

The 4/4 Work Schedule: Impact on Employee Productivity and Work Attitudes in a Continuous Operation Industry

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Abstract

This study compared the productivity and work attitudes of employees on a 6/2 work schedule (n=66) to employees on a 4/4 work schedule (n=132) in four continuous operation facilities. Findings suggest that employees on the 4/4 work schedule were more productive, had better attitudes toward the job itself, and were generally found to have more favorable co-worker attitudes. Researchers suggest that if attempting to implement this work schedule, management should consider that the schedule is favored by younger workers and by women. The authors suggest further research is needed to determine which types of jobs and operations would especially benefit from the 4/4 work schedule and to determine the effect that length of time on the schedule might have on employee productivity and attitudes.

Introduction

This study examines productivity and work attitudes of employees on the 4/4 work schedule in a continuous operation industry. Many modern industries are dependent on continuous operation facilities, examples are electric companies, oil refineries, and water plants. While the least complicated work schedule for most continuous operation facilities is the 6/2 work schedule (6 days at work and 2 days off), human resource managers and production managers are continuously seeking to improve scheduling for this type of shift work. The 4/4 work schedule is a form of an alternative work schedule for continuous operations facilities that compresses the work week into a schedule where the employee spends 4 days at work and 4 days off of work by using 12 hour work days. By comparing employee and supervisor attitudes of the 6/2 work schedule to the 4/4 work schedule, this study can contribute to the growing body of literature on compressed work week scheduling and also assist business and management in planning for the round-the-clock work force.

Literature Review and Hypotheses

The general theme of research during the 1980's portrayed the shift worker as having worse mental and physical health, less sleep, fewer friends, more disrupted family relationships, and one who is in general, out of step with the rhythms of life (See Rotational Shiftwork:

CCOHS Report, 1988; Tippins and Stroh, 1991). The report by the Canadian Centre for Occupational Health and Safety lists some of the problems encountered by rotational shift workers. These include: problems with breathing, digestion, sleep and wake cycles, blood pressure, stomach disorders, heart attacks, more interference with family life, and more accidents and injuries.

Jamal (1981) reported that one fourth of the labor force in the U.S. and Canada had shiftwork schedules, and that the rate was growing at about one percent per year. Current estimates are that over 25% of working men and nearly 20% of working women are involved in its growth (Verespej, 1990). Much of the research involving shiftwork in continuous operation industries has examined the traditional eight hour 6/2 work schedule. The 6/2 work schedule is 6 eight hour work days with two days off. This traditional continuous operation schedule is used most frequently because it is believed to be easier to schedule and implement than most other continuous operation schedules. This schedule is the simplest to staff on a 24 hour basis because supervisors can use three shifts on 8 hour days. Recently, however, researchers have begun to examine alternative schedules compressing the work week into fewer days, but longer hours each day (Tepas, 1985).

The most common form of the compressed work week

is working 4 ten hour days and then having 3 days off (Tepas, 1985). There are, however, other forms of the compressed work week. The 12-hour shift schedule (also known as the Dupont work schedule) incorporates three primary shift patterns (Stafford, Sherman, McCollum, 1988). The 3/3 shift pattern has employees working three consecutive 12 hour days, followed by three consecutive days off. While little research exists on this form, a salient disadvantage to the employee would be a reduction in pay during some weeks (Stafford, et al., 1988) because workers are only working a 36 hour week. The 3/2/2 pattern has been used by the Monsanto plants and is more complex. Stafford and associates (1988, p.52) note: "During a two week cycle, an employee works two days, is off two; works two days, is off three; works two days, is off two."

The shift system in continuous operation industries that appears most advantageous to both the employer and employee, the 4/4 work schedule, compresses the workweek to four days using 12-hour shifts. The 4/4 work schedule may have advantages because the workers receive four days off after four days work in a consistent manner (United Steelworkers Union, 1983).

Productivity

A recent study of white collar engineers reported that personal business could be conducted more efficiently and productivity improved with the 4/4 work schedule because of increased work continuity, while customer service improved by extending the hours. In contrast, they indicated a restricted ability to engage in weekday evening activities and a more difficult evening commute (Economides, Neck, & Schub, 1989).

