

INFORMATION TO USERS

The most advanced technology has been used to photograph and reproduce this manuscript from the microfilm master. UMI films the original text directly from the copy submitted. Thus, some dissertation copies are in typewriter face, while others may be from a computer printer.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyrighted material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each oversize page is available as one exposure on a standard 35 mm slide or as a 17" × 23" black and white photographic print for an additional charge.

Photographs included in the original manuscript have been reproduced xerographically in this copy. 35 mm slides or 6" × 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.



300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA

Order Number 8821080

Hazardous job and decision to quit: An equity approach

Farid, Mamdouh Ismael, Ph.D.

City University of New York, 1988

Copyright ©1988 by Farid, Mamdouh Ismael. All rights reserved.

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

PLEASE NOTE:

In all cases this material has been filmed in the best possible way from the available copy. Problems encountered with this document have been identified here with a check mark ✓.

1. Glossy photographs or pages _____
2. Colored illustrations, paper or print ✓
3. Photographs with dark background _____
4. Illustrations are poor copy _____
5. Pages with black marks, not original copy ✓
6. Print shows through as there is text on both sides of page _____
7. Indistinct, broken or small print on several pages ✓
8. Print exceeds margin requirements _____
9. Tightly bound copy with print lost in spine _____
10. Computer printout pages with indistinct print _____
11. Page(s) _____ lacking when material received, and not available from school or author.
12. Page(s) _____ seem to be missing in numbering only as text follows.
13. Two pages numbered _____. Text follows.
14. Curling and wrinkled pages _____
15. Dissertation contains pages with print at a slant, filmed as received _____
16. Other _____

U·M·I

HAZARDOUS JOB AND DECISION TO QUIT:

AN EQUITY APPROACH

by

MAMDOUH FARID

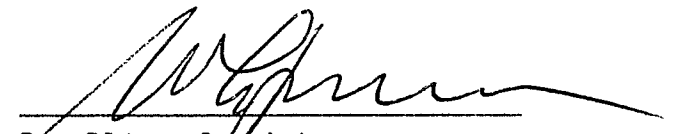
**A dissertation submitted to the Graduate Faculty in Business
in partial fulfillment of the requirements for the degree
of Doctor of Philosophy, The City University Of New York.**

1988

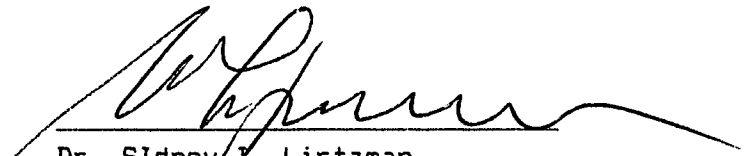
COPYRIGHT BY
Mamdouh Farid
1988

This manuscript has been read and accepted for the Graduate Faculty in Business in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

4/25/88
date


Dr. Sidney I. Lirtzman
Chairman of Examining Committee

4/25/88
date


Dr. Sidney I. Lirtzman
Executive Officer

Dr. Abraham K. Korman

Dr. Edward H. Wolf

Dr. Adria C. Casey

Supervisory Committee

The City University of New York

Abstract

HAZARDOUS JOBS AND DECISION TO QUIT: AN EQUITY APPROACH

by

MAMDOUH FARID

Advisor: Dr. SIDNEY LIRTZMAN

The present dissertation addresses employee perceptions of hazardous working conditions and their psychological and behavioral responses. This would include employee decisions to enter and/or quit hazardous employment conditions.

Four conceptual differences are derived from the literature to distinguish between the terms "job hazard" and "hazardous job". Hazard is a multidimensional concept and three dimensions of this concept are identified. The literature shows that these dimensions influence the individual's assessment of hazard level.

The equity model is applied to draw six hypotheses about the tradeoff between hazard acceptance, hazard premium, fringe benefits and quitting a hazardous job. In addition, two models are proposed: (1) a structural model that shows variables and causal relationships, and (2) an asymptotic model that shows the dynamics of the tradeoff between hazard acceptance and expected compensation.

The study is conducted in Egypt. The field experiment involves the random sampling of 251 blue collar workers from the chemical industry. Empirical analysis generally support the hypotheses in the following manner:

A. The rate of exchange between hazard acceptance and the expected reward is found to be different across different hazard levels. In highly hazardous situations, workers request higher hazard premiums for each additional unit of hazard, than in less hazardous situations.

B. Workers do not quit hazardous jobs because of the hazard factor per se but rather because of: (1) actual or expected health or work problems, (2) experienced anxiety, and (3) experienced inequity regarding hazard compensation. This is in line with the proposed nature of hazardous jobs (in contrast to job hazard).

In addition, the study tests models that have the potential to predict workers' reactions to hazardous conditions. The empirical analyses show the following:

A. Among equity models, Anderson and Farkas (1975) is shown to be a better predictor of workers quitting hazardous jobs than models by Adams (1965) and Walster et al (1973).

B. This study generally supports Viscussis's (1979) model for the probability of quitting hazardous jobs, but in addition indicates that the variable "equity regarding hazard premium" should be added to the model to enhance its predictability.

ACKNOWLEDGEMENTS

Many people have provided help and assistance during the completion of this research. First, my feelings of gratitude are to three individuals who made this work feasible. To my wife Wadida El-Habashy, a tender comrade, who has provided tremendous emotional support and tolerated the writer "muddling through". To Dr. Sidney Lirtzman, my dissertation adviser and chairman of my doctoral committee, who first suggested the present research and whose guidance and patience make this research possible. He is an incredible and talented teacher. And to a long life comrade; Dr. Gamal Mokhtar, the president of the Arab Maritime Academy, who inspired the writer by his encouragement and by his sheer force. No body around him could remain untouched by his qualities.

Deep thanks go to my teachers and colleagues at CUNY; Dr. Abraham Korman, Dr. Edward Wolf, my doctoral committee members, and Dr. Moshe Banai for their precious comments, feedback and encouragements while conducting this study.

Special appreciation go to Dr. Kay Anderson (M.D.), Dr. Esther Muehlbauer and Mr. Eric Muehlbauer who read earlier drafts and provided many useful editing comments. They really tolerated this novice writer.

TABLE OF CONTENTS

Abstract	iv
Acknowledgements	vi
LIST OF FIGURES	x
LIST OF TABLES	xi
CHAPTER ONE: PURPOSE AND IMPORTANCE OF THE STUDY	1
Purpose	1
Importance	2
CHAPTER TWO: HAZARDOUS JOB	6
A hazardous job or job hazard	6
Hazard assessment: subjective hazard	11
Hazard assessment: objective hazard	12
Dimensions of hazard	15
Summary	18
CHAPTER THREE: SOURCES OF BIAS IN SUBJECTIVE HAZARD	20
Personal variables	20
Nonpersonal variables	23
Summary	25
CHAPTER FOUR: EQUITY THEORY	27
Equity propositions	27
Equity models	32
Problems with equity theory	35
CHAPTER FIVE: PSYCHOLOGICAL AND BEHAVIORAL IMPACT OF HAZARD PERCEPTION	44
Viscussi's model	45
Equity model	46
CHAPTER SIX: DEVELOPING HYPOTHESES AND THEORETICAL MODEL	51
Hypothesis one	52
Hypothesis two	54
Hypothesis three	55
Hypothesis four	57
Hypothesis five	60
Hypothesis six	61
A proposed model	61
Summary of hypotheses and models to be tested	64

CHAPTER SEVEN: DESIGN OF THE STUDY	68
Subjects	68
Data collection	68
Checking the random assignments	70
Checking the manipulation	71
CHAPTER EIGHT: EMPIRICAL RESULTS	74
Hypotheses one and two	74
Hypothesis three	82
Hypothesis four	95
Hypotheses five and six	100
The impact of old and new information on recent opinion and intention	112
Hazard assessment	112
Quit intention	114
Models testing	116
Equity models	116
Viscussi's model	118
CHAPTER NINE: SUMMARY AND CONCLUSIONS	122
APPENDIX (A): SAMPLE CHARACTERISTICS	130
APPENDIX (B): LABELS	134
APPENDIX (C): DEFINITION OF VARIABLES AND QUESTIONNAIRE	144
APPENDIX (D): FACTOR ANALYSIS OF PSYCHOLOGICAL REACTIONS TO INEQUITY	185
BIBLIOGRAPHY	186

LIST OF FIGURES

Fig. 1	Objective and subjective hazard	26
Fig. 2	A proposed model	63
Fig. 3	A linear model	80
Fig. 4	An asymptotic model	81

LIST OF TABLES

1. Differences among the experimental groups at time 1	70
2. Differences in perceived new hazard at time 2	72
3. Comparison between linear and exponential models	75
4. Slope differences among experimental groups	76
5. Characteristics of workers in two different departments	83
6. Correlations among hazard measurements	86
7. Cross tabulation of subjective hazard with equity measurements	87
8. Cross tabulation of subjective hazard with equity measurements	90
9. Cross tabulation of objective hazard with equity measurements	91
10. Psychological reaction to inequity	93
11. Regression analysis of hazard and intention to quit	97
12. Workers' preference for various job improvements over appropriate pay raise	101
13. Changes in quit intention due to changes in subjective hazard assessment	106
14. Changes in quit intention due to changes in subjective hazard assessment	108
15. Changes in quit intention due to changes in subjective hazard assessment	110
16. The impact of old and new hazard information on recent hazard assessment	112
17. Worker preference for source of information	114

LIST OF TABLES (cont.)

