IMPLEMENTING NEW TECHNOLOGIES IN THE OFFICE: A COMPARATIVE STUDY OF PERCEIVED THREAT

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The views expressed in the present document are those of the author

N O T E

ABSTRACT

This paper reports the results of a study undertaken amongst all secretaries of a large state university to determine the relationships between perceived stress due to the introduction of office automation. Two groups of secretaries were compared: one group had previous experience with this new technology and the other group, no such experience. Key conclusions point to the underlying of two factor constructs of perceived stress: "Job Content" and " Job Context". Secondly, those secretaries with no previous experience were on the overall more stressed than those with some experience.

RESUME

Cette recherche fut entreprise auprès de toutes les
secrétaires d'une grande université canadienne dans le
but de déceler un lien possible entre le stress tel que
perçu et l'introduction de la bureautique. Deux groupes
de secrétaires ont été comparés : un premier groupe avait
préalablement acquis de l'expérience avec la nouvelle
technologie implantée et un second groupe ne possédait
aucune expérience. Les conclusions font ressortir deux
facteurs principaux reliés au stress perçu : le "contenu
de l'emploi" et le "contexte de l'emploi". Aussi, les
secrétaires sans expérience se percevaient généralement
plus stressées que celles qui possédaient une quelconque
expérience.

INTRODUCTION

The rate of technological change is greater today than at any time in the past. Technology changes the nature of jobs performed at all levels (Handy, 1980). Most innovations within organizations are seldom confined to the technical aspects of production but also require alterations in the work and social satisfaction of employees to make the innovation accepted. This factor of "acceptance" makes the problem of introducing changes especially critical in today's world. Automation and the increasing use of computers in the office has made this problem more acute.

Ever since the pioneering work of Coch & French (1948) it has been known that anxiety is an important consideration in implementing a new technology. It is this anxiety factor which has led an increasing number of behavioral scientists to research the nature of stress generated by the introduction of new technologies in the office (see for example:Cherns, 1978; De Blasis, 1982; Rousseau, 1978).

In this study an attempt is made to understand the nature of the stress perceived by secretaries when word-processors are introduced in the office. Research in this domain is fragmentary and case specific, but a wide range of possible work consequences have already been identified. Some have studied the impact of office automation on social relations,(Zuboff, 1982; Walton, 1982); some the impact on communication changes (Randolph

& Finch, 1977); other on health and safety (Zuboff, 1982; Wisner 1977); yet others on task difficulty (Jelinek, 1977); on work load (Sole, 1980), and on mental health (Dolan & Arsenault, 1984) .

The first question this study addresses is the following : Is there any underlying stucture, relating to perceived stress associated with the introduction of new technologies in the office and if so what are its critical dimensions? A secondary objective is to see if experience with new technology reduces the aforementioned "threat" and affects the resistance to change. The underlying hypothesis to be tested is that secretaries even with limited experience with word-processors are less threatened than their counterparts with no experience at all.

METHOD

Subjects

All secretaries employed full time at a large University for at least six (6) months - in all 316 - were asked to participate in the study. The percentage who participated by returning complete usable questionnaires was 67 percent (191 out of 316), a rate which might be regarded fairly satisfactory (see Erdos, 1970). The characteristics of the subjects were the following: average age was 33 years, ranging from 22 to 38 years; average education was 12 years ranging from 9 to 17 years; seniority on the present job ranged from 3 to over 10 years with an average of 3 years. Of the 191 subjects, 137 (i.e. 71.7% of the respon-

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dents) had no previous experience with word processors (here-after to be named "Group I") while the remaining 54 had previous experience (hereafter to be named Group II).

Measures

Stress as perceived by the subjects, was captured by utilizing a self-report questionnaire developped for this study. In view of the fact that no such instrument had been used in previous empirical research on occupational stress (see:Arsenault and Dolan, 1983) an original measure was constructed. Ten (10) of the most commonly measured occupational stressors found in the literature were incorporated in the questionnaire, (in all 63 items). Each respondent was asked the extent to which intro-duction of a word processor created stress for her as tapped by each of the items contained in the questionnaire.

For each item, the subjects were asked to respond to statements by giving a rating from (1) strongly disagree to (5) strongly agree. Relying on the subject responses to the 63 items, the ten (10) measures were constructed. The measures, their reliability (alpha) coefficients, the number of items included in each scale along with an example of a typical question , are detailed in Table 1. A scale score was computed by linear addition of all items in a given scale.

Insert Table 1 about here

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RESULTS

A principal components factor analysis was applied to the ten scales in order to group the information into a more meaningful order. Figure 1 illustrates the results. The variables are clearly distributed around the two orthogonal factors. Factor I,which groups 3 scales, is labeled as "Job Context", and factor II, grouping the remaining 7 scales, is labeled "Job Content". The total variance explained by the two factors before iteration is 67.7%.