An Exxon facility in Winnipeg Canada piloted the 12-hour shift in 1970 for a trial period of 9 months. At the conclusion of the trial period, the employees voted unanimously to continue the schedule. Eventually, Exxon permanently adopted the 12-hour shift to more than 20 other facilities (Economides, et al., 1989).

Monsanto, following Exxon's lead began pilot studies of 12-hour shifts at some of its plants in the mid 70's. Their test group showed greater productivity and morale, while absenteeism and turnover were reduced. Monsanto thus began the implementation of this schedule to other plants. Both the Exxon and Monsanto 12-hour schedules were conducted by having the employees design, implement, and evaluate the schedule. It is suggested that much of the success attributed toward the schedule's acceptance is due to this fact (Economides, et al., 1989).

Initial inroads into the 12-hour compressed workweek in electric power companies began with South Carolina's Duke Power Company in 1983. After comparing absen-

tee data from the last year of the old three shift rotational schedule to the first year of the new 4/4 work schedule, it was determined that the number of sick days decreased and the percentage of overtime also decreased. Evaluations of this comparison noted that in every instance, productivity either equaled or exceeded expectations on the 4/4 work schedule (Patterson, 1984).

Given the above noted references to the positive effect of the compressed work week schedule on employee productivity, we establish the following directional hypotheses related to the 4/4 work schedule.

Hypothesis 1: Employees who work on the 4/4 work schedule are more productive than those who work on the 6/2 work schedule.

Hypothesis 1a: Employees who work on the 4/4 work schedule take less personal business days than those who work the 6/2 work schedule.

Hypothesis 1b: Employees who work on the 4/4 work schedule have an absentee rate lower than those who work the 6/2 work schedule.

Hypothesis 1c: Supervisors will perceive that employees who work on the 4/4 work schedule are more effective and efficient than those who work on the 6/2 work schedule.

Hypothesis 1d: Supervisors will perceive less staffing problems associated with staffing employees who work on the 4/4 work schedule than when staffing those who work the 6/2 work schedule.

Hypothesis 1e: Supervisors will perceive there is less overtime necessary when using the 4/4 work schedule than on the 6/2 work schedule.

Employee Attitudes

The compressed workweek is a type of alternative work schedule that can provide the worker with greater flexibility and freedom in scheduling off-the-job activities. Tepas (1985) suggests the advantages of the compressed work schedule include not only increased efficiency and effectiveness in the work place but also the following benefits to employee attitudes: reduced commuting costs, increase multi-day off-the-job leisure, better co-worker attitudes, and overall better morale.

Ronen and Primps (1981) in examining 14 different studies in the 1970's on the compressed workweek summarized that employee attitudes were positive toward the compressed schedule. They also suggest, however, that these positive attitudes toward the schedule may not generalize to attitudes toward the job and note that their research does not suggest that those who

are positive about working the 4/4 work schedule will also have better work related attitudes. These authors suggest that attitudes toward the schedule do not necessarily generalize to job attitudes. They suggest that the compression of the workweek is a function of leisure desirability. They also note that positive outcomes associated with the compressed workweek (including attitudinal change) rely on antecedents like job level and the degree of job satisfaction. Employee's with lower initial levels of job satisfaction would tend to be more positive toward the change. They also reported strong evidence to support declining absentee rates (Ronen and Primp, 1981). Finally, Breugh (1983) suggests that employees who have never worked the 4/4 work schedule will be less likely to favor the schedule than those who have worked the 4/4 work schedule.

Based on the above noted research related to the compressed work week, we will test the following hypotheses regarding the 4/4 work schedule:

Hypothesis 2: Employees who work on the 4/4 work schedule have better attitudes toward work than those who work on the 6/2 work schedule.

Hypothesis 2a: Employees who work on the 4/4 work schedule have better attitudes toward work itself than employees who work on the 6/2 work schedule.

Hypothesis 2b: Employees who work on the 4/4 work schedule have better attitudes toward their co-workers than employees who work on the 6/2 work schedule.

Hypothesis 2c: Employees who work on the 4/4 work schedule have better attitudes toward the 4/4 work schedule than those who have never worked the 4/4 schedule.

Demographics

Koen (1989) indicates that some employees report that they use too much of their off-time recovering from the 12-hour shifts, while others indicate no ill effects. In her view, the variation in reported off-time quality may be linked to sex and age patterns.

