged on the table top. Two trays, one of connectors and another of screws, a small plastic fixture, and a spiral ratchet screwdriver were all that were required for the assembly.

Unlike the assembly task, Ss performing inspection were required to stand. The terminal blocks were taken from bins and placed into the wooden fixtures for inspection. All loose screws were tightened prior to inspection. After the screws were set to the proper torque, they were counted and dispensed.

The experimental manipulation required that S adjust his work rate to a timing apparatus mounted on the work bench. The timer which was connected to a Hunter 124S interval cyler consisted of a small metal

box on which a large green light had been mounted. Located below this light were two smaller flashing red lights. If, for example, S were instructed to adjust his work rate to a 60 second cycle, the timer would be set to 45 seconds of the steady green light followed by 15 seconds of the flashing red lights, the latter signaling the end of a complete cycle.

Experimental Treatments

The self-paced condition. The first four sessions for all Ss were run under the self-paced condition. In this condition, S was permitted to work at his own rate. No restrictions were placed upon the number of informal rest periods which S wished to take. S's output on the fourth day of work was used as a base rate for the assigned-pace condition. In order to obtain a meaningful base rate for each S, two conditions had to be satisfied: (1) that the time period from which the base rate was determined be unaffected by learning, and (2) that a high degree of reliability of output over sessions be demonstrated.

The assigned-pace condition. The assigned-pace condition required that each S work with the previously-described timing apparatus. There were five conditions of assigned pace.

1. The high-positive discrepancy condition in which the timer was set to 14 percent slower than S's base rate.
2. The low-positive discrepancy condition in which the timer was set to seven percent slower than S's base rate.
3. The no-discrepancy condition in which the timer was set to match S's base rate.
4. The low-negative discrepancy condition in which the timer was set to seven percent faster than S's base rate.
5. The high-negative discrepancy condition in which the timer was set to 14 percent faster than S's base rate.

S was instructed to attempt to "beat the clock," that is, to complete a unit of work (five pieces) within each time cycle. If S completed the work prior to the completion of a cycle, he was not permitted to use the remaining time for any work-related purposes. Specifically, S was not allowed to use the additional time remaining in a cycle to work or to set up for the next cycle. If S failed to complete a unit of work within the allotted time, he was instructed to increase his rate during subsequent cycles in order to make up the deficiency.

On fewer than 10 occasions, Ss continued to fall behind and were permitted to re-start from the beginning of a new cycle.

Of the 40 Ss performing each task, eight were randomly assigned to each of the five discrepancy conditions. Each S worked under just one of the five conditions for each of the three 50-minute periods within the final session.

The Pilot Study

The size of the units of discrepancy was determined on the basis of a pilot study. The problem was to find some unit of discrepancy which was large enough to be perceived as noticeably different from the person's preferred work rate. At the same time, the choice of too large of a discrepancy, particularly in the high-negative discrepancy condition, would result in frequent failure to complete a unit of work within the allotted time period. This choice, of course, would introduce effects of failure on satisfaction and was, therefore, judged to be undesirable.

In the pilot study, seven Ss were instructed to work for a 30-minute period of self-pace, a 20-minute period of a fast assigned-pace (the high-negative discrepancy condition), and a 10-minute period at their

maximum pace. On the basis of the pilot study, discrepancy units of 7 and 14 percent were judged to be optimal, because completion occurred for almost all trials. Larger units of discrepancy were associated with a substantially higher frequency of failure to complete.

One inadequacy of the pilot study was the inability to run Ss for a sufficient period of time to achieve a stabilized rate of learning. Practicality dictated that the pilot study be brief, although a psychophysical scaling procedure of the different work rates would have been desirable in order to determine just-noticeable-differences between rates and to ascertain their subjective distances from one another. Since Ss in the assigned-pace condition would work for two and one-half hours under the assigned rate, the proposed scaling operation would require equivalent time periods for pilot and experimental studies, which would have been impractical.

Measures

The following ratings of satisfaction, boredom, and fatigue were obtained from each S after completing the assigned-pace condition of work:

The Job Descriptive Index Work Scale (JDI) (Smith, Kendall, & Hulin, 1969). With the JDI, Ss were required to indicate their agreement with a set of adjectives

which are descriptive of satisfaction with work, itself. This particular subscale of the JDI combines both evaluative and descriptive items (Appendix A).

General Motor Faces Scale (Kunin, 1955). A five-point version of the Faces scale was used to obtain a summary evaluative rating of the task. Five faces were ordered in accordance with their scale values for this measure. S checked the face which most closely described his general feelings about his work (Appendix B).

The Evaluative Semantic Differential (ESD) (Osgood, 1957). Five pairs of polar adjectives representing Osgood's evaluative factor were used to measure satisfaction with the task. Total score was computed as the summed responses to the five seven-point scales (Appendix C).

Numerical rating scale of boredom. Degree of boredom was measured by a nine-point rating scale of boredom which was anchored at the extremes by the phrases "Not Bored" and "Very Bored" and at the midpoint by the phrase "About Average" (Appendix D).

Numerical rating scale of fatigue. A nine-point rating scale of fatigue was anchored at the extremes by the statements "Not Fatigued" and "Very Fatigued" and at the midpoint by the phrase "About Average" (Appendix E).

A seven-point scale of perceived work rate (SPS).

S was instructed to check the phrase which best described his perception of the rate of work which was required of him under the assigned-pace condition (Appendix F).

The Activity Semantic Differential (ASD) (Osgood, 1957). Five pairs of polar adjectives representing Osgood's activity factor were used as a measure of S's perception of his assigned rate of work (Appendix C).

For all of the above measures, S was instructed to respond on the basis of the assigned-pace condition rather than for the four-day period of work under conditions of self-pace.