18. The impact of old and new subjective hazard assessment upon recent intention to quit	115
19. Correlation between equity indices and intention to quit	117
20. Logistic parameter estimates for quit intention determinants	119
21. Sample characteristics	132
22. Definition of variables and pertinent items	144

CHAPTER ONE

PURPOSE AND IMPORTANCE OF THE STUDY

PURPOSE:

The purpose of this dissertation is to study employees' reactions to hazardous jobs. Factors that have the potential for explaining psychological and behavioral implications to potential hazards in work situations will be identified and compared. Related hypotheses will also be proposed and tested.

Hazards can be part of industry and technology. This has been recently demonstrated by the disaster in Bhopal where more than two thousand people died, and by the Chernobyl meltdown where hundreds of people were exposed to deadly radiation. While the focus of the media was on the community and the public reaction to such catastrophic events, nothing was revealed about the reactions of those working in the chemical or nuclear industries.

The focus of the present study is concentrated on those who are operating in the technical core of hazardous industries. The chemical industry, as an example of a hazardous industry, has been selected for the present research.

Specifically, the present study will focus on the following elements:

1. Workers' perception of hazard in their jobs

2. Hazard Compensation (monetary and fringe benefit)
3. Equity Model
4. Workers' psychological and behavioral reactions to perceived inequity and/or hazard, including quitting their jobs.

IMPORTANCE

The hazard factor in one's job has been traditionally ignored in research and theory. Empirical and theoretical works in the area of turnover reflect that assertion. For example, no studies about hazards in the job were cited in reviews by Goodman, et. al. (1975), Forrest et. al. (1977) and Mobley et. al. (1979). Only one study, Hakkinen and Toivainen (1960), cited in Porter and Steers (1973) deals with psychological factors contributing to turnover among Swedish miners.

In a similar vein, March and Simon's (1958) model of turnover does not include working conditions or hazards as factors causing workers to quit. That heuristic model has stimulated significant theoretical writing and empirical research (for review of empirical research see, for example, Pettman 1973). According to the model, workers' propensity to leave is proposed to be a function of his/her perception of 1) desirability of leaving the organization and 2) ease of movement from the organization. These two major causal factors are supposed to be influenced by a host of variables that are related to the person, the job, the organization and the environment. Working conditions,

including job hazard were, however, were not included.

Introducing the hazard factor as a predictor of turnover should interest students of organization behavior since attitudinal variables, e.g., job satisfaction, have not successfully explained turnover behavior (e.g., Forrest et. al. 1977). In addition in their review of turnover literature, Forrest et. al. (1977) state that "Predictors as variables should include motivationally-oriented constructs, since participation decisions are assumed to be motivated choice decisions" (P. 593). Hazards in the job is a motivational variable and should be expected to have the potential to explain quitting behavior.

Hazards in the work place have recently begun to attract attention. The nuclear accident at the power plant on Three Mile Island has spurred empirical investigations (see for example Kasl and his colleagues, 1981). In the economic literature of the labor market, Viscussi (1979) studied employees' turnover and showed job hazards as a major determinant. In the psychology literature, Akin (1975) used a phenomenological methodology to study workers' conception and experience of risk. The present study is an application and extension of findings, measurements and research questions associated with this body of research.

In addition, the present research intends to incorporate equity theory. This will be the first study to apply the equity model to a situation in which exposure to hazards is proposed to be an important factor to the employment relationship. Equity

models have been applied to a wide variety of social exchanges and business transactions. Besides the initial application to the industrial setting in the area of resource allocation, equity models have been used to stimulate performance and enhance satisfaction (see review of literature such as Pritchard 1969, Weick and Nasset 1968, Adams and Friedman 1976). Equity theory has also been applied to the harm-doer/victim relationship (e.g., Ross et. al. 1971), to coalition formation (Wahba 1972), to intimate relationship (e.g., Backman and Secord 1966), to dating preference (e.g., Walster et. al. 1966), to the philanthropist-recipient relationship (e.g., Levantal et. al. 1969), and to legal justice (Legant 1973). Adams and Freedman (1976) encourage researchers to reformulate and extend the equity model to other phenomena of interest, and this dissertation attempts to do so by exploring the hazardous job and equity.

Thus the questions to be addressed are: (a) Does equity theory have the potential to explain and predict workers' reactions to hazardous jobs, including the decision to quit, (b) does change in hazard perception arouse equity motives. These research questions will be operationalized in a number of hypotheses to be tested.

The notion of equity implies a universal aspiration and many noble goals (e.g., fairness, justice, class and psychological harmony) that are valued by any society or institution. Equity is related directly to the issue of resource distribution which

is faced by any organized group of people. This lead to a decision to undertake this study in a real chemical work environment in a middle-eastern nation, viz: Egypt.

Applying equity theory to a real world situation in a different cultural environment represents a contribution to equity research and theory since equity theory has long been studied only in artificial settings and among western college students.

CHAPTER TWO

HAZARDOUS JOB

In this section two issues will be considered: the first issue is a proposed differentiation between a hazardous job and job hazards. The second issue is the elements of hazard assessment.

A HAZARDOUS JOB OR JOB HAZARDS.

In general hazards in one's job denote potential for bodily injury and/or health problem. It is important, however, for the purpose of the present research to differentiate between two terms; a hazardous job and job hazards. It is proposed here that the two terms are not identical. Four qualitative differences are identified. The first difference relates to the nature of the hazard and its effect. The term job hazard, designates hazards that arise from numerous sources that exist in or are related to the work but not inherent in the technology employed. Such hazards are not fixed characteristics of the job and accordingly they do not uniformly affect the employees who are working in the same facility or site or doing the same job. Each one of us is subject to one or another of a variety of job hazards e.g., driving to and from work, physical attack from customers, sharing the same workspace with a smoker or living near a factory or power plant.

On the other hand, hazardous jobs are jobs that are characterized by a permanent hazard feature or set of features. That is, exposure to hazard routinely is encountered occupationally. Hazards in this kind of job are therefore, inherent in or due to the technology or material used. Accordingly, hazards uniformly, not randomly, affect those who are doing that job. The consequence of uniform hazard on employees' physical and psychological conditions may differ, according to factors of training, hazard information and labeling, education, experience, and safety equipment and precautions.

A second feature of hazardous jobs is related to the concept of voluntarism (i.e. self selection or personal choice). A person who chooses a hazardous job is making a voluntary decision to expose him/herself to a specific potential hazard in the prospect of a return. The tradeoff that is made in accepting a hazardous job mainly involves accepting uncertain or unexpected harm in return for expected gain. The expected gain in that tradeoff could be monetary, e.g. hazard premium and extra pay, or psychological, e.g. feeling of excitement or adventure (such as in practicing risky sports, or working in the army or CIA).

A third feature of a hazardous job is that the level of hazard is perceived by the job holder as being above average in comparison to other jobs. The assumption is that a hazardous situation (e.g. job) represents an incremental hazard over and above hazards that workers face in the normal course of working

life. Hazard in the formal situation is, maybe, accepted and expected from workers. Hazard factor may lead to quitting normal jobs but hazard should be high enough to result in quitting hazardous jobs. This last statement in fact reflects a main thrust of this dissertation.

The criterion that hazardous job is preceived as being above average hazard is parallel to that used by OSHA (Occupational Safety and Health Agency) to prioritize and target inspection in the industries. The difference, however, between a person's hazard assessment and OSHA is that the former refers to subjective assessment, a point that is discussed later, while the latter is based on objective assessment. OSHA uses the objective criterion of Loss of Working Days Index (LWDI) to rank industries and employers. High hazard is associated with high loss of working days and vice versa. According to OSHA, jobs above national LWDI average are considered highly hazardous jobs.

In addition, hazardous jobs are characterized by more fatal accidents, more health problems and a higher death rate. Pochin (1979), cited in Griffith (1981), has examined U.S. data about the incidence of death and injuries at work and reports that "... in the more hazardous occupations fatalities constitute an increasing portion of the total harm caused" (p. xix).

A fourth feature of a hazardous job relates to a perception of controllability. Personal choice or voluntariness together with awareness of hazard and safety precautions, may enhance a

feeling of personal control over the occurrence of adverse outcomes. In his study of phenomenological risk, Akin (1976) reports a feeling of mastery over events, expressed by individual who are doing risky activities (e.g. car racers, investors). Data (e.g., Langer 1975, Wortman 1975) also show that when individuals choose an uncertain course of action (even when they choose numbers in gambling) they experience more of a feeling of control of the consequences than when they do not have the choice. Langer (1975) coined this as the "illusion of control." Also with the existence of safety precautions, safety clothes and equipment, training and labeling, hazards may be perceived as subject to control. Government regulations for handling, storing, packaging and usage of hazardous materials are designed to increase control over hazards.

Voluntariness of exposure and perceived controllability, as characteristics of hazardous jobs, have been cited extensively in the literature of risk and risk acceptance (e.g., Otway, et. al, 1978). Rowe (1977), for example, includes them among what he calls the most significant factors in hazard acceptance. Perception of hazard controllability should have an impact on hazard evaluation and hazard acceptance (voluntariness). The higher the perceived controllability over a specific hazard the more the hazard is accepted. Apparently people devalue the hazards that are subject to control. Everything else being equal, higher controllable hazards are perceived as safer than

less controllable hazards.