Both Koen (1989) and Dickenson and Wijting (1975) suggest that female workers tend to view the 4/4 work schedule more negatively than male co-workers. They suggest that females perceive there are more disruptions in their home and personal lives. Koen (1989) also claims that younger workers favor the 12-hour day more than older workers. Coleman (1989) agrees and notes that the 12-hour day is more desirable to younger workers who prefer having more consecutive days of leisure time in order to engage in vigorous leisure time exercise and activities. A longer work day allows this. Coleman (1989) also suggests that older workers prefer

shorter work days.

Based on the above noted research we establish the following testable demographic hypothesis:

Hypothesis 3: Demographic variables have an impact on employees' attitudes toward working on the 4/4 schedule.

Hypothesis 3a: Male employees will prefer the 4/4 work schedule more than female employees.

Hypothesis 3b: Younger employees will prefer the 4/4 work schedule more than older employees.

Methods

Sample

Respondents for this study were drawn from four manufacturing plants of a major company in the continuous operation energy industry that had been experimenting with both the 4/4 and the 6/2 work schedule. To ensure confidentiality, these four unionized plants will be referred to with the following plant titles: Plant A, Plant B, Plant C, and Plant D. Supervisors familiar with all plants suggest the production process and job descriptions of jobs at all plants were the same. The physical demands of the jobs in these plants are not considered to be labor intensive, although occasional exertion may be used on all the jobs in all plants.

In this continuous operation company, the 4/4 work schedule began at Plant D with some of the production supervisors in January, 1986. The first implementation of some of the employees on the 4/4 work schedule was in November, 1988. This new work schedule was begun on a trial basis, not all employees and supervisors changed to the new schedule. Therefore, this situation provides an especially rigorous attempt to make comparisons between the two forms of scheduling. This schedule was then used in part at other plants as well.

Sample Size and Response Rates

There were nine supervisors of employees on the 6/2 work schedule and twenty six supervisors on the 4/4 work schedule (see Table 1 for breakdown by plant). These supervisors were predominately male and an average of 38 years old. There were 66 employees on the 6/2 work schedule and 132 on the 4/4 work schedule. Employees on both work schedules averaged about 38 years old. One hundred percent of the employees in Plant B were male and 99% were male in Plant C and Plant D. Seventy-nine percent of the employees in Plant A were male. The response rates for the employee surveys was 92% and 89% for the supervisor surveys.

Table 1
Sample Demographics of 4/4 and 6/2 Supervisors and Employees

	6/2 Work Schedule (n=75)		4/4 Work Schedule (n=166)	
	Supervisors (n=9)	Employees (n=66)	Supervisors (n=24)	Employees (n=132)
Plant A				
n	4	31	1	8
Age	30	38	28	37
Sex	100%	79%	100%	79%
	Male	Male	Male	Male
Plant B				
n	5	35	2	6
Age	33	39	28	36
Sex	100%	100%	100%	100%
	Male	Male	Male	Male
Plant C				
n	0	0	6	38
Age			32	41
Sex			100%	99%
			Male	Male
Plant D				
n	0	0	15	80
Age			30	40
Sex			99%	99%
			Male	Male

Procedure

There are four production crews at each plant and 2 chem tech crews. There were no significant differences in measures used for this study between these two groups of employees. Consequently, for ease in reporting, we refer to the combined group of production employees and chem techs as simply, production employees. Collecting data on the last work day of the first set of crews and the first day back for the next set, appeared to be the most efficient method of data collection and the one that was preferred by the management at each plant site. A statement was attached to each survey ensuring employees that the study was an independent, unbiased, and confidential study, solely intent on exploring the 4/4 and 6/2 work schedules as objectively as possible.

Data collection began on the last day of March 1991 and continued through the second week of May. In most cases, individual employees were surveyed at their work site. In a few cases where this procedure was not able to be followed, all of the employees on the crew were called to a central location, where the study could be explained, and the survey administered. A basic strategy was to keep the questionnaire to a length that would not take longer than fifteen minutes to fill out. Disruption to the work process would hopefully be minimized while a greater likelihood of compliance would be realized. Supervisors were told to fill out the survey at their convenience, but to return it within a week in a self

addressed stamped envelope.