The following relative ratings were also obtained and are denoted in the text by the letter R following the scale abbreviation:

Relative rating: Job Descriptive Index. The work scale of the JDI was used to obtain a rating of one's satisfaction with the assigned-pace task relative to his satisfaction with the self-paced task. In this method, the first (self-paced) task became the referent for rating the second (assigned-pace) condition. For each item of this scale, S rated the assigned-pace task as follows: "+" if S believed the second task to be more "creative," "hot," "useful," etc., than the self-paced condition; "=" if both conditions were rated as

identical with respect to the item, and "-" if the condition was judged as having less of any specific item. Total score was based upon the summed values of plus one, zero, and minus one. For example, an item was scored as plus one if a plus response was given to a positive item such as "creative" or a minus was given to a negative item such as "hot" (Appendix G).

The relative ratings were judged to be potentially useful, since it is quite possible that S may regard all conditions as equally dissatisfying, thus obscuring true differences between conditions. This would not be extremely surprising considering the nature of the tasks and the part-time status of the Ss. One advantage of relative ratings as compared to difference scores based upon absolute ratings of both conditions of work is that the former approach establishes a frame of reference or context for rating the second condition.

Relative rating: Faces. On a five-point Faces scale, satisfaction with the self-paced condition was set equal to the midpoint. The assigned-pace condition was rated relative to the self-paced condition and was scored in units of discrepancy from the midpoint (Appendix H).

Relative rating: The Evaluative Semantic Differential. Similarly, the midpoint of each scale for the polar

adjectives was arbitrarily set equal to S's satisfaction with the self-paced task and ratings of the assigned-pace condition were made relative to those points. Discrepancies were summed algebraically (Appendix I).

Relative rating: Boredom. Degree of boredom with the self-paced task was set to the midpoint of the rating scale and the assigned-pace condition was rated in relation to this midpoint (Appendix J).

Relative rating: Fatigue. Similarly, fatigue was measured on a numerical scale in relation to S's presumed rating of the self-paced condition (Appendix K).

Relative rating: The Activity Semantic Differential. Perceived rate of work under the assigned-pace condition was compared to work rate under the self-paced condition by the method of relative ratings (Appendix I).

The order of presentation of the measures used in the present study was counterbalanced as a precaution against possible order effects. Verbal instructions were used as required to supplement the written instructions.

Analysis

The relationship between the satisfaction measures and rate of work was predicted to be curvilinear. Planned comparisons were done for quadratic trend using orthogonal polynomials. For the predicted relationships with fatigue and boredom, tests of linear trend were

performed.

In order to deal with the problem of multiple tests and still retain a relatively powerful analysis, the .10 level of confidence was specified for any single test. However, no outcome was considered to be of practical significance unless the specified confidence level was met for both tasks. In effect, the theoretical significance level for this experiment was $(.10 \times .10) = .01$ at best.

A second analysis was done in which data from the Ss performing the assembly and inspection tasks were pooled. For this analysis, perceived rate of work rather than actual work rate was used as the "independent" variable. The same tests used for the analysis with actual rate were repeated. Practical significance was assumed only (1) if results significant at the .05 level for any single test were reconfirmed by another analysis with other measures of the same concept, or (2) if a significant result for a particular measure was reconfirmed for two or more measures of perceived rate.

Results

The intercorrelations among the measures of satisfaction, fatigue, boredom and perceived rate for the groups performing the assembly and inspection tasks are presented in Tables 1 and 2. Correlation coefficients

Table 1

Intercorrelations among Scales for Ss Performing Assembly Task (Decimals omitted)

	JDI	Faces	Boredom	Fatigue	ASD	ESD	SPS	JDI-R	Faces-R	Boredom-R	Fatigue-R	ASD-R
JDI												
Faces	58*											
Boredom	-47*	-54*										
Fatigue	-48*	-56*	66*									
ASD	08	04	-39	-03								
ESD	68*	71*	-60*	-62	02							
SPS	-12	-16	-17	12	62*	-30						
JDI-R	60*	74*	-55*	-63*	09	66*	-22					
Faces-R	49*	69*	-54*	-58*	-04	59*	-14	78*				
Boredom-R	-43*	-40*	76*	57	-37	-50*	-07	-76*	-68*			
Fatigue-R	-34	-49*	43*	70*	04	-52*	19	-75*	-65*	65*		
ASD-R	11	-01	-36	-08	81*	-01	56*	13	-06	-41	-06	
ESD-R	55*	73*	-59*	-57*	08	78*	-22	78*	69*	-66	-69*	11

*p < .01, both groups

Table 2

Intercorrelations among Scales for Ss Performing Inspection Task (Decimals omitted)

	JDI	Faces	Boredom	Fatigue	ASD	ESD	SPS	JDI-R	Faces-R	Boredom-R	Fatigue-R	ASD-R
JDI												
Faces	.56*											
Boredom	-.65*	-.55*										
Fatigue	-.40*	-.61*	.41*									
ASD	-.09	-.29	-.17	.28								
ESD	.66*	.58*	-.60*	-.39	-.06							
SPS	.01	-.15	-.05	.23	.57*	-.11						
JDI-R	.46*	.60*	-.50*	-.44*	-.14	.53*	-.06					
Faces-R	.45*	.65*	-.44*	-.51*	-.22	.58*	-.29	.65*				
Boredom-R	-.47*	-.53*	.56*	.36	-.15	-.60*	-.27	-.72*	-.60*			
Fatigue-R	-.38	-.69*	.44*	.77*	.34	-.55*	.24	-.69*	-.66*	.57*		
ASD-R	-.14	-.27	-.07	.29	.91*	-.15	.66*	-.16	-.19	-.13	.33	
ESD-R	.46*	.62*	-.51*	-.52*	.07	.62*	.01	.72*	.59*	-.70*	-.73*	.03

*p < .01, both groups

which were significant at the .01 level for both groups have been denoted by a single asterisk. Means and standard deviations of these measures are given in Tables 3 and 4 for the assembly and inspection groups.

Self-Paced Condition

Learning curves for the two assembly tasks and the inspection task are shown in Figure 1. It should be recalled that Ss worked for three 50-minute periods on each of four consecutive days of self-paced work.