Insert Figure 1 about here

Since our hypothesis is that secretaries having no experience with word processors show more resistance to technological change than those with previous experience, the former were expected to indicate a higher level of tension than the latter.

Student's one tailed t-test was used to verify that hypothesis. Table 2 illustrates the results emerging from the data.

Insert Table 2 about here

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They indicate that seven (7) dimensions (related to both Job Content and Job Context) show statistically significant mean differences at the .05 level, and are in the predicted direction. Secretaries with no word processor experience anticipate greater difficulty in their work content, a lack of interest towards their job, a decrease in autonomy, a threat for their health and safety, a negative impact towards work organization and social relations as well as constraints on their career prospects. In general, the experimental group shows a more negative opinion towards the effects of implementing new technology on Job Content.

Inversely and contrary to expectations, secretaries with previous experience, reported higher levels of tension associated with the variable "Training and Information". They were unsatisfied with the degree of preparation offered them by their employer before the technological change took place.

Other dimensions which also indicate a lack of statistical significance are "Job Context" and the two (2) variables related to that index which are Job Security and Wage. Although we can not conclude to a significant difference between the two groups in terms of perceived threat, it is interesting to point out that these variables appear to create considerable tension, their means seem to be relatively high.

DISCUSSION AND CONCLUSION

The present study provides additional empirical evidence to an area of research which has long been studied by behavioral science specialists. The results reached by the factor analysis (Figure 1) confirm the importance of using two dimensions which have previously been reported in the field of motivation and job satisfaction models: namely "Job Content" and "Job Context" Herzberg et al., 1959). To be more precise, that respondents express and distinguish their preoccupations towards extrinsic and intrinsic stressors associated with the introduction of a new technology in the office.

Furthermore, the comparative analysis between responses given by the two groups reflect the nature of these preoccupations. Secretaries anticipating the implementation of new technologies fear a deterioration in the quality of their work life ,while those who had previously been involved in the handling of word processors show more concern for extrinsic dimensions, particularily for "Training and Information".

It is worth noting that the three work context dimensions are matters subject to negotiation between unions and management. Thus, it seems safe to conclude that preoccupations are less due to office automation per se but originate from the quality of employee-employer relations. This shows that employees involved in the process of technological change might not oppose their task content as long as the economic aspects of their job remain intact or are improved. For that to be the case it is

imperative that they be consulted and prepared to the change
by proper information and training programs.

Resistance to the shift from the industrial era to the
information society is a known fact. Its effects however could be
mitigated and adaptation to the change could be smoothened by
identifying the true needs of those involved. This paper suggests
that the agreement on the process of implementation has a
significant influence on secretaries' perceptions about office
automation.