Follow-up for absent or vacationing employees was conducted in the latter part of May. At this time fifteen previously unavailable employees were contacted and asked if they wished to participate. Surveys were then distributed through the company mail.

Absentee data were acquired by contacting an industrial relations administrator, who in turn arranged for copies of the microfiche to be made available from human resources.

Measures

Independent Variables

The work schedule is the independent variable for this study. Work schedule has two levels, the 4/4 work schedule and the 6/2 work schedule. The 4/4 is a work schedule where employees work 4 twelve hour days with 4 days off. The 6/2 is a work schedule where employees work 6 eight hour days followed by 2 days off.

Dependent Variables

Productivity. Productivity was examined by using personal business days, sick days, productivity, staffing, and overtime measures. Personal business days and sick days were acquired by reviewing records from the company's corporate headquarters. Both personal

business days and sick days were measured as a percent of total hours scheduled. Personal Business Days data were compared from January, 1990 to January, 1991 between the 4/4 workers at Plant D (n=80), and the 6/2 workers at Plant A and Plant B (n=66). Data for Plant C was not comparably measured, as Plant C recently changed method of collecting and coding personal business days. The data used for the Sick Days measure was used for all four plants from April, 1990 to January, 1991. The month of April was chosen as the beginning of data collection simply because for the first time in the company's history, two plants were on 4/4 and two were on 6/2. In both of the examples noted, a lower mean percentage would indicate improvement.

The productivity construct was used to determine how effective the supervisors thought that their workers used their work time and how much effort it required to get the workers to be productive. This scale consisted of questions derived from the Morse Indexes of Employee Satisfaction Supervisory Behavior Description, and Insel & Moos Work Environment Scale. The response choices for this scale were based on a 5 point Likert scale, 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree. The eleven item summated scale has a Cronbach alpha reliability of .90. Examples of questions used include, Most of my workers just seem to be putting in time, and My employees often do exceptional work.

To develop the measure regarding supervisors' perspectives of staffing problems we met with three supervisors to determine what constituted appropriate information to ask of employees and supervisors and also to check on the proper phrasing of questions asked. A four point Likert type index was used 1=very easy, 2=easy, 3=difficult, and 4=very difficult to determine ease in staffing for vacations, overtime, job assignments, employee ability to trade shifts, and communication ability.

The overtime measure used for this study consisted of two questions asked of supervisors of both the 4/4 and 6/2 employees. Both questions were developed for use in this study. The response choices for this scale were based on a 5 point Likert scale, 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree. An example of a question used was, I find that overtime is used more often than necessary.

Employee work attitudes. Employee work attitudes include measures of 1) the work itself--measured by job satisfaction and intrinsic motivation, 2) co-worker attitudes--measured by crew harmony, conflict/cohesion, labor/management relations, co-worker harmony, and 3) attitude toward the 4/4 work schedule.

Employee job satisfaction consisted of a total of four

questions, derived from Brayfield and Rothe's (1951) Index of Job Satisfaction and from the Work Environment Scale (Insel and Moos, 1974). The response choices for this scale were based on a 5 point Likert scale, 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree. Alpha reliability of the scale is .74. Examples of questions used for this construct include, My workers seem satisfied with their jobs, and Most of my workers take pride in their jobs.

Intrinsic motivation was developed from Hackman and Lawler (1961) and Quinn and Staines (1977)'s Intrinsic Satisfaction Scale. The response choices for this scale were based on a 5 point Likert scale, 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree. Examples of questions used in this scale include, My work is interesting, I feel badly when I do my job poorly. Alpha reliability for this construct is .74.

Co-worker attitudes. Co-worker attitudes were measured using 1) crew harmony, 2) conflict/cohesion, 3) labor/management relations, 4) co-worker harmony.

Crew harmony was measured by two questions aimed at determining whether or not the supervisors have observed that a departing work crew would leave the next crew with work, risking poor co-worker attitudes. This scale was developed in part from Seashore's Group Cohesiveness Index (1977). The response choices for this scale were based on a 5 point Likert scale, 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree. Alpha reliability for this scale is .73.

Conflict/cohesion was measured using three questions derived from Hemphill's Index of Group Dimensions (1956) and Seashore's Group Cohesiveness Index (1977). The response choices for this scale were based on a 5 point Likert scale, 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree. Alpha reliability for this scale is .79. Examples of questions used for this scale include, My employees treat each other with respect, Work crews often "pawn" off work to the following crew.