The intercorrelations among the twelve work periods are presented for the combined assembly tasks and for the inspection task in Tables 5 and 6. Tables 7 and 8 are the intercorrelational matrices for the two types of tasks based upon each S's daily total output.

Assigned-Pace Condition

Actual rate of work was correlated with S's perception of his rate under the assigned-pace condition, the latter being measured by the seven-point scale of work rate and the Activity Semantic Differential (absolute and relative ratings). These correlations are shown in Table 9 for the assembly and inspection groups.

Job satisfaction. The six measures of job satisfaction used in this study included absolute and relative ratings of the work satisfaction scale of the JDI, the Faces scale, and the evaluative dimension of the Semantic

Table 3
Scale Means and Standard Deviations for Ss
Performing Assembly Task

Scales	Means	Standard Deviations
JDI	20.40	8.81
Faces	2.92	1.05
Boredom	5.00	2.33
Fatigue	5.07	2.30
Activity SD	22.25	6.66
Evaluative SD	20.50	5.48
SPS	3.62	1.39
JDI-R	0.92	7.40
Faces-R	-0.09	1.13
Boredom-R	-0.75	2.07
Fatigue-R	-0.20	2.32
Activity SD-R	2.82	6.27
Evaluative SD-R	0.42	5.73

Table 4
Scale Means and Standard Deviations for Ss
Performing Inspection Task

Scales	Means	Standard Deviations
JDI	12.87	8.19
Faces	2.57	0.98
Boredom	6.20	2.05
Fatigue	5.72	2.25
Activity SD	21.32	6.64
Evaluative SD	18.15	5.34
SPS	3.52	1.26
JDI-R	0.60	6.26
Faces-R	0.50	1.11
Boredom-R	-0.22	2.28
Fatigue-R	0.0	2.36
Activity SD-R	1.40	6.58
Evaluative SD-R	0.50	7.37

Fig. 1. Learning curves for assembly and inspection tasks.

Table 5

Intercorrelations among Work Periods for Ss
Performing Assembly Task (Decimals omitted)^a

Trial	1	2	3	4	5	6	7	8	9	10	11
1											
2	92										
3	90	94									
4	87	91	89								
5	84	89	88	95							
6	83	87	90	91	94						
7	83	85	84	90	93	94					
8	76	81	82	85	90	94	95				
9	83	87	85	87	89	93	94	95			
10	83	86	83	89	92	92	96	93	93		
11	85	86	84	91	92	93	95	93	95	98	
12	79	84	84	88	90	92	93	92	93	94	95

^a

All correlations significant at the .01 level.

Table 6
Intercorrelations among Work Periods for Ss
Performing Inspection Task (Decimals omitted)

Trials	1	2	3	4	5	6	7	8	9	10	11
1											
2	80*										
3	74*	85*									
4	77*	70*	72*								
5	71*	62*	68*	87*							
6	69*	55*	68*	82*	87*						
7	58*	32	38	60*	65*	67*					
8	62*	41*	48*	60*	67*	67*	87*				
9	48*	32	41*	42*	47*	60*	73*	79*			
10	43*	26	29	47*	46*	55*	69*	68*	78*		
11	46*	25	35	50*	51*	59*	64*	69*	69*	90*	
12	40*	26	45*	45*	51*	56*	63*	68*	71*	78*	89*

*p < .01

Table 7
Intercorrelations among Daily
Output Totals for Ss Performing
Assembly Task^a

Days	1	2	3
1			
2	.92		
3	.87	.94	
4	.87	.95	.98

^a All correlations significant at
.01 level.

Table 8

Intercorrelations among Daily Output
Totals for Ss Performing Inspection Task

Days	1	2	3
1			
2	.77*		
3	.50*	.65*	
4	.39	.53*	.75*

*p < .01

Table 9
Correlations between Actual and Perceived
Rate of Work

Measure of Perceived Rate	Assembly Task	Inspection Task
Seven-Point Scale	.42*	.51*
Activity Semantic Differential	.36	.45*
Activity Semantic Differential-R	.34	.50*

*p < .01

Differential. The .10 level of confidence was designated for each analysis; no result, however, was considered to be of practical significance unless this confidence level was met for the analysis of both tasks. Accordingly, these data are interpreted in the following tables only with regard to this joint confidence level. The results of these analyses are summarized in Table 10 for the satisfaction measures. None of the findings was statistically significant.

Fatigue and boredom. Absolute and relative measures of fatigue and boredom were obtained with a nine-point rating scale. The results of these analyses which are given in Table 11 indicate that none of the hypotheses was confirmed.

Analysis by Perceived Rate of Work

Data from the assembly and inspection tasks were pooled for several analyses in which S's perception of his work rate under the assigned-pace condition was treated as the "independent" variable. Based upon their responses to the seven-point scale, Ss were grouped into four categories, while the distribution of scores for the absolute and relative ratings of the Evaluative Semantic Differential resulted in six groups of Ss. The rationale for choosing the specific number of groups depended primarily upon the ability to obtain groupings

Table 10

Planned Comparisons for Quadratic Trend between Satisfaction
and Discrepancies from Self-Pace

Sources of Variation	Assembly Task			Inspection Task			Joint F Ratio
	Sums of Squares	DF	Mean Squares	Sums of Squares	DF	Mean Squares	
Job Descriptive Index							
Quadratic	135.52	1	135.52	126.86	1	126.86	ns
Within	2857.00	35	81.63	2410.12	35	68.86	
Total	3025.60	39		2614.37	39		
Faces							
Quadratic	2.07	1	2.07	5.69	1	5.69	ns
Within	39.62	35	1.13	30.37	35	0.87	
Total	42.78	39		37.77	39		

Table 10 (continued)