In sum, it seems that hazardous jobs, in contrast to job hazards, are associated with the following qualities:

Inherent hazard

Above average level of hazard

Voluntarism

Controllability

While the first attribute, inherence of hazard, is related directly to the nature of technology or material used in the job, the third and fourth characteristics, voluntarism and controllability, are related to both the job and job holder (at least when the worker makes an initial decision to engage in this kind of job). They may also change from time to time for the same job or the same industry. For example a worker may perceive high controllability when he makes his initial choice (voluntarism) to engage in this kind of job. Later on the worker may experience lesser controllability. Such changes should have psychological and behavioral implications.

The second aspect of a hazardous job, as being above average, refers to the hazard level as assessed by objective and subjective measures. The following section deals with the issue of assessing hazard level and sources of bias when making that assessment. Before proceeding to this discussion, a note about the two terms of "hazard" and "risk" is in order.

Vlek and Stallen (1980), among others, use the two terms

hazard and risk interchangeably. According to dictionary definitions (e.g., Webster's Third New International Dictionary) these terms are similar but slight differences in meaning exist. "Hazard" refers to the source itself, e.g., hazardous material or dangerous equipment, while risk refers to human activities or undertakings including exposure to the hazard. Risk also involves the probability of loss or injury. In summary, it seems safe to assume that the terms refer to two facets of the same thing, viz; hazardous job. A hazardous job may then represent an interface between a hazardous source and a related risky human undertaking.

HAZARD ASSESSMENT: SUBJECTIVE AND OBJECTIVE HAZARD

Hazard assessment has both subjective and objective components. At the individual level, objective hazardous stimuli, e.g. labels, injuries and health problems, are translated into subjective hazard assessment through perception. The outcome of this information processing may include psychological and behavioral changes e.g. anxiety, avoidance, awareness and cautions. Some physiological changes may also be observed, e.g. increases in heart rate or muscle tension. One measuring device known as the "galvanic skin response" has long served as a direct measure of physiological arousal and is an indirect indicator of anxiety (for example see Geer 1966).

SUBJECTIVE HAZARD ASSESSMENT

At the individual level, hazard is mainly measured subjec-

tively. Many means of measuring psychological perception of hazard levels have been used. One way is by asking individuals whether they think their jobs are hazardous (yes....no.....). Another way is by asking about physical health problems or physical work problems that have resulted or could have resulted from doing the job. These two methods have been used by Viscussi (1979) among cross sectional sample of various employees. In addition, the magnitude estimation technique and anxiety measurement have been used to measure the level of hazard in one's job. For example Viscussi and O'Connor (1984) use the magnitude estimation technique among a sample of chemical workers by asking them to mark the level of hazard on a scale ranging from low to high level. Kasl et. al. (1981) use anxiety measurement among workers in the Three Mile Island Power Plant.

All of these subjective measurement should correlate with each other. However, more than one measurement of perception of the existence of hazard and its level should be used simultaneously in order to tap all of the hazard dimensions. The point of multidimensionality of the concept of hazard is discussed in the next section. Psychological perception of hazard level is important and related directly to labor demand for improvement in salary and safety precautions.

OBJECTIVE HAZARD ASSESSMENT

One objective measures of hazard is in terms of the expected cost of providing additional safety to specific jobs or activi-

ties (Thelers and Rosen 1976). Increasing the safety of hazardous jobs usually requires high expenses for new technology or safety equipments and clothing. Accordingly, safety expense is a measurement of hazard level. The higher the hazard level, the more the safety expenses.

Other sources of major objective hazard information are the OSHA's Loss of Working Days Index (LWDI) and the Bureau of Labor Statistics' (BLS) incident rates. Both of these measures reflect the number of injuries and illnesses in various industries. For example the BLS data gives accidental death and injury rates for 4-digit SIC industry codes on an annual basis. This permits comparability across industries. Industries which score above average are labeled as hazardous.

Individual researchers also use similar objective measures of hazard. Beattie (1967), for example, uses number of nuclear casualties as a measure of nuclear hazards. Starr (1976) measures an industry hazard in terms of thousands of man-days lost for every million man-hours of work.

However, there are two problems one may encounter when using objective statistics. First, statistics used by government agencies as well as research understate the delayed impact of exposure to hazardous materials (chemicals) and radiation. In fact the BLS publications admit such shortcomings and several have shown that occupational illness, especially delayed illness, is the most underreported of these statistics. However, this

neglected segment of objective information about health problems seems to play a significant role in public and employees' perception of hazard. Viscussi (1979) finds that threat of delayed health problems tends to cause stronger intention to quit (two and one-half times), than do immediate injuries and accident.

The other problem about statistical hazard data is that they are aggregative data. Accordingly, hazards at the level of individual companies are not delineated. In fact hazard assessment of individual jobs is essentially subjective. In addition the correlation between objective and subjective hazard does not seem to be perfect. In asking groups of people about their assessment of some known hazards, Slovic et. al. (1982), find that the correlation between subjective hazard assessment and annual frequency of death are .92 for experts and .62, .50, and .56 for the League of Women Voters, students, and active club samples respectively. While Viscussi (1979) finds a high correlation among manufacturing samples, the data shows that subjective hazard assessment is a product of learning experience and other personal factors such as age. Lirtzman (1984) notes that workers in hazardous jobs mainly assess the hazard relative to themselves, since hazard is potential, rather than hazard information per se.

Some personal and situational variables seem to moderate the relationship between objective and subjective hazard. This may introduce personal bias and lead to misjudgment. To examine and understand bias in perception and misjudgment we first must iden-

tify dimensions of hazard and second identify sources of bias in perceiving these dimensions.

DIMENSIONS OF HAZARD:

Hazard is a multidimensional concept. Vlek and Stallen (1980) define hazardous situation quantitatively as a situation associated with the probability of loss and the magnitude (or seriousness) of this loss. The product of these two dimensions, i.e. probability times seriousness, is known as expected loss in economic and psychology literature. These two aspects of hazard are different concepts but they are not completely independent. People are usually not very cautious when facing hazards that result in a small amount of harm and this behavior, therefore, may increase the probability of the occurrence of small hazards. The opposite relationship should be observed in very hazardous situations. The proposition that hazard measurement involves probability of occurrence of adverse events and the consequences or severity have been proposed by many other hazard researchers. Griffiths (1981) notes that "It has now become common to express risk in the form of a line depicting the relationship between the frequency of occurrence and the magnitude of the consequences for a spectrum of events," p. 61. Starr et. al. (1976) propose "a law of risk" as a line or a continuum from high-probability/small-loss to low-probability/large-loss. Kinchin (1978) considers the product of frequency of hazard multiplied by its consequences as a constant over time.

The rationale behind Kinchin's (1978) argument is provided by Wilde (cited in Vlek and Stallen 1980), who observes that in any hazardous activity, perceived hazard intensity and the caution in performing this activity are variables positively related to each other. Apparently people behave rationally by exerting more caution in, or otherwise avoiding, dealing with activities which may result in severe Loss. In contrast, Wild argues, accident rate (hazard frequency) is constant or always regresses to a constant mean over the long run. Imposing safety standards, for example, will decrease the accident rate in the short run until people realize that things have become safer. They then become less cautious, and this will put the accident rate back at its initial Level. A similar observation was made by Starr (1976) who states "...almost every sporting event has about the same average accident rate in terms of death per hour of sporting activity. It is very hard to explain this other than that people build up their activities in a sporting event to some level of a risk that they are willing to accept." (p.18).

To sum up, the literature reveals that (1) the dimension of hazard intensity (or severity) is a more influential factor than the dimension of hazard probability in the subjective assessment of hazard level and that (2) the relationship between probability and intensity for a given hazard is negative or that fatal hazards are characterized by lower probability and higher severity while minor hazards are associated with higher probability and

lower severity.

More recently another dimension for hazard assessment has attracted attention. Griffiths (1981) notes that one of the major developments in the field of industrial hazard over the last two decades has been the increasing recognition of the importance of delayed impact in the assessment of hazard. The time dimension or the delayed impact of hazardous materials has been recently subject to legislation and safety standards. This dimension has been labelled as "hazard immediacy" and it refers to the distribution of hazard severity in the near or far future. That is whether the impact is instantly observed (e.g. injuries) or takes time (maybe years) to be realized.

At the individual level, the dimension of immediacy (instant/delayed impact) of an adverse outcome also play a role in hazard assessment. Vlek and Stallen (1980), strongly argue for the impact of time dimension upon man's evaluation of hazard. In a series of laboratory experiments among groups of students and workers, Lirtzman and O'Connor (1982) show that people seem to be affected by two factors when assessing hazard, viz; hazard intensity and hazard immediacy. Hazard labels were used as stimuli. In another study, Lirtzman (1984) shows that reaction time dimensions of eight types of hazard are not the same when values associated with groups of students are compared with values of industrial workers. This last study may highlight sources of bias in perceived hazard immediacy. However, the data does not show

reasons for time perception differences.