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Table 1

Details on the measures employed in the study

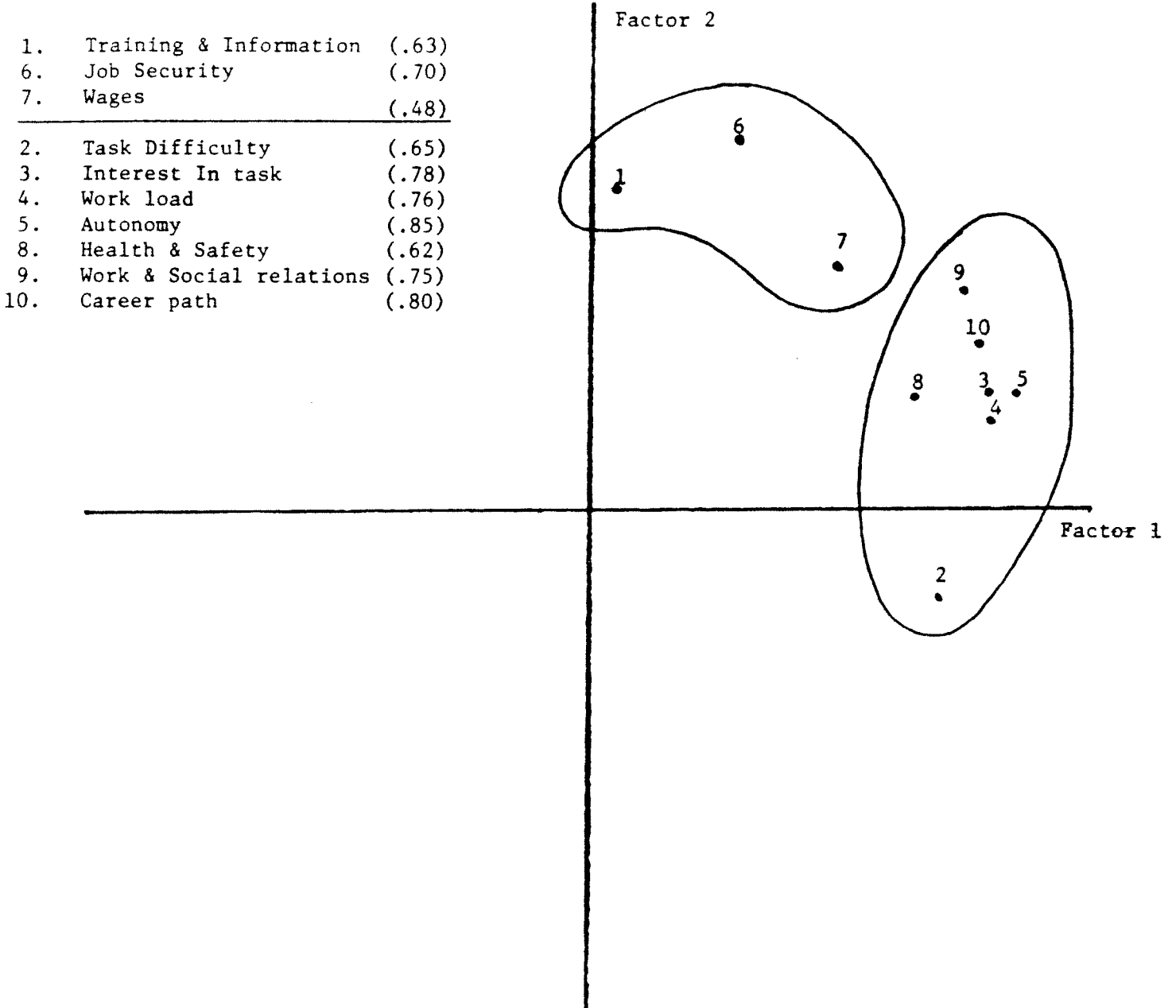| Measure	No of items	Example of a typical item	Chronbach's alpha
Training & Information	5	The University's authorities informs adaquately before implementing new technology	.81
Task difficulty	7	All in all I do not forsee any difficulties in adapting to a new word processor	.82
Interest in task	4	With a word processor, my work will become more routine and monotonous	.73
Work load	6	The new technology will require higher volume of output	.73
Autonomy	6	The new technology will control the management of my time	.84
Job security	4	The University will take advantage of the new technology in order to reduce personnel	.68
Wages	5	The new technology will lead to employee's "underpayment" in relation to work accomplishments	.72
Health & Safety	7	Research has demonstrated that word processors affect the health of their users	.87
Organization of work & social relations	7	With the introduction of new technology, I will be more isolated in my work	.86
Career path	6	The implementation of new technology will reduce possibilities for promotions	.79

Table 2

Comparative means of perceived threat between
Control and Experimental groups

Measures	Number of cases (N)		Mean	Standard Deviation	t-value
Training & Information	134	(Gr I)	3.3	.78	-2.74*
	52	(Gr II)	3.6	.83	
Task Difficulty	133	(Gr I)	2.5	.69	1.82*
	53	(Gr II)	2.3	.65	
Interest in task	135	(Gr I)	3.2	.81	2.92*
	53	(Gr II)	2.9	.80	
Work - load	131	(Gr I)	3.3	.64	.46
	53	(Gr II)	3.2	.82	
Autonomy	133	(Gr I)	2.9	.77	2.03*
	53	(Gr II)	2.7	.83	
Job Security	133	(Gr I)	3.6	.78	1.31
	53	(Gr II)	3.5	.83	
Wages	134	(Gr I)	3.7	.77	-1.38
	53	(Gr II)	3.9	.68	
Health & Safety	131	(Gr I)	3.6	.76	3.41*
	53	(Gr II)	3.2	.91	
Organization of Work & Social Relations	134	(Gr I)	3.3	.78	1.95*
	53	(Gr II)	3.1	.70	
Career path	132	(Gr I)	2.8	.75	2.06*
	52	(Gr II)	2.6	.73	
Job Content Factor	126	(Gr I)	3.1	.61	2.54*
	52	(Gr II)	2.8	.62	
Job Context Factor	132	(Gr I)	3.5	.61	-1.28
	51	(Gr II)	3.7	.60	

* $p < .05$

FIGURE 1

RESULTS OF PRINCIPAL COMPONENTS
FACTOR ANALYSIS *

1.	Training & Information	(.63)
6.	Job Security	(.70)
7.	Wages	(.48)
2.	Task Difficulty	(.65)
3.	Interest In task	(.78)
4.	Work load	(.76)
5.	Autonomy	(.85)
8.	Health & Safety	(.62)
9.	Work & Social relations	(.75)
10.	Career path	(.80)

*   The Coefficient in parenthesis indicates factor's loading.