Sources of Variation	Assembly Task			Inspection Task			Joint F Ratio
	Sums of Squares	DF	Mean Squares	Sums of Squares	DF	Mean Squares	
Faces-R							
Quadratic	0.73	1	0.73	3.92	1	3.92	ns
Within	45.75	35	1.31	38.75	35	1.11	
Total	49.60	39		47.90	39		
Evaluative Semantic Differential-R							
Quadratic	25.96	1	25.96	139.06	1	139.06	ns
Within	1164.12	35	33.26	1760.25	35	50.29	
Total	1279.77	39		2117.90	39		

Table 10 (continued)

Sources of Variation	Assembly Task			Inspection Task			Joint F Ratio
	Sums of Squares	DF	Mean Squares	Sums of Squares	DF	Mean Squares	
Evaluative Semantic Differential							
Quadratic	32.31	1	32.31	21.48	1	21.48	ns
Within	1054.50	35	30.13	1028.50	35	29.38	
Total	1172.00	39		1113.10	39		
Job Descriptive Index-R							
Quadratic	133.23	1	133.23	80.92	1	80.92	ns
Within	1965.87	35	56.17	1270.75	35	36.31	
Total	2134.77	39		1527.60	39		

Table 11

Planned Comparisons for Linear Trend between
Fatigue and Boredom Measures and Discrepancies from Self-Pace

Sources of Variation	Assembly Task			Inspection Task			Joint F Ratio
	Sums of Squares	DF	Mean Squares	Sums of Squares	DF	Mean Squares	
Fatigue							
Linear	9.80	1	9.80	5.04	1	5.04	ns
Within	181.62	35	5.19	175.88	35	5.02	
Total	206.78	39		197.98	39		
Fatigue-R							
Linear	6.09	1	6.09	4.49	1	4.49	ns
Within	192.75	35	5.51	186.75	35	5.34	
Total	210.40	39		218.00	39		

Table 11 (continued)

Sources of Variation	Assembly Task			Inspection Task			Joint F Ratio
	Sums of Squares	DF	Mean Squares	Sums of Squares	DF	Mean Squares	
Boredom							
Linear	0.49	1	0.49	0.32	1	0.32	ns
Within	199.00	35	5.68	127.35	35	3.65	
Total	212.00	39		164.40	39		
Boredom-R							
Linear	1.24	1	1.24	0.20	1	0.20	ns
Within	156.25	35	4.46	167.38	35	4.78	
Total	167.50	39		202.97	39		

that were as nearly as possible equal in size.

Job satisfaction. Analyses for quadratic trend were done for the six satisfaction measures previously mentioned. The .05 level of confidence was specified for all tests. While this confidence level may appear to be low considering the number of tests, no statistically significant result was considered to be of practical importance unless (1) statistical significance was also demonstrated for the same scale using different measures of perceived rate, or (2) statistical significance was demonstrated for other measures of the same concept using the same or different measures of perceived rate.

The results of the analysis of perceived rate of work and job satisfaction are presented for the seven-point scale (Table 12), for absolute ratings of the Activity Semantic Differential (Table 13), and for relative ratings of the Activity Semantic Differential (Table 14). For the seven-point scale of perceived rate of work, quadratic trends were demonstrated for four of the six measures of job satisfaction (absolute and relative ratings of the Evaluative Semantic Differential, relative ratings of both the JDI and the Faces scale). None of the satisfaction measures showed significant trends for the set of analyses using the Activity Semantic

Table 12

Planned Comparisons for Quadratic Trend between Satisfaction and
Perceived Rate of Work by the Seven-Point Scale

Sources of Variation	Sums of Squares	DF	Mean Squares	F
Job Descriptive Index				
Quadratic	164.15	1	164.15	1.91
Within	6517.47	76	85.76	
Total	6772.49	79		
Faces				
Quadratic	2.66	1	2.66	2.58
Within	78.51	76	1.03	
Total	83.00	79		
Evaluative Semantic Differential				
Quadratic	236.65	1	236.65	8.67*
Within	2074.34	76	27.29	
Total	2395.55	79		

Table 12 (continued)

Sources of Variation	Sums of Squares	DF	Mean Squares	F
Job Descriptive Index-R				
Quadratic	176.05	1	176.05	4.01*
Within	3332.67	76	43.85	
Total	3664.49	79		
Faces-R				
Quadratic	6.40	1	6.40	5.51*
Within	88.05	76	1.16	
Total	97.95	79		
Evaluative Semantic Differential-R				
Quadratic	507.05	1	507.05	13.47*
Within	2861.29	76	37.65	
Total	3400.49	76		

*p < .05

Table 13

Planned Comparisons for Quadratic Trend between Satisfaction and
Perceived Rate of Work Measured by the Activity Semantic Differential

Sources of Variation	Sums of Squares	DF	Mean Squares	F
Job Descriptive Index				
Quadratic	22.49	1	22.49	4.1
Within	6639.11	74	89.72	
Total	6772.49	79		
Faces				
Quadratic	0.19	1	0.19	4.1
Within	80.07	74	1.08	
Total	83.00	79		
Evaluative Semantic Differential				
Quadratic	113.24	1	113.24	3.69
Within	2266.26	74	30.63	
Total	2395.55	79		

Table 13 (continued)

Sources of Variation	Sums of Squares	DF	Mean Squares	F
Job Descriptive Index-R				
Quadratic	21.59	1	21.59	4.1
Within	3590.03	74	48.51	
Total	3664.49	79		
Faces-R				
Quadratic	3.61	1	3.61	3.01
Within	88.46	74	1.20	
Total	97.95	79		
Evaluative Semantic Differential-R				
Quadratic	86.54	1	86.54	1.95
Within	3288.82	74	44.44	
Total	3400.49	79		

Table 14

Planned Comparisons for Quadratic Trend between Satisfaction and
Perceived Rate of Work Measured by the Activity Semantic Differential-R

Sources of Variation	Sums of Squares	DF	Mean Squares	F
Job Descriptive Index				
Quadratic	217.30	1	217.30	2.58
Within	6211.88	74	83.94	
Total	6772.49	79		
Faces				
Quadratic	3.35	1	3.35	3.45
Within	71.84	74	0.97	
Total	83.00	79		
Evaluative Semantic Differential				
Quadratic	108.29	1	108.29	3.88
Within	2061.72	74	27.86	
Total	2395.55	79		