Some evidence suggests that a delayed adverse outcome, e.g., pollution, nicotine intoxication, is perceived by people as less harmful than an immediate one, everything else being equal. Vlek and Stallen (1980) cite two studies that show that people prefer a delayed hazard over a comparable immediate hazard. Also among a sample of chemical workers and technicians, Viscussi and O'Connor (1984) reported that T.N.T. was perceived as more hazardous than asbestos. Starr (1976) notes that "The usual perception of the individual about something that is remote in time or distance or has a low probability is that it is not going to happen to him" (p.5).

On the other hand while hazards with short term consequences are usually well understood, in terms of cause-effect relationship, and can be observed by people, hazards with delayed consequences are poorly understood (due to insufficient information) and usually irreversible (i.e., hard to stop). For example injuries are easier to identify and observe while causes of delayed physical or health loss could be harder to isolate. Workers who develop cancer and other similar long term disease may be unable to attach specific causes to such disease and have difficulties in supporting their legal claim for work compensation.

SUMMARY

There are three major attributes of any objective hazard that may influence personal judgment of that hazard. These at-

tributes are:

1. The rate, or probability of occurrence of a specific hazard
2. The consequence, severity or magnitude (i.e. degree of fatality and disability) of that hazard's occurrence
3. The immediacy/deferment of that consequence.

Throughout this paper the term Hazard Level refers to these three dimensions of hazard, viz; probability, severity and immediacy. While people make an overall judgment of a specific hazard in terms of low-high or below-above average, identifying dimensions of the concept of hazard is essential in order to understand how people make judgments regarding hazardous situations. The issue of personal bias and misjudgment in assessing objective hazard is discussed in the next chapter.

CHAPTER THREE

SOURCES OF BIAS IN SUBJECTIVE HAZARD

Subjective hazard, or personal assessment of hazard, is subject to influence from some factors other than the objective hazard itself. These factors, which may be labelled as moderator variables may introduce bias in person's assessment of hazards. This may result in a discrepancy between objective hazard stimulus and subjective hazard assessment. For the purpose of simplicity these factors may be broken down in terms of personal and non personal (or situational factors).

Personal Variables:

Prior Belief and Information. One source of influence in assessing hazard is previous experience & information. Prior belief and information, based upon media news and previous training and experience, may lead to selecting, avoiding or distorting information when the person is exposed to new or contradictory information (Weinstein 1980).

Lirtzman (1984) points to the difficulty in isolating from old information the independent impact of new information on subsequent behavior and attitude. Viscussi and O'Connor (1984) find that both old and new information play roles in shaping

chemical workers' reaction to new information. When the Campbell Soup Company wanted to find the most efficient way to market its Swanson frozen dinner line, Campbell found that commercials aimed at non-users worked much better than those aimed at those already buying the brand (Surprises on what makes an ad work." The New York Times (July 10,1986).

A recent publicized example also demonstrates the impact of the factor of prior belief on the disproportionate public apprehension for chemical hazards and chemical plants, despite good safety records. Two prominent authorities (the head of the Environmental Protection Agency and the Director of Health, Safety and Chemical Regulations with the Chemical Manufacturers Association) claim that people's fear of the chemical industry is great despite the fact that the chemical industry is surpassed in safety by only three industries: finance and insurance, petroleum, and services, while twenty-five industries were rated below chemical on safety scale, in terms of employee days lost to work related injuries and illness. (The New York Times, May 18, 1986).

Indeed, data published in 1984 by the Bureau of Labor Statistics (BLS) about occupational injury and illness-incidence rates show that the chemical industry had 5.3 lost days per 100 full-time workers, while the manufacturing average was 10.6 per 100.

It's important to note that BLS' data, as had been previous-

ly argued, understated the delayed impact of exposure to hazardous material. One of the troubling problems of the chemical industry is the latency and irreversible effects of some chemical substances on human health. In most cases the latent period for human carcinogenesis is 5 to 40 years. In case histories of human exposure to chemical carcinogens with such long latent periods, such as asbestos, conclusive epidemiological findings were not available until 20 or more years after the start of exposure. The safety scale of chemical industry, however, does not reflect such delay of illness.

Demographic Factors. There is a body of research that examine how demographic characteristics influence attributions towards and assessment of hazard, (For a review of literature see, for example, Kogan and Wallach (1967)) . The most cited demographic variables include; age, wealth, education, experience and susceptibility to risk (i.e. whether a person is risk seeker or risk averter). Many of these variables, e.g. wealth, education and experience, are age correlates. Research on personal characteristics (e.g. Slovic 1971, Viscussi 1979) provide only a tentative or a weak support of their impact. Some scholars even argue that perceived hazard is mainly situational (e.g., Koziielecki 1974 cited in Vlek and Stallen 1980) or that hazard in the job is perhaps viewed on a more standard basis by workers, i.e. individual differences in viewing hazard are minimum, than are many other job attributes such as stress (Smith 1979).

Cognitive Differences. Another factor relates to people differing in their cognitive storage and retrieval of information. In addition more recent or more frequently occurring events are easier to recall than old or rare events. Tversky and Kahneman (1973) coined this phenomenon "availability." An example of availability is Steinbrugge et. al. (1969) finding of a strong correlation between the occurrence of an earthquake and the subsequent purchase of earthquake insurance.

Non-personal and Situational Factors:

Source Credibility. Perceived source of information and its credibility should affect the impact of hazard information. Source credibility could be affected by two characteristics of the source. These are; "information authority" and "information impartiality". Sources which are perceived to be respected authorities in their specific fields may also be considered dependable sources. However a sufficient condition to build credibility is impartiality. Information authority as a characteristic of sources seem to be more stable or constant while impartiality seems to be variable across situations and across receivers of information. Impartiality is perceived by receivers when authorities engages in disinforming behavior.

Information impartiality seems also to exert more impact on receivers than source authority. For example, Lirtzman and Shuv-Ami (1986) find that consumers will believe negative information

about a product's hazards if that information is provided by the producers rather than by another source. Information impartiality seems to underlie that finding since producers gain nothing, but avoiding liability suits, from disseminating hazard information. Attitude change will then be greater among receivers who perceive impartiality of sources of communication on product hazards.

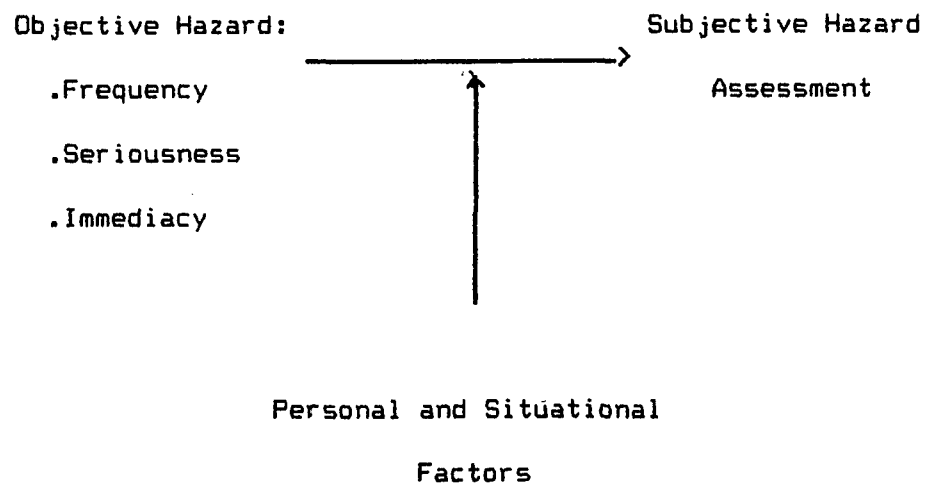
A related issue to impartiality and disinformation (information distortion) is how statistical data such as probability of specific hazard is presented. Wagenaar (1977) points out that the way statistical information is presented influences a receiver's assessment. Statistical data and number usually permit manipulation. For example, hazard that increases annual chances of death or injury by 30% would probably be judged as less hazardous if it is presented, instead, as an increase from 1 in 10,000 to 1.3 in 10,000. (This example is in fact a distortion of an example cited in Slovic et. al. , 1982.)

Workers and unions sometimes think that employers are not providing highly trustworthy information about unhealthy and unsafe working conditions. Employers may not have sufficient information (not a source authority) about the delayed impact of these hazards or may not update hazard information. Employers also may be thought to be disinforming employees in order to reduce workers and unions' demand for extra protection and/or fringe benefit.

Media. As noted by Lichtenstein et. al. .(1978); there is a tendency to exaggerate the occurrence of high emotional adverse events, e.g., atomic catastrophes, while underestimating "quiet killers" at any given level of objective frequency. This may be due to bias and intense coverage of specific adverse events in the media. Combs and Slovic (1979) find people's judgment of causes of death correlate higher with media coverage than with actual statistics. A popular example is the impact of films about sharks, such as "Jaws" on the build up of fear of sharks and of reports of seeing sharks.

Summary

The above mentioned personal and non personal source of bias are not expected to be independent from each other. Their existence may result in unrealistic personal judgment about any specific objective hazard and its aspects, Viz; probability, consequence and immediacy. These, along with moderating variables, may be depicted as in Figure 1



(Fig.1): Objective and subjective hazard.