Labor-management relations consisted of 6 questions derived from the Work Environment Scale (Insel and Moos, 1974). The response choices for this scale were based on a 5 point Likert scale, 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree. The alpha reliability coefficient for this summated scale is .56. Examples of questions used for this construct would include, The work atmosphere in our department is impersonal, Most of my employees would say that I stand up for them.

Co-worker harmony examines the worth that employ-

ees place on his or her co-worker. It essentially deals with the question of harmony and cohesion measured from the employee's perspective. Co-worker attitudes consisted of two questions derived by the researchers based on employee input. The response choices for this scale were based on a 5 point Likert scale, 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree. An example of this question include, The workers in my department do their fair share of work. Alpha reliability of this construct is .61.

Attitude toward work schedule was measured using 6 questions developed by Breugh (1983) and compared the opinion of the 6/2 worker about the 4/4 work schedule, to the attitude about the 4/4 schedule by the workers who work on the 4/4 work schedule. The response choices for this scale were based on a 5 point Likert scale, 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree. Examples of questions include, My job would be too strenuous and tiring for the 12-hour day. The alpha reliability for this construct is .94.

Demographic Controls

This study examined attitudes of male and female employees and younger and older employees regarding working the 4/4 work schedule. A positive correlation favors younger employees.

Analysis

Absentee data was tabulated to produce a mean and standard deviation. Independent t-test were used to compare mean differences for both the employee and supervisor responses. Age was analyzed by using Pearson correlation coefficients to determine the direction and strength of the relationship between age and attitudes toward work schedule.

Results

Employees who work the 4/4 work schedule are more productive than those who work the 6/2 work schedule.

To examine this hypothesis we compared last years' personal business days from the 4/4 Plant D production department with the 6/2 Plant A and Plant B production departments. The results are presented in Table 2. A lower mean percentage represents fewer personal business days taken by the employee. The numbers reflect the percentage of total hours scheduled.

The results indicate that the mean percentage does decrease by .18%. The mean comparison in this study shows a decline in personal business days used by workers on the 4/4 work schedule, but this finding is a non-significant reduction. Both the NRC report and Tepas indicated a reduction in personal business days

due to compressed 12-hour schedules (Patterson, 1984; Tepas, 1985). This research suggests that the hypothesis of reduction is supported, but the finding is not significant.

We were able to examine the number of sick days of some employees (n=164) while they were still on the 6/2 work schedule and then again after they had worked the 4/4 work schedule in order to test hypothesis 1b. The length of time on the 4/4 work schedule varied from 7 months to 24 months. Table 2 looks at the same employees' absentee rates before going on the 4/4 work schedule (when they were on 6/2) and then again after they had gone on the 4/4 schedule. Comparisons are made within each plant site.

All departments had lower absentee rates when employees were working on the 4/4 work schedule than when they were on the 6/2 work schedule. Both Plant A and Plant D had significantly lower rates. The department that has been on the 4/4 schedule the longest (24 months) Plant D, shows the lowest absentee rates after going on the 4/4 work schedule.

These data show a downward trend in absentee rates of all the company employees and show support for hypothesis 1b. The fact that the department with the longest "treatment" of 4/4 (Plant D) had the lowest rates may suggest that measurements taken over longer periods of time may show an even greater number of departments with significantly lower absentee rates.

The data in Table 2 allow us to test hypothesis 1c. The data suggest that the supervisors provided some useful insight into managements' perception of its employees. (The lower the mean score, the more favorable the group is to that construct).

The results of this table show that according to these shift workers' supervisors, productivity was significantly better for the 4/4 employees, supporting hypothesis 1c.

Data in this table, however, indicate that overtime was viewed almost identically by both types of schedule supervisors. Consequently, there appear to be no advantages in these areas associated with either the 4/4 or the 6/2 work schedule.

Similar to the NRC guidelines (Lewis, 1987), Tepas (1985), and the Duke power study (Patterson, 1984), this study concurs that productivity improves on a twelve hour compressed work week, but this study singles out and specifies the four day on, four day off use of the 12-hour work day.

Staffing, although not significant, was reported to be more problematic by the 4/4 supervisors, therefore not supporting hypothesis 1d.