Table 14 (continued)

Sources of Variation	Sums of Squares	DF	Mean Squares	F
Job Descriptive Index-R				
Quadratic	232.00	1	232.00	5.05*
Within	3394.76	74	45.88	
Total	3664.49	79		
Faces-R				
Quadratic	2.57	1	2.57	2.14
Within	86.39	74	1.67	
Total	97.95	79		
Evaluative Semantic Differential-R				
Quadratic	20.01	1	20.01	4.30*
Within	343.98	74	4.65	
Total	375.99	79		

*p < .05

Differential; however, a significant quadratic trend was demonstrated for the relative rating of the JDI with the relatively-rated Activity Semantic Differential. Figures 2, 3, and 4 are graphic representations of the significant quadratic trends for the JDI, the Faces scale, and the Evaluative Semantic Differential.

Fatigue and boredom. A linear trend for the fatigue measures was demonstrated (absolute and relative ratings) only with the seven-point scale of work rate (Table 15). The trend analyses for the boredom measures were significant in the case of the ratings of boredom for the Activity Semantic Differential, and for the relatively rated boredom scale with the relatively rated Activity Semantic Differential (Table 16).

Discussion

Self-Paced Condition

The learning curves shown in Figure 1 indicate that an asymptote had not been reached for any of the three tasks. Since output on the fourth day of work (trials 10, 11, and 12) was used as the basis for determining S's work rate under the assigned-pace condition, the fact that output continued to increase on this day must be viewed as a problem with respect to obtaining the desired experimental effect. Even though the rates of learning had decreased considerably

Fig. 2. Quadratic trends between two measures of perceived rate and the relatively-rated Job Descriptive Index.

Fig. 3. Quadratic trend between perceived rate of work measured by the seven-point scale and satisfaction measured by Faces-R.

Fig. 4. Quadratic trends between two measures of satisfaction and the seven-point scale of perceived work rate.

Table 15
Planned Comparisons for Linear Trend between Fatigue
and Perceived Rate of Work

Sources of Variation		Sums of Squares	DF	Mean Squares	F
Seven-Point Scale					
Fatigue	Linear	25.79	1	25.79	5.06*
	Within	287.41	76	5.09	
	Total	413.20	79		
Fatigue-R	Linear	30.36	1	30.36	5.81*
	Within	396.81	76	5.22	
	Total	429.20	79		
Activity Semantic Differential					
Fatigue	Linear	8.84	1	8.84	1.61
	Within	389.76	76	5.27	
	Total	413.20	79		
Fatigue-R	Linear	19.99	1	19.99	3.66
	Within	404.30	76	5.46	
	Total	429.20	79		

Table 15 (continued)

Sources of Variation		Sums of Squares	DF	Mean Squares	F
Activity Semantic Differential-R					
Fatigue	Linear	3.33	1	3.33	◀ 1
	Within	366.16	76	4.95	
	Total	413.20	79		
Fatigue-R	Linear	4.00	1	4.00	◀ 1
	Within	395.92	76	5.35	
	Total	429.20	79		

*p < .05

Table 16
Planned Comparisons for Linear Trend between Boredom
and Perceived Rate of Work

Sources of Variation		Sums of Squares	DF	Mean Squares	F
Seven-Point Scale					
Boredom	Linear	3.28	1	3.28	4.1
	Within	369.74	76	4.86	
	Total	405.20	79		
Boredom-R	Linear	7.24	1	7.24	1.69
	Within	324.87	76	4.27	
	Total	375.99	79		
Activity Semantic Differential					
Boredom	Linear	28.15	1	28.15	5.66*
	Within	367.83	76	4.97	
	Total	405.20	79		
Boredom-R	Linear	15.40	1	15.40	3.28
	Within	346.79	76	4.69	
	Total	375.99	79		

Table 16 (continued)

Sources of Variation		Sums of Squares	DF	Mean Squares	F
Activity Semantic Differential-R					
Boredom	Linear	7.24	1	7.24	1.52
	Within	353.95	76	4.78	
	Total	405.20	79		
Boredom-R	Linear	20.01	1	20.01	4.30*
	Within	343.98	76	4.65	
	Total	375.99	79		

*p < .05

by the fourth day, even small amounts of continued learning could have had a substantial effect upon the assigned rate, which was based upon relatively small discrepancies from the base rate. As a result of this continued learning, the positive discrepancy condition would be exaggerated, the no-discrepancy condition would become a positive discrepancy, and the negative-discrepancies would be less negative, perhaps in some cases positive.

Correlations were relatively high among time blocks within a given day (Tables 5 and 6) and among totals across days (Tables 7 and 8). The assembly task in particular produced extremely high intercorrelations. In order to demonstrate that a relatively stable self-pace exists for most workers, it was necessary to obtain high correlations across days after learning rate had stabilized. While the obtained reliability coefficients were relatively high, these correlations offer support only for the relative stability of output over days. The problem of continued learning over the first four days of the experiment precludes any firm conclusions regarding the absolute stability of one's self-pace.

Assigned-Pace Condition

The relationship of actual and perceived rate of work. The fact that learning continued through the

fourth day of work probably would not account for the relatively poor correlations between actual and perceived work rate under the assigned-pace condition (Table 9). Mean ratings of perceived rate would be displaced as a result of this problem; however, this displacement should be systematic and should not affect correlations (except to the extent that range may be restricted). Moreover, the relatively high correlations between output totals for consecutive days indicates that differences in changes in learning rates among Ss were not pronounced; consequently, it would not seem that the low correlations with perceived work rate could be attributed to this factor.