CHAPTER FOUR

EQUITY THEORY

Equity theory shares some basic propositions with social exchange theories as exemplified by P.M. Blau (1964) who wrote about justice in social exchange, and in Gouldner's (1960) "The Norm of Reciprocity", and Homan's (1950) "The Human Group". While these scholars focus mainly on class and intergroup social harmony, equity theory is concerned with psychological harmony.

The most explicit propositions incorporated in equity theory are those stated by Walster et. al. (1976) and Austin et. al. (1976) and endorsed by Homans (1976). Briefly they include the following:

1. Man is selfish. Individuals by nature are trying to maximize their outcomes (outcome equals reward minus cost). Everyone, however, will suffer from a state of warfare as a result of retaliation from the victims of injustice.

2. Laws and equity values. Groups and societies work out compromises by enacting and enforcing laws and value systems which "equitably" apportion rewards and costs among members. For example, the Common Law is based on the principle of equity.

3. Feeling inequity. When persons or groups discover they are inequitably participating in an exchange relationship with others, they become distressed and tense. The more inequitable

the relationship, the more the distress. This emotional or psychological reaction to inequity is the motivational aspect of equity theory.

4. Restoring equity. Persons and groups who participate in an exchange relationship and discover inequity will attempt to restore equity. The more inequitable the relationship, the more distress to the participants and the harder they will try to restore equity. The reaction to restore equity represents the behavioral aspect of the theory.

The second proposition refers to institutionalization of the equity principle or moral values of equitable exchange which should shape child rearing and business and social transactions. As a result, a socialized individual may react to restore equity when he participates in an inequitable relationship.

The third and fourth propositions deal with the consequences of discovering inequity. While the second proposition speaks about procedures which establish objective equity, the third proposition talks about subjective equity. They are not the same. Subjective judgment of equity (the third proposition of equity theory) is the focus of psychological models of equity e.g. Adams 1965 model.

Psychological models of equity are algebraic representations of cognitive calculus processes assumed to be performed by participants of an exchange in calculating their outcomes. Two cognitive calculations are assumed to be processed. A participant

first calculates his relative outcome by comparing his outcomes from the exchange to his input (contribution) to the exchange i.e. the ratio of the outcome to the input. Second, the participant calculates the magnitude of inequity, i.e., being treated differently because of either underpaid or overpaid, by comparing his relative outcome against the relative outcome of the referent other. Harris (1976) designates these processes as a "double relative." "Thus equity is a double relative concept defined by the relationship among outcome measures each of which is itself measured relative to that person's inputs" (p.197). According to equity theory, the pair comparison process (self against referent other) is accomplished whether or not participants perceive gains or loss. Equity comparison is undertaken in distributing profit as well as losses. An example of distribution of losses is the concession bargaining by labor unions in which workers agree to reduce their wages and fringe benefits in order to share in financial difficulties suffered by employers.

A discrepancy in a paired comparison causes tension or distress. An inequitably underrewarded individual will experience anger against another party while an inequitably overrewarded individual may feel guilt. According to the second proposition, the roots of any emotional inequity reaction should be in the equity socialization process. Theories in social psychology such as learning theory and cognitive dissonance would predict that a socialized individual will feel tension or

dissonance if he/she faces a conflicting situation between what is learned and a stimulus. Some specific explanations have also been proposed. Homans (1976) feels that the origin of anger feelings from inequity is the frustration-aggression hypothesis. Whereas feeling guilt represents, perhaps, anxiety from anticipated retaliation by another party or a threat to self-esteem by producing less than others (Austin et. al. 1976). Guilt and anxiety from possible retaliation do not seem, however, to be the same thing. A harm-doer (e.g., murderer), for example may reduce his feeling of guilt, but not anxiety from anticipation of losing a relationship, and may surrender himself to pay his dues to society. This may also have its roots in the socialization process.

The important point to be emphasized is that whenever we apply equity to a specific context, the nature of the psychological reaction to perceived inequity should be identified. Treating the psychological reaction to inequity as an intervening variable (MacCorquodale and Meehl, 1948) will help to predict the means taken by participants to restore equity (proposition 4). Adams and Freedman (1976) point out that the quality of the reaction to inequity, guilt, anger, etc. is important in the prediction of how persons will attempt to restore equity. Restoring equity (proposition 4) may be achieved by either restoring actual equity (reality restoration) or restoring psychological equity (reality distortion). Reality restoration

includes actual or observable behavior that attempts to change outcome and/or input of one's self and others. Reality distortion may involve rational justification of the status quo or changing referent others. Changing the situation, i.e., leaving or quitting, may restore actual equity if it changes inputs and/or outcomes.

Adams (1963: P.427-29) postulates eight hypotheses about means available to persons when reducing inequity. Only three of these have been investigated (Telly et. al. 1971), viz; restoring equity by increasing one's inputs, restoring equity by decreasing one's inputs and restoring equity by leaving the field (e.g., quitting, transfer or absenteeism).

Adams (1965) specifies conditions that governing the choice of one mode of resolution over another. To be selected, the choice should satisfy the following:

- (a) A person will maximize positively valent outcomes and the valence of outcomes.
- (b) He will minimize increasing inputs that are effortful and costly to change
- (c) He will resist real and cognitive changes in inputs that are central to his self concept and to his self-esteem. To the extent that any of Person's outcomes are related to his self-concept and to his self-esteem, this proposition is extended to cover these outcomes. (p. 295).

Availability and adequacy in the means used to restore equity are important to the prediction of how persons will attempt to restore this equity. The means that a person uses should be available and adequate to do the task. Evidence also

exists to support the idea that costly means are less likely to be used (Adams and Rosenbaum 1962, Weick and Nessel 1969).

Equity Models

Various models of equity have been proposed. These models deal mainly with the third proposition of equity theory (calculating the degree of equity/inequity). Perhaps the first equity view was the one expressed in Aristotle's *Nichomechean Ethics*, cited in Walster (1975), in a form of the equation

$$(O_A / O_B) = (I_A / I_B)$$

where O_A and O_B are the outcomes of persons A and B, whereas I_A and I_B are their correspondent inputs.

The first popular equity model explicitly proposed by Adams (1965), is:

$$(O_A / I_A) = (O_B / I_B)$$

Vecchio (1982) and others claim that the former model is to be preferred over Adam's formulation because Aristotle permits the division of inputs and outcomes by similar units. This is true if the problem is of the type of allocating resources, e.g., rewards, between two persons doing common tasks. In some other situations, however, inputs or outcomes of the participants may not be measured in similar units.

A serious criticism against Adam's ratio model is that it is

restricted to positive inputs ($I > \text{zero}$) from all participants. For example, the model cannot handle negative inputs in the form of negligence. Examples cited in literature (e.g., Walster and Piliavin, 1972) show that with negative values of inputs, Adams' formula generates equity when, logically, it does not.

In order to handle negative sign values, Walster et. al. (1973) have proposed the following formula:

$$(O_A - I_A) / (|I_A|)^{K_A} = (O_B - I_B) / (|I_B|)^{K_B} \quad I \neq \text{zero}$$

where:

$|I|$: the absolute value of inputs, i.e., disregarding the sign of inputs.

K : are exponents that take the value of -1 if I and $(O - I)$ have opposite signs otherwise they take the value of $+1$.

The above formula provides information about the net gain of each participant (outcomes minus inputs) in terms of sign and magnitude. Person "A" will perceive that net profit equals zero if his inputs equals his outcomes. This will also be perceived as an equitable situation if referent others are perceived, by person "A", to receive zero net profit. Person "A" may also perceive gains if outcomes $>$ inputs and loss if outcomes $<$ inputs. The magnitude of equity/inequity, i.e., the extent of being treated differently from others, is discovered through ratio comparison.

In another contribution Anderson and Farkas (1975), Anderson (1976), and Farkas and Anderson (1979) use the information integration theory as a basis for studying the algebra of equity judgment. Their alternative definition of equity is that,

$$O_A / (O_A + O_B) = I_A / (I_A + I_B)$$

According to this model, A's proportionate share of the outcomes should be equal to his proportionate contribution to the inputs. This model seems to apply better to a division of a fixed sum between two persons doing common tasks and each claiming a reward equal to his input.

Harris (1976) derives a set of criteria (or derivation) that any equity model should satisfy to be valid. One fundamental criterion, for example, which is not satisfied by Adam's, nor as the early version of Walster et. al.'s. (1973) formula, is that when equity holds true, outcomes should be an increasing function of the inputs. Failing to satisfy these derivations, Harris shows by means of thought experiment, leads to an inconsistency between an equity model and the hypotheses derived from it. Most of these thought experiments show shortcomings in equity models in handling negative input or outcome values. Harris' preferred equity definition is based on the following linear formula (cited in Farkas and Anderson 1979):

$$O_A = bI_A + a$$

$$O_B = bI_B + a$$

where:

parameters "a" are the intercepts (or initial equity) which are identical for both persons but may depend on I_A and I_B . Parameters "b" are the slopes (>0). They are the rate of change between inputs and outcomes.

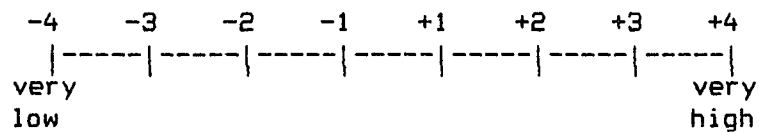
According to this approach, equity for a two party division is defined as the equality of the two slopes. Farkas and Anderson (1979) criticized this formula on the basis of both mathematical and psychological grounds. First the two equations can always be solved to give a perfect fit to a two party division. And second the formula is not linear, as it appears, since the rate of change between inputs and outcomes is not, and should not be, constant at all times. This last point is of special importance since it argues for a non-linear relationship between change in input and expected fair outcome.