Table 2
Employee Productivity

Plant	Schedule	N	Length of Time on Schedule	Mean	SD	t
Personal Business Days^a						
Plant A & B	6/2	66	26 ^b	.55% ^c	.47	-1.29
Plant D	4/4	80	13	.37%	.16	
Sick Days						
Plant A	6/2	8		14.04	4.39	-2.51**
	4/4		8	9.02	3.56	
Plant B	6/2	6		14.26	4.2	- .87
	4/4		7	11.82	6.06	
Plant C	6/2	7		12.37	7.74	-1.40
	4/4		10	8.43	.18	
Plant D	6/2	19		15.80	4.90	-3.01**
	4/4		24	11.87	4.04	
Productivity						
All Plant Supervisors	6/2	9		33.11	6.88	-2.79**
	4/4	24		25.54	6.98	
Staffing						
All Plant Supervisors	6/2	9		8.78	2.10	1.35
	4/4	24		9.88	1.95	
Overtime	6/2	9		7.00		
	4/4	24		5.13		

Note: A lower mean represents fewer personal business days taken by employees. Personal business days make comparisons, between Plant A & B, and Plant D. Sick days make comparisons before employees in Plant A,B,C,D were on the 4/4 work schedule and after they went on the 4/4 work schedule. These are only employees that we had data on who had previously been on the 6/2 work schedule. For the Productivity, Staffing, Safety, and Overtime measures the length of time varies as noted under Sick Days construct.

* $p \leq .05$

** $p \leq .01$

^a Data for Plant C was not comparably measured, as Plant C recently changed method of coding personal business days.

^b Length of time is measured in months on 4/4 schedule.

^c These percentages reflect the percentage of total hours scheduled.

Employees who work the 4/4 work schedule have better attitudes toward work than employees who work the 6/2 work schedule.

The data in Table 3 from the supervisors' perspective support hypothesis 2a and suggest that supervisors' perceive their employees on the 4/4 work schedule do have better attitudes toward their work than those on the 6/2 work schedule. Supervisors of the 4/4 employees suggest that their employees are more satisfied with their jobs and that these employees take more pride in

their jobs than employees on the 6/2 work schedule. The intrinsic motivation scale measuring employees' own attitudes toward work, however, also favored the 4/4 employees, but was not significant. Therefore these data show only moderate support for hypothesis 2a.

The data in Table 3 also show support for hypothesis 2b. From the supervisors' perspectives, employees on the 4/4 work schedule do have more co-worker harmony and also have better morale than those employees on the 6/2 work schedule. These findings indicate an

efficiency in the design of the 4/4 twelve hour work week. These findings support Brinton's (1983) theory that since there are only two work crews (one following the other), greater concern is taken by each crew to get along with the crew that follows them. This harmony, or between crew cohesion as it is referred to in the Duke power study (Patterson, 1984) may be due to the removal of an in-between crew inherent in the 6/2 schedule.

While data from the Labor Management Relations construct using the supervisors' perspectives are not significant at $p < .05$, these data too show moderate support for hypothesis 2b. The only Co-Worker Attitude to show an inverse relationship is Co-Worker Harmony. For this construct, the 6/2 employees show more Co-Worker Harmony than do the 4/4 employees and this finding fails to support hypothesis 2b. This finding suggests that the 6/2 employees are more likely to think that their co-workers do their fair share of work.

Workers who had worked the 4/4 work schedule had significantly better attitudes about working the 4/4 work schedule than employees who had never worked the 4/4 work schedule ($p < .01$). These findings support similar

findings from Foster (1979) and Breugh (1983) and also show support for hypothesis 2c. Studies by Lewis (1987), Tepas (1985), and Patterson (1984) also indicate improvements in work force morale on a compressed work schedule.

Hypothesis 3a suggests that males will prefer the 4/4 work schedule over the 6/2 work schedule. Both Koen (1989) and Dickenson and Wijting (1975) report that males will prefer the 12-hour day more than females. Yet, data from our study using t-test comparisons indicate that the females who work in a power plant preferred the 4/4 schedule more than men ($t = 2.13$, $p < .05$). Hypothesis 3a, which originated from Koen's (1989) study, is not supported by these data.