The importance of obtaining large correlations between actual and perceived work rate should not be minimized. The success of the experimental manipulation in producing the intended corresponding perception of work rate was judged to be a critical factor in this research. Logically, there seems to be no basis for expecting a relationship between actual work rate and job satisfaction unless differences in rate of work are noticeably different. As previously indicated, psychophysical scaling of different work rates was considered to be impractical. Regrettably, two important questions remain unanswered (1) Were all rates noticeably different from one another? and (2) Were the psychophysical scale

separations at least approximately equal? A negative finding in either case, particularly with respect to the question of inds, would tend to lower correlations between actual and perceived rate of work.

One hypothesis, if confirmed, which would help to explain these low correlations is that a person's perceived rate of work may be a function of his satisfaction with the task. Actual rate of work and job satisfaction may have an interactive effect upon the perception of work rate. A person's perception of his work rate may, in part, reflect his attitude towards the work. A worker who is satisfied with a particular task may perceive a very fast rate of work (actual) as somewhat slower than the rate perceived by a dissatisfied worker. Conversely, a satisfied worker may judge a very slow work rate to be faster than that perceived by a dissatisfied worker.

The results of several analyses shown in Table 17 are consistent with the hypothesis regarding the moderating effect of satisfaction upon perception. In the analysis, each of the five measures of satisfaction was dichotomized into the upper and lower 50 percent.¹ F ratios for interactions were computed between actual rate of work and each satisfaction measure, with three measures of perceived rate as the dependent variables. None of the interactions

Table 17

Analysis of Variance Test of Interaction between
Actual and Perceived Work Rate and Job Satisfaction

Measure of Perceived Rate	Sources of Variation	Sums of Squares	DF	Mean Squares	F
Job Descriptive Index					
SPS	Interaction	12.05	4	3.01	2.35
	Within cells	89.71	70	1.28	
	Total	137.55	79		
ASD	Interaction	174.57	4	43.64	1.20
	Within cells	2533.89	70	36.20	
	Total	3465.39			
ASD-R	Interaction	243.19	4	60.80	1.90
	Within cells	2240.47	70	32.00	
	Total	3267.99	79		

Table 17 (continued)

Measure of Perceived Rate	Sources of Variation	Sums of Squares	DF	Mean Squares	F
Faces					
SPS	Interaction	10.36	4	2.59	2.12
	Within cells	85.26	70	1.22	
	Total	137.55	79		
ASD	Interaction	202.75	4	50.69	1.50
	Within cells	2371.06	70	33.87	
	Total	3465.39	79		
ASD-R	Interaction	193.79	4	48.45	1.54
	Within cells	2203.25	70	31.47	
	Total	3267.99	79		
Evaluative Semantic Differential					
SPS	Interaction	16.95	4	4.24	3.58*
	Within cells	82.80	70	1.18	
	Total	137.55	79		
ASD	Interaction	383.21	4	95.80	2.87*
	Within cells	2340.66	70	33.44	
	Total	3465.39	79		
ASD-R	Interaction	297.02	4	74.26	2.37
	Within cells	2189.28	70	31.28	
	Total	3267.99	79		

Table 17 (continued)

Measure of Perceived Rate	Sources of Variation	Sums of Squares	DF	Mean Squares	F
Job Descriptive Index-R					
SPS	Interaction	20.02	4	5.00	4.35*
	Within cells	80.54	70	1.15	
	Total	137.55	79		
ASD	Interaction	325.22	4	81.30	2.37
	Within cells	2395.54	70	34.22	
	Total	3465.39	79		
ASD-R	Interaction	367.62	4	91.90	3.04*
	Within cells	2118.68	70	30.27	
	Total	3267.99	79		
Evaluative Semantic Differential-R					
SPS	Interaction	13.85	4	3.46	2.70*
	Within cells	89.81	70	1.28	
	Total	137.55	79		
ASD	Interaction	338.71	4	84.68	2.47
	Within cells	2398.30	70	34.26	
	Total	3465.39	79		
ASD-R	Interaction	458.93	4	114.73	3.90*
	Within cells	2059.01	70	29.41	
	Total	3267.99	79		

*p < .05

for the JDI and the Faces scale was significant; however, for the relatively-rated JDI and the Evaluative Semantic Differential (absolute and relative ratings) six of nine interactions were significant at the .05 level. Tables 18-23 show cell means for the significant interactions. In each case, the direction of the interaction agreed with this post hoc hypothesis. Satisfied Ss perceived lower work rates than dissatisfied Ss at higher (actual) rates. For lower work rates, satisfied workers perceived higher rates than did dissatisfied workers. Of course, these interactions would serve to diminish correlations between actual and perceived rates of work.

Correlations are presented in Table 24 between actual and perceived work rates for the total sample and for high and low groups based upon the three measures of satisfaction for which significant interactions were obtained. In all cases, the moderated correlations for the high-satisfaction group were smaller than the corresponding correlations based upon the total sample; while correlations for the low-satisfaction groups were larger than total-group correlations. For the nine pairs of correlations based upon the upper and lower halves of the three satisfaction measures, z tests for the

Table 18

Cell Means for Interaction between Seven-Point
Scale of Perceived Rate, Actual Rate, and
Score on Evaluative Semantic Differential

Assigned-Pace Treatment Group	Mean Perceived Work Rate
High Satisfaction Group	
High negative	3.00
Low negative	3.33
No discrepancy	3.60
Low positive	4.00
High positive	3.17
Low Satisfaction Group	
High negative	2.67
Low negative	2.00
No discrepancy	3.83
Low positive	4.50
High positive	4.90

Table 19

Cell Means for Interaction between Perceived
Rate Measured by Activity Semantic Differential,
Actual Rate, and Score on Evaluative
Semantic Differential

Assigned-Pace Treatment Group	Mean Perceived Work Rate
High Satisfaction Group	
High negative	21.50
Low negative	20.89
No discrepancy	17.70
Low positive	25.83
High positive	27.00
Low Satisfaction Group	
High negative	17.50
Low negative	14.71
No discrepancy	24.00
Low positive	23.50
High positive	25.90