Problems with Equity Theory

Equity theory suffers from three problems each of which reflects methodological as well as conceptual aspects. These are: how to account for negative input, how to account for multidimensional inputs and outcomes, and how to define the theory boundary.

The problem of negative inputs. Experiments cited by researchers and theorists of equity theory show that the inclusion of negative values of input or outcome in equity calculation makes the

model predict equity between two persons when it is logically or intuitively not equitable. For the purpose of illustration consider the following example. Suppose a student is asked to rate his input and outcome from a specific course on a scale that ranges from -4 (very low) to +4 (very high). For example the scale may look as follows:



This scale permits the selection of negative values for input and outcome. (This scale, in fact, has been suggested by Walster et. al. (1976) to be used with equity calculations since it omits the zero value). The student should also agree upon the component(s) of input (his level of efforts in the specific course) and outcome (his grade in that course). The student is then asked to do the same thing for any other student who had attended that course and whom the original student considers for comparison or his referent other. Now suppose the original student assigns the following values:

Input self(I_s) = + 3
 Outcome self(O_s) = - 3
 Input other(I_o) = - 3
 Outcome other(O_o) = + 3

Clearly the original student does not feel equity since he puts

dividing outcome with inputs. For example, in the previous calculation of relative outcome, using Adam's model, one may compare $(-3: +3)$ to $(+3: -3)$. Clearly the two sides of the comparison are not equal. This result is different from the case when one compares (-1) to (-1) , which are the final products of the ratio, as it is used in equity literature.

The more recent models proposed by Walster et. al., and Anderson and Farakas, claim that they have overcome this problem. One may want to examine such claim by applying the same hypothetical problem to the following equity models:

Walster et al (1973) model: Substitute the values assigned by the original student in the Walster et. al. model as follows:

$$\frac{O_s - I_s}{(|I_s|)^{K_s}} = \frac{-3 - 3}{(3)^{(-)(+)}} = \frac{-6}{(3)^{-1}} = -18$$

$$\frac{O_o - I_o}{(|I_o|)^{K_o}} = \frac{3 - (-3)}{(3)^{(-)(+)}} = \frac{+6}{(3)^{-1}} = +18$$

$$-18 \neq +18$$

The model shows that the student should not feel equity since his relative outcome is (-18) while his referent other is $(+18)$. The model shows that the scrutineer (the student) experiencing loss while the other experiences gain.

This model, e.g. Walster et. al., attempts to solve the problem mathematically. However, the issue seems to carry a

conceptual dimension. Anderson (1976) feels that negative inputs seem to create conceptual problem that lies deeper in primitive psychology than in equity theory and that, he states, equity theory should be applied to negative contribution only if a participant accepts blame for the undesired behavioral input to the relationship. Thus, a participant should feel personal negligence in order to accept responsibility for subsequent negative outcome. In other words, a participant will feel equity with negative outcome, e.g. penalty, only if he accepts blame for undesired inputs to the relationship. This point is explained again by the Walster et al (1979) argument below.

Problem of multidimensional inputs and outcomes. Adams (1965) has correctly recognized the multitude of inputs and out-comes. Participants in an exchange relationship may perceive the relevance of many input factors such as age, seniority, performance or accomplishment, education, family background, and social status. Factors such as effort, intention, ability and even needs may also be perceived to influence input value (Farkas and Anderson 1979). Walster et. al. (1979) label positive input as assets and negative input as liabilities. Implicit assets should claim positive outcome. Liability may claim negative outcomes if the person accepts responsibility for undesired input. Positive outcomes include reward resulting from the exchange relationship such as pay, promotion, status and interpersonal relationship. Negative outcomes include negative consequences such as penalties

and or punishment.

There are two issues related to the multidimensionality of input and outcomes. First is to know what factors constitute input and what factors constitute outcomes. Factors such as effort and wages can be easily designated as input and outcome respectively; some other factors are not. Examples of the latter are factors such as job responsibility, authority and many other psychological factors that are usually found in job enrichment and job design literature. These latter factors could be considered as input or outcomes depending on participant's view. Accordingly equity researchers should identify beforehand which factors are considered relevant to the exchange of relationship and then proceed by indentifying which are considered as input and which are considered as outcomes from the participant's view. For example Walster et. al. (1976) have suggested a strategy to inquire about what factors represent inputs and what represents outcomes from the subjects view point. This strategy implies that subjects are shown a comprehensive list of inputs and outcomes. Selection would be those that are relevant, from the subject's point of view, to the relationship of interest.

The second issue underlying the problem of multidimensionality is whether or not to integrate various components of input and outcomes. Integration of input or outcome components, i.e. adding up input or outcome variables to reach an overall equity

judgment, should be of great usefulness if the components of input (or outcome) are considered as representing one dimension. Adding up input variables is labelled "input summation" (Anderson 1976). A necessary and sufficient condition to use input summation is homogeneity or similarity of input variables. The same thing applies to outcome variables.

What if input or outcome variables are not homogeneous or similar? This issue has been addressed by Anderson & Farkas (1980) who proposed an "equity summation" approach which permits distinct input factors, e.g., education, seniority, performance, effort, to act separately in determining equity; that is, equity comparison between person A and person B should be applied to each factor. The overall division of relative outcome between person A and person B should be reached, therefore, by using a weighted sum or an averaging of these "mini relative outcomes". Relative outcomes (ratios) are qualitatively comparable and accordingly they can be summed.

Equity summation technique permits examining distinct outcome factors and how they are related to their correspondent input factors. An interested student of equity is then able to compare mini-input factors of persons A and B such as seniority, achievement and working in hazardous conditions, to their correspondent outputs, e.g., promotion, pay raise and hazard premium. The overall decision of relative outcome should then be reached by combining these ratios or mini relative outcomes.

Two necessary conditions are specified by Farkas and Anderson (1979) in order to successfully use the equity summation approach. First, input factors should be heterogeneous. Second, input factors should be known, explicitly specified and under experimental control. Since equity is subjective, any equity experiment, as has been noted previously, should specify and define in advance the inputs to the exchange and the expected consequences of the exchange; otherwise explicit summation may run into a serious problem and the input factors may not all be known.

The problems of multidimensionality and the subjective judgment of which factors are to be considered as relevant to the exchange lead to another problem faced by equity researchers, namely equity boundary.

The problem of Equity Boundary. Specifying the boundaries of equity in terms of what inputs and outcomes are to be included in an equity experiment is complex. In a real situation many of these values are culturally and historically determined. Adams (1963) states that "In order to predict when an individual will experience inequity under given conditions of inputs and outcomes, it is necessary to know something of the values and norms to which he subscribes-- with what culture or subculture he is associated." (P. 425). Presumably these values and norms are built into individual cognition and influence his judgment of fair exchange.

Furthermore recent philosophical writing in equity paradigm suggests that we should go beyond the nearly stable cultural norms to consider as well changes in the surrounding economic condition and even the political values. Values such as need (as it is applied in the social welfare policy) and parity (an equal reward to each participant) have been argued to be considered within the equity paradigm (e.g., Deutch 1975, Leventhal 1980). The issue of whether these values should be treated differently from the customary merit input or be intergrated in an equity model as part of the exchange related inputs is still debatable.

CHAPTER FIVE

PSYCHOLOGICAL AND BEHAVIORIAL IMPACT OF HAZARD PERCEPTION

The impact of hazards on a workers' attitude and behavior has been neglected in management and organization studies. Empirical and theoretical works in the area of turnover, absenteeism, job stress and job satisfaction, while paying some attention to the working conditions, have almost neglected hazard in the job as an important psychological and physical element. For example, no studies about hazards in the job were identified in the turnover literature (for review of literature see for example Goodman et al 1973, Forrest et al 1977, Mobley et al 1979). Similarly, March and Simon's (1958) model of turnover does not include working conditions or hazards as factors causing workers to quit.

Few studies have attempted to explore the impact of hazards in jobs on subsequent welfare and behavior. In a study of job satisfaction among miners, Kelly and Harrel (1949) found that much dissatisfaction results from unhealthy and dangerous situations. When subjects were asked whether they would select the same job if they were 16 again, ninety percent of the miners answered "No." Those miners who said they would not select the same job if they had the chance again probably have greater intentions to quit than other miners. This job acceptance

question has been used as indication to quit hazardous jobs (e.g. Viscussi and O'Connor 1984).

In another study among a group of Swedish miners, Hakkinen and Toivainen (1953), find that the dangerous effects of dust and the risk of accidents were cited by workers as major determinants of dissatisfaction.

Also survey data show that hazardous working conditions erode job satisfaction. Frenkel et al (1980) analyze data from national surveys, conducted in years 1969, 1972, 1977, about quality of employment life and they report that perceived exposure to hazard is related negatively to length of employment. They note that workers who perceive a hazardous work environment stay significantly shorter periods than other workers.

Viscussi's Model. An explicit model that deals with hazard and quitting has proposed by Viscussi (1979). Viscussi presents a model that predicts intention to quit as a function of a host of attributes of the job and the job holder. Specifically the "quit intention probability" can be described by the logistic probability function of

$$P = 1 / (1 + e^{-\theta x})$$

where:

P: quit intention probability

θ : weight associated with worker and job's attributes

x: a vector of a set of attributes of the worker (e.g., education, sex, wealth etc.) job (hazard, physical effort,

etc.)

e: Euler's natural log

Viscussi demonstrated that the probability of quitting was doubled when the job was perceived as hazardous. The study, however, was correlational and based on survey data which do not imply cause-effect relationship. Viscussi admits that a competing explanation holds that turnover leads to a high percentage of inexperienced workers (new hires) which may then increase the injury rate (high hazard).

In a subsequent field study, Viscussi and O'Connor (1984) manipulate level of risk and observe changes in workers' responses. The results show that workers demand more compensation as a tradeoff for increasing hazard. In a highly hazardous condition (T.N.T., asbestos), however, workers may respond by considering quitting their jobs.

Equity Model: No previous research addresses the relationship between equity theory and working in hazardous environment or the impact of perceived potential risk on feeling inequity.

Although equity theory has been used as a cognitive measure of inputs and outcomes in exchange situations, hazardous conditions add another element to the employment exchange. The equity model can then be used as a cognitive measure of perceived hazard (i.e., increases in hazard cause increases in inequity, everything else being equal). If that is so, then what are the behav-

ioral implications of the psychological state of inequity?

To deal with these issues, guidelines for equity application will first be considered, then some assumptions and considerations will be stated and finally hypotheses will be developed.

Equity literature provides guideline that should help to undertake the present research. Equity researchers should start by identifying relevant inputs and outcomes for the specific exchange as they are perceived by the participants. In addition, in their review of literature, Adams and Freedman (1976) argue that equity researchers should deal with three issues of 1) identifying the phenomenological quality of such emotional reaction to inequity as guilt, regret, retaliation, anxiety, anger, betrayal, hurt and shame; 2) behavioral implication of these emotional states and how people restore equity; and 3) developing quantitative measures of input and outcomes and developing mathematical definitions of equity. These recommendations should then guide the present research.

A point of departure in developing understanding of hazard-equity connection involves employees' awareness of potential hazards. Equity theory can make no prediction if a participant does not recognize his inputs (or contribution) to the exchange relationship. Awareness of hazard input may come through information about existing hazard compensation, existing safety precautions or injuries and illness. Awareness of hazard as an

inherent aspect of the job will be recognized by the employee as a special contributions to the employment exchange for which the employee expects a fair return or hazard premium.

Working in a hazardous job may represent a unique and distinct contribution to the employment relationship. Employee's realization of exposing himself to a potential risk is a distinct input by itself independent from such customary merit inputs, as effort, performance and ability, to the employment relationship. Hazard input could be measured subjectively via hazard assessment. As noted previously, equity theory can make no prediction if participant does not recognize his/her specific inputs to the employment situation.

Accordingly, an employee who works in a hazardous job will calculate his relative outcome (i.e., outcome/input) and compare the ratio with that of referent others (including his own ratio in a previous exchange). Also, referent others may include future ratio in another attractive job (Patchen 1971) or comparison among classes of jobs (Adams 1965). Employee's outcome represents compensation for inputs. Hazard compensation includes monetary premiums and other hazard-related fringe benefits, e.g., life insurance, medical insurance and sick leave, that are perceived by the employee to be related directly to being exposed to hazards in their jobs. Data support the existence of such trade-off between hazard as job characteristic and hazard premium as outcome.

Empirical evidence (e.g. Viscussi 1979, Thaler and Rosen 1976) shows that workers' will demand, or receive, hazard premium for jobs perceived as hazardous. The origin of this causal relation may be traced back to Adam Smith who states that workers will demand additional compensation for jobs that pose hazard on their health. According to Adam Smith (Thaler and Rosen 1976), workers must be induced to take hazardous jobs through a set of compensating difference in wage rates. In fact wage differential theory in the literature of the economic of labor market is based on that notion (read for example Thaler and Rosen 1976 for more detail about wage differential theory). In addition, it is proposed here that hazard premium should at least equal, if not exceed, hazard level, assuming that both hazard premium and hazard level are subjectively measured. In order to keep employees in jobs with above average level of hazard, employees should at least feel indifferent between their jobs and the attractiveness of alternative jobs.

A participant in a hazardous exchange, e.g. hazardous job, will experience equity to the extent he feels that: first his costs (possibility of loss or inputs) do not exceed his benefits outcomes i.e. $((\text{outcomes}/\text{inputs}) \geq 1)$: second, a participant should feels that his relative benefit (outcome/input) is equal to that of referent others (other's outcome/other's inputs). We may label, a la Pritchard (1969), the first equity condition (that is outcome divided by input is equal to or larger than one)

as "internal equity" or "internal standard". Internal equity denotes the level of hazard compensation that a worker perceives as being commensurate with his own input (hazard assessment) without regard to any comparison with others.

On the other hand, the other equity condition may be labeled as an "external equity" or "external standard" which denotes comparison between two ratios; self's O/I vs. other's O/I (Adams, 1963). A participant in a risky situation will experience equity to the extent he feels that the two ratios are equal.

Hypotheses about equity conditions are developed in the next section. The focus will be on internal equity.

CHAPTER SIX

DEVELOPING HYPOTHESES AND THEORETICAL MODEL

I. The Relationship between perception of hazard level and request for hazard compensation. This relationship is expected to take a shape of a peculiar function. Some theses about human behavior in hazardous situation may help to identify the shape of that function. For example, Zuckerman's (1976) "two-factor theory of approach and withdrawal from novel or risky situations" postulates that man is seeking an optimal level of arousal from a risky situation. The strength of a sensation-seeking (benefit) drive increase as the hazard increases until the situation approaches an optimal arousal level. Anxiety (cost), however, increases monotonically with increasing riskiness. At the optimal point, anxiety will be equal to satiation i.e., optimal balance between benefits and hazards. Beyond the optimal point, anxiety will dominate and the behavior will change from approach to withdrawal from the situation.

Similarly, according to arousal theory (for review of literature see, for example, Weiner 1980), individuals prefer and seek out an optimal level of stimulation. Hebb (1955), for example, finds a curvilinear relationship between level of arousal and approach behavior. Before the optimal level of arousal there is an increase in the positive emotion and

individuals will engage in activities that produce increments in arousal. Whereas beyond the optimal level persons will experience high anxiety and will engage in avoidance behavior.

Coombs and Avrunin (1977) propose that the optimal point between perceived benefit and cost appears to lie at a moderate level of risk. Their explanation of the dominance role of anxiety beyond the optimal level is based on the utility function of each benefit and loss. Benefit starts with a convex utility which changes to an apparently concave utility after the optimal point. While cost (dis) utility starts in the reverse order.

It seems then that hazard compensation should be increasingly favorable to offset the possibility of loss imposed by increases in hazard.

The following hypothesis attempt to predict workers' responses in order to maintain equity under different hazard levels.

Hypothesis One: Below moderate hazard level, workers demand for hazard compensation is expected to be linearly related to perceived hazard. The relative outcome (outcome divided by income) for additional units of hazard is expected to be similar and equals one as the hazard level increases from low to moderate level. That is assuming equity, then

$$R_1 = \frac{\Delta HC_1}{\Delta H_1} = \frac{\Delta HC_2}{\Delta H_2} = \dots = \frac{\Delta HC_n}{\Delta H_n} = \frac{HC}{H} \approx 1 \quad (\text{i.e. a constant equity ratio})$$

where:

R_1 = Relative outcome (equity) over Low to moderate hazard.

$\Delta HC_1, \Delta HC_2, \dots, \Delta HC_n$: Incremental changes in hazard premium requested.

$\Delta H_1, \Delta H_2, \dots, \Delta H_n$: Incremental changes in perceived hazard level.

HC: Original hazard premium.

H: Original perceived hazard.

However the tradeoff between exposure to hazard and hazard compensation is not expected to be constant at all levels of hazard. Some evidence of the peculiar relationship in hazardous jobs may be derived from studies on the utility of money by Galanter (Personal Communication, 1967, cited in Adams and Freedman 1976). Benefits may add at a slower than linear rate whereas costs may add at greater than linear. It is expected then that there will be a higher desired hazard premium per additional unit of hazard at higher level than at lower level of hazard. This proposed hazard-reward ratio is not counter intuitive. The proposed ratio is similar to the case when one invests money in the stock market. When investing, the higher the risk, e.g. buying junk bonds, the higher the expected reward.

Accordingly, the relative outcome (R) is not, therefore, expected to be the same at different levels of hazards due to changes in the perception of what constitutes a just tradeoff

between inputs and outcomes. Specifically, at a higher level of hazard, this relationship may take a shape of an accelerating function.

Hypothesis Two: At high hazard levels, workers demand for hazard compensation is expected to be an accelerating function of perceived hazard. The relative outcome (equals outcome divided by inputs) is expected to be higher at high hazard levels than at low hazard levels. Equity outcome will reflect the following:

$$R_2 > 1$$

$$R_2 > R_1$$

Where:

R_1 : Relative outcome at low to medium levels of hazards.