Hypothesis 3b suggests that the younger workers will prefer the 4/4 work schedule more than older workers. To examine this hypothesis we used correlation analysis. The results of this analysis support hypothesis 3b, that the younger worker will prefer the 4/4 schedule more than the older worker ($r = -.28$, $p < .01$).

Discussion

Many of the hypotheses in this study were supported,

Table 3
Employee Work Attitudes

Construct	Schedule	Mean	SD	n	t
Work Itself					
Job Satisfaction ^a	6/2	12.67	2.18	9	-1.95*
	4/4	10.87	2.76	24	
Intrinsic ^b Motivation	6/2	8.85	2.76	66	-.34
	4/4	8.72	2.35	132	
Co-Worker Attitudes					
Crew Harmony ^a	6/2	7.00	1.50	9	-2.98**
	4/4	5.13	1.87	24	
Conflict/Cohesion ^a	6/2	16.78	3.77	9	-1.67*
	4/4	14.33	3.74	24	
Labor Management ^a Relations	6/2	21.11	3.19	9	-1.62
	4/4	19.08	3.67	24	
Co-Worker Harmony ^b	6/2	5.35	1.40	66	2.21*
	4/4	5.85	1.69	132	
Attitude Toward 4/4 ^b Work Schedule	6/2	16.56	7.55	66	-3.38**
	4/4	13.07	6.49	132	

Note: The sample for these findings varies, ^adenotes a sample from supervisor perspectives and ^bdenotes a sample from employee perspectives.

* $p \leq .05$

** $p \leq .01$

suggesting that an employee's work life is affected by their work schedule. As measured in this study, employees on the 4/4 work schedule appear to be more productive, and have better co-worker harmony than those employees on the 6/2 work schedule. The 6/2 employees, however, think their co-workers do a more fair share of their work than do the 4/4 employees. Employees on the 4/4 work schedule also prefer the 4/4 work schedule to the 6/2 work schedule. While women and younger employees prefer the 4/4 work schedule more than men and older employees, most 4/4 employees prefer the 4/4 work schedule to the 6/2 work schedule.

The research design for this study is sound, but it is not without its weaknesses. For example, surveying incoming employees while coming to the work place and also surveying outgoing employees as they leave the work place, may have had an impact on the data. Perhaps some employees were more tired than others and consequently would not have been as careful as others. While, from our observations this did not seem to be the case, it may have had an impact.

Also, the duration one spends on a schedule may effect its desirability. While our study suggests the 4/4 workers favor the 4/4 schedule, these 4/4 employees had only been on the 4/4 work schedule at most 2 years. Bulkeley (1973) found that even though initially workers liked the new schedule, over time they grew to dislike it, because absentee and turnover rates increased. Consequently, further follow up research would be important to investigate the effect of time on employees' attitudes toward the schedule.

Other disadvantages may also include a greater likelihood of fatigue, possible safety problems, and communication problems as it is more difficult for employees to be kept abreast of current work conditions because of the extra days off from work. Koen (1989) notes that 12 hour shift employees work 182 days annually, while 8 hour workers work 273 days. Some may also be distrustful of a company's intent in a union environment toward using a 12-hour day because working this schedule takes away something that unions fought so hard for--the eight hour day (Tepas, 1985).

Suggestions For Future Research

Future research might consider the impact of variance in shift breaks or variances in rotation, local economy or possibly differences in communities that these plants reside in that this study was not able to consider. The differences in the number of male and females at each plant may be hinting that other phenomena may be going on in these plants than this study was able to investigate due to time, resources and ultimate limitations to the data. All of these factors may have had an impact on the outcome of findings generated by this

study.

In summary, this study's findings suggest that the 4/4 work schedule will likely contribute to an employees' productivity, attitudes associated with the job itself, and co-worker attitudes from the supervisor's perspective. If attempting to implement this work schedule, management should consider that the schedule is favored more by younger workers than older and is favored by women more than men. More critical analysis might be undertaken to determine what type of jobs and operations would especially benefit from such a schedule. Other important issues appropriate for future study related to the 4/4 work schedule include a continued longitudinal examination of the impact of working the 4/4/ work schedule for a longer period of time. This study's findings do, however, draw attention to the need for continued planning at the organizational level for shift workers during the next decade, particularly as global competition and the changing world market place a premium on efficient work flow. ■

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