Table 20

Cell Means for Interaction between Seven-Point
Scale of Perceived Rate, Actual Rate, and
Score on the Job Descriptive Index-R

Assigned-Pace Treatment Group	Mean Perceived Work Rate
High Satisfaction Group	
High negative	3.12
Low negative	3.30
No discrepancy	3.57
Low positive	3.71
High positive	3.43
Low Satisfaction Group	
High negative	2.62
Low negative	1.83
No discrepancy	3.78
Low positive	4.78
High positive	4.89

Table 21

Cell Means for Interaction between Perceived
Rate Measured by Activity Semantic
Differential-R, Actual Rate, and
Score on Job Descriptive Index-R

Assigned-Pace Treatment Group	Mean Perceived Work Rate
High Satisfaction Group	
High negative	2.62
Low negative	-0.30
No discrepancy	-0.57
Low positive	1.86
High positive	7.86
Low Satisfaction Group	
High negative	-1.75
Low negative	-6.33
No discrepancy	4.33
Low positive	5.22
High positive	5.89

Table 22

Cell Means for Interaction between Seven-Point
Scale of Perceived Rate, Actual Rate, and Score
on Evaluative Semantic Differential-R

Assigned-Pace Treatment Group	Mean Perceived Work Rate
High Satisfaction Group	
High negative	3.25
Low negative	3.25
No discrepancy	3.62
Low positive	4.00
High positive	3.67
Low Satisfaction Group	
High negative	2.50
Low negative	1.80
No discrepancy	3.71
Low positive	4.56
High positive	4.60

Table 23

Cell Means for Interaction between Perceived Rate
 Measured by Activity Semantic Differential-R,
 Actual Rate, and Score on Evaluative Semantic
 Differential-R

Assigned-Pace Treatment Group	Mean Perceived Work Rate
High Satisfaction Group	
High negative	4.00
Low negative	-0.58
No discrepancy	0.50
Low positive	1.71
High positive	9.33
Low Satisfaction Group	
High negative	-3.12
Low negative	-6.00
No discrepancy	3.86
Low positive	5.33
High positive	5.20

Table 24
Correlations between Actual and Perceived Work Rate
Moderated by Job Satisfaction^a

Satisfaction Scores	Seven-Point Scale	Activity Semantic Differential	Activity Semantic Differential-R
High group: ESD	.18	.30	.29
Low group: ESD	.63	.52	.54
(r total)	(.46)	(.40)	(.42)
High group: JDI-R	.15	.35	.30
Low group: JDI-R	.65	.45	.51
(r total)	(.46)	(.40)	(.42)
High group: ESD-R	.25	.33	.29
Low group: ESD-R	.59	.47	.54
(r total)	(.46)	(.40)	(.42)

^a
r_{total} is correlation between actual rate and measures of perceived rate for total sample (N = 80).

difference between correlation coefficients resulted in only three significant differences. This finding may be somewhat misleading, particularly because of the small sample size which resulted from dichotomizing the groups by satisfaction scores. The probability is approximately $.002 \left[\left(\frac{1}{2} \right)^9 \right]$ that all nine correlations for the low-satisfaction groups would be greater than the nine corresponding correlations for the high-satisfaction groups as a result of random sampling alone.

Analysis by Actual Rate of Work

The previous discussion seems to have a considerable bearing upon the negative results of this dissertation. In light of the interactions between satisfaction and work rate, the failure to demonstrate the predicted relationships with satisfaction, fatigue, and boredom is not surprising. Moreover, it would appear that any attempt to relate work rate and attitude would be hampered to the extent that one's perception of his rate of work may be affected by his attitude.

Analysis by Perceived Rate of Work

As described previously, a second analysis was done regarding the principal hypotheses in which perceived work rate instead of actual rate was treated as the independent variable.

Job satisfaction, fatigue, and boredom. The analyses using the seven-point scale of work rate were considerably

more successful than were the analyses with the other measures of rate. Since no measure of reliability was obtained for the scales, there is no way of determining whether this factor affected the analysis. Correlations between absolute and relative ratings of work rate with the Activity Semantic Differential were relatively high (Tables 1 and 2); however, correlations of these measures with the seven-point scale were much lower. That the seven-point scale may be more valid for the measurement of work rate, is suggested by the positive results obtained with four measures of satisfaction, most of which are only moderately intercorrelated (Tables 1 and 2).

Because it was necessary to subdivide the response distributions of the work rate measures into approximately equal groups for analyses, the groups were not equidistant from one another with respect to perceived rate. One assumption of planned comparisons for trend using orthogonal polynomials is that the scale separations among treatment groups be equal (Hays, 1963). While the importance of this assumption was recognized, the sample size was too small to make such a breakdown possible. Because of this problem and, also, because replication was not possible, subsequent research should be done to determine whether the results of the analysis by perceived work rate can be further substantiated.

Implications for Future Research

The problem of causality. The interaction between job satisfaction and actual and perceived work rate is, in the author's opinion, a significant finding which deserves further investigation. One important problem which arises from the results of this research deals with the direction of causality. While satisfaction may determine one's perception of his work rate, the opposite interpretation is equally tenable.

The results of the present investigation do not offer any evidence which bears upon the question of causality. In a somewhat arbitrary and, frankly, indefensible manner, one part of this study has implied that satisfaction may determine perceived work rate (the interaction), while in another section, the opposite relationship was assumed (the curvilinear relationship). In part, these designations were merely a matter of convenience. It should be noted that the curvilinear relationship between perceived rate and satisfaction is not a sufficient condition to account for their interaction. While the two relationships mentioned here are regarded as the principal findings of this investigation, there is no basis for deciding whether they represent two independent outcomes or merely two interpretations of a single outcome.

Undoubtedly, the most direct solution to this problem would require that an experiment be done in which both factors are independently manipulated. The difficulties of successfully manipulating satisfaction and perception of work rate need not be elaborated.