R_2 : Relative outcome at high levels of hazard.

On the other hand, inequity occurs when a worker perceives hazard compensation as insufficient. Since more feeling of anxiety is expected at high level of hazard, this may nullify positive compensation. Accordingly hazard compensation at high levels of hazards may be perceived by workers as too low in comparison with their inputs (exposure to hazard) and in comparison with ratio of others (including self) at lower level of hazard.

In addition, feeling of insufficient compensation at high level of hazard seems to be more compelling than feeling of undercompensation at lower level of hazard. This is parallel to

a postulate by Adams (1963) who states that "Within certain limits of inequity there will be a tendency on the part of the person to manipulate and weigh cognitively his own inputs and outcomes and those of others in such a manner as to minimize the degree of felt inequity. Beyond these limits of inequity, the tendency will be to manipulate and weigh inputs and outcomes so as to maximize the inequity because this will increase the motivation to adopt behavior that will eliminate the inequity entirely". (P. 421.)

In sum, more workers at a high hazard are expected to perceive hazard compensation as insufficient.

Hypothesis Three: There is greater perception of inequity in high hazardous jobs than in low hazardous jobs. That is, more workers are expected to feel inequity at higher than at lower hazard. In addition, it is expected that inequity will be felt with greater intensity by workers in high than in low hazardous jobs.

II. Reaction to inequity. Similar to underpayment inequity, hazard undercompensation will cause feelings of anger. However, the quality of the psychological reaction (anger) will take a different meaning based upon the level of risk assessment. In case of low to moderate risk, anger is argued to represent a feeling of injustice, whereas anger in the case of a high level of risk represents rage and high anxiety or, perhaps, fear. In the second case, health and life are at stake. Psychologist Hebb

(1946) equates the emotions of fear and anger. "Fear and rage are notoriously related and it is impossible to frame any statement of the causes of rage which would not on some point comprise causes of fear as well". (P. 273.)

The behavioral implication of these different psychological states of injustice, rage and fear, may not be the same. Restoring equity in case of low to moderate hazard may be achieved by demanding more hazard compensation. An example is when a labor union requests higher hazard premium as a just compensation for increases in job hazard. This is supported in Starr's (1976) study of the mining workers' unions. His historical analysis shows that demands for higher compensation were based on complaints about increased injuries and illness. Also studies by Thaler and Rosen (1976) and others, cited in Viscussi and O'Connor (1984), show a correlation between workers' perception of hazards in their job and hazard compensation.

If hazard compensation is not feasible, a worker may restore psychological equity by means of rational justification.

Quitting the job may also be explored through the search process. Adams' (1963) hypothesis predicts that the an individual may leave the field when he experiences inequity. However, "leaving the field will be resorted to only when the magnitude of inequity is high and others means of reducing it are unavailable. Partial withdrawal, such as absenteeism, will occur more frequently and under conditions of lower inequity" (Adams

1965, P.46). The relationship between inequity underpayment and turnover is empirically supported in the literature (e.g., Fin and Lee 1972, Planz 1970, Telly et al. 1971).

On the other hand, Viscussi (1979) proposes a positive relationship between job hazards and quit rate. Viscussi's study, however, is based on cross sectional jobs and not primarily on hazardous jobs. Hazard factor may lead to quitting normal jobs (in terms of hazard level) but hazard should be high enough to result in quitting hazardous jobs. Quitting a high hazardous job then seems to be a more plausible action than in the case of low or moderate hazardous jobs.

Hypothesis Four There will be a stronger relationship between perceived hazard and willingness to quit at a higher than at a lower level of hazard. In other words, at a highly hazardous job, hazard will be a dominant factor in intention to quit, whereas at a lower hazardous situation other job characteristics will be more compelling.

III. Reaction to a very high level of hazard: Hypotheses one and two deal with workers' reaction as the hazard they face increases from low, moderate to high level. Implicitly these two hypotheses propose that request for higher hazard premium is a principle response to alleviate increases in hazard and to achieve a sort of equity.

Hypotheses one and two imply that workers who accept hazardous jobs are expected to request higher compensation for

any increases in hazard level. At a very high level of hazard, hazard compensation is not expected to play such a prominent role in restoring equity. Many reasons justify this thesis. One reason is that adequate compensation at that level is too expensive to be expected realistically by workers. At a very high range of hazard, employers may not be able, economically, to provide sufficient compensation. Medical and life insurance will also be very expensive and may not be available.

A second reason for the limitation of hazard compensation to restore equity at a very high level of hazard is that at that level workers will experience high potential for death or fatal injury. Some workers are expected to suffer from health and work problem as a result of exposure to hazard. These will lead them to perceive in low hazard controllability and to perceive that their lives are at stake. Psychological symptoms of high anxiety are expected to be observed among workers who face a very high level of hazard. Sufficient empirical evidence shows that people facing highly hazardous situation experience feelings of high anxiety and fear. In their study of the Three Mile Island nuclear incident, Kasl et al (1981) find that the nuclear workers experienced extreme feelings of upset, worry, anger and various other psychological symptoms of anxiety and fear.

Additional hazard compensation is not expected, therefore, to restore equity in a very highly hazardous situation. Other means are then expected to be adopted. A study by Hebb (1966)

may provide some guideline to the expected ways to reduce inequity. In his experimental study of fear, Hebb identifies three ways to eliminate the feeling of fear. These are; 1) "flight", or leaving the field; 2) "aggression" as a way to modify the disturbing sources, and 3) "fawning" as another way to modify the disturbing sources by placating them. Hebb's (1946) experiment deals with fear which is more related to personal feelings in high or very high hazard situations. Therefore we may propose that employees' act to restore equity in a job perceived as very hazardous include: 1) leaving the field (may take any of several ways; quitting the job, or obtaining a transfer), 2) modifying the disturbing source (decrease exposure to hazard) by demanding better safety precautions or perhaps by behaving more cautiously, or 3) placating the disturbing sources via information distortion.

Information (or reality) distortion, however, seems to be an improbable means to restore equity in a high level hazard. Festinger (1957) suggests that at a high level, as opposed to low level, of inequity (or dissonance) an individual seeks more information which then results in an action. Reduction in hazard level by means of better equipment and safety precautions may represent a more probable mean. Reduction in hazard level, however, incurs expenses and to maintain the level of profit, employers will be more willing to reduce hazard if they can simultaneously reduce the wage level (Smith 1979). By reducing

hazards, employers in fact may be more able to attract new workers to accept the safer jobs. Workers may also be willing to share in some of these expense. Evidence supports the thesis that workers may be willing to forgo part of their income in order to reduce an imminent hazard. Many studies show that people in general are willing to pay for reduction in risk of death (e.g. Acton, 1973, Jones-Lee 1976, Blomquist 1977, all cited in Smith 1979). Smith (1979) notes that on the average, a worker is willing to pay \$200-\$500 for a one-per-thousand reduction in the death rate. These studies look mainly to reduce certain, not possible, death. That situation may resemble facing a very high Level of hazard. Some data from the collective bargaining literature indicates that workers and unions may give up some compensation in order to enhance safety. A compelling question is how much a worker is willing to pay to reduce a very high hazard. A plausible answer is that the amount for reducing hazard by one unit, for example, should be less than the amount requested to accept the same hazard. This is based on our discussions of characteristics of hazardous jobs. Workers engage in many hazardous jobs for the prospect of gain, so that gain may be in some cases more valued than safety.

Hypothesis Five: Workers who perceive a very high range of hazard will be more willing to forgo additional hazard premium in order to reduce that level of hazard. This attitude will be weaker at lower to moderate hazard levels.

Withdrawal from stressful situation is a common means of coping with tension (Kahn et al 1964). Kasl et al (1981) found that about fifty percent (50%) of the workers in the Three Mile Island power plant left the area or wanted to leave both during and after the nuclear incident. This was in contrast to about ten percent (10%) in a comparison plant.

Hypothesis Six: Workers who perceive a very high range of hazard will be less willing to accept any extra hazard compensation and will be more willing to quit their jobs.

A Proposed Model.

Perhaps the best way to summarize the literature that has been discussed so far is the model illustrated in figure (2). The model shows that intention to quit and other dependent variables are the outcome of job characteristics (e.g. hazard, compensation, fringe benefit, etc.) The major intervening (explanatory) variables, equity (or inequity), subjective hazard assessment and anxiety explain the relationship between the independent and dependent variables. The two arrows from subjective hazard and anxiety to each of equity and the dependent variables mean that subjective hazard and anxiety have independent impact, beside their impact on equity, on intention to quit and other dependent variables, if their values are high enough.

Moderator variables include situational (e.g. hazard

information, labels, safety precautions, labor market etc.) and personal (age, experience, length of service, hazard propensity etc.) variables that affect the relationship between objective hazard, subjective hazard, anxiety and the dependent variables.

Willingness or intention to quit is used as a dependent variable instead of real quitting (turnover). Actual quitting, as a means of restoring equity, is subject to many other factors beyond the scope of this study. These factors may include labor market condition (or March and Simon's 1957 Search Process), transaction cost (e.g., sacrificing seniority) and union membership consideration. Intention to quit has been found to be a very strong predictor of actual quitting (Porter and Steers 1973).

Other dependent variables include desire for transfer to less hazardous job and request for extra compensation and safety precautions.