One possible approach for establishing causality would require that measures of satisfaction and perceived rate of work be taken for each S at high, moderate, and low actual rates. If satisfaction proved to be stable across different rates of work, then the sample would be dichotomized into satisfied and dissatisfied Ss. Difference scores reflecting disparities between S's perception of the moderate and extreme rates could be used as the basis for testing whether greater change in perception would occur for the dissatisfied Ss than for the satisfied ones. A positive result would establish satisfaction as a causal factor with respect to the perception of work rate.

Summary and Conclusions

The present research was undertaken for the purpose of investigating the effects of work rate on job satisfaction. The primary hypothesis of curvilinearity between discrepancies from self-pace and job satisfaction was not confirmed. However, the U-shaped relationship with satisfaction was supported when perceived rate of work

rather than actual rate of work was used as the independent variable in the analysis. Correlations between actual and perceived work rate were moderate. The latter finding was explained, in part, by a statistical interaction between actual rate, perceived rate, and satisfaction. Whether satisfaction determines the differential perception of work rate, is a question which goes beyond the scope of this dissertation.

The potential importance of establishing a causal relationship between satisfaction and perception of work rate should be re-emphasized. If this hypothesis were confirmed, this finding would have a far-reaching effect upon industrial psychology. The value of demonstrating that high satisfaction among workers does have some tangible "payoff" is self-evident.

Such a finding would suggest that job satisfaction may have the same sort of differential effect upon tolerance for other extreme conditions such as noise and heat. Of course, this speculation presupposes that the hypothesis in question would, in fact, be confirmed. While the present study should be viewed as preliminary in nature, the results of this research seem to be encouraging.

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1

Relative ratings for the Faces scale were not analyzed, because it was not possible to obtain approximately equal cells.

Appendices

Appendix A

Think of your present work. What is it like most of the time? In the blank besides each word given below, write

Y for "Yes" if it describes your work
N for "No" if it does NOT describe it
? if you cannot decide

.....

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

Appendix B

Put a check under the face that best expresses how you feel about the work you did TODAY.

☐ ☐ ☐ ☐ ☐

Appendix C

Rate the work you did TODAY using the following pairs of adjectives. For each pair of adjectives listed below, there is a corresponding line which has been divided into seven parts. You are to indicate your attitude about the work which you have done TODAY by placing a checkmark somewhere along each of the broken lines.

[illegible]

Appendix D

Circle the number below which best describes the extent
to which you were bored by the work you did TODAY.

Circle only one number

Not Bored

About Average

Very Bored

1 2 3 4 5 6 7 8 9

Appendix E

Circle the number below which best describes the extent to which you found the work TODAY to be fatiguing.

Circle only one number

Not Fatigued

About Average

Very Fatigued

1 2 3 4 5 6 7 8 9

Appendix F

Check the one statement below which best describes your feelings about the rate at which you were required to work TODAY.

CHECK ONLY ONE

MUCH TOO FAST	_____
TOO FAST	_____
SLIGHTLY TOO FAST	_____
ABOUT RIGHT	_____
SLIGHTLY TOO SLOW	_____
TOO SLOW	_____
MUCH TOO SLOW	_____

Appendix G

INSTRUCTIONS

Examples of how you might
rate your feelings about
the work you did TODAY

<u>=</u>	Precise
<u>+</u>	Amusing
<u>-</u>	Fast

In the column above are examples of how you might rate your feelings about the work you did TODAY compared with your feelings about the work you did over the past four days.

The = sign in the example means that you rate TODAY's work and the work you did previously to be equally Precise.

The + sign in the example means that you rate the work TODAY to be more Amusing than the work you did before.

The - sign in the example means that you rate the work TODAY to be less Fast than the work you did before.

Using the signs of "+," "-", or "=", rate your feelings about TODAY's work compared to how you feel about the work you did previously.

Appendix G (continued)

Use the signs below to rate your feelings about TODAY's work:

+ for MORE THAN

- for LESS THAN

= for EQUAL TO

Your ratings of TODAY's work

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

Appendix H

We want to know what your feelings are about the work you did TODAY in comparison with your feelings about the work you did before. Assume that you rated the previous work by checking the third face in the rating scale below. It doesn't really matter whether you actually would rate the previous work by checking the third face; however we want you to assume that you did. Using this rating as a reference point, rate your general feelings about the work you did TODAY. In a sense, you are comparing your general feeling about TODAY's work with that of the previous work.

Your general feelings
about the work you did
prior to today

<p>Your rating of the previous work</p>

quick _____:_____:_____:_____:_____:_____:_____ slow

good _____:_____:_____:_____:_____:_____:_____ bad

unfair _____:_____:_____:_____:_____:_____:_____ fair

active _____:_____:_____:_____:_____:_____:_____ passive

pleasant _____:_____:_____:_____:_____:_____:_____ unpleasant

relaxed _____:_____:_____:_____:_____:_____:_____ tense

calm _____:_____:_____:_____:_____:_____:_____ excitable

negative _____:_____:_____:_____:_____:_____:_____ positive

worthless _____:_____:_____:_____:_____:_____:_____ valuable

busy _____:_____:_____:_____:_____:_____:_____ lazy

Appendix J

We want to know what your feelings are about the work you did TODAY in comparison with your feelings about the work you did over the four previous days. Assume that you rated the work you did before as a zero on the scale below. It doesn't really matter whether you actually rated the work as a zero; however we want you to assume that you did. Using this rating as a reference point, rate the degree of boredom you experienced in TODAY's work. In a sense, you are comparing your feeling of boredom TODAY with that of the previous four days.

Appendix K

We want to know what your feelings are about the work you did TODAY in comparison with your feelings about the work you did over the four previous days. Assume that you rated the work you did before as a zero on the scale below. It doesn't really matter whether you actually rated the work as a zero; however we want you to assume that you did. Using this rating as a reference point, rate the degree of fatigue you experienced in TODAY's work. In a sense, you are comparing your feeling of fatigue TODAY with that of the previous four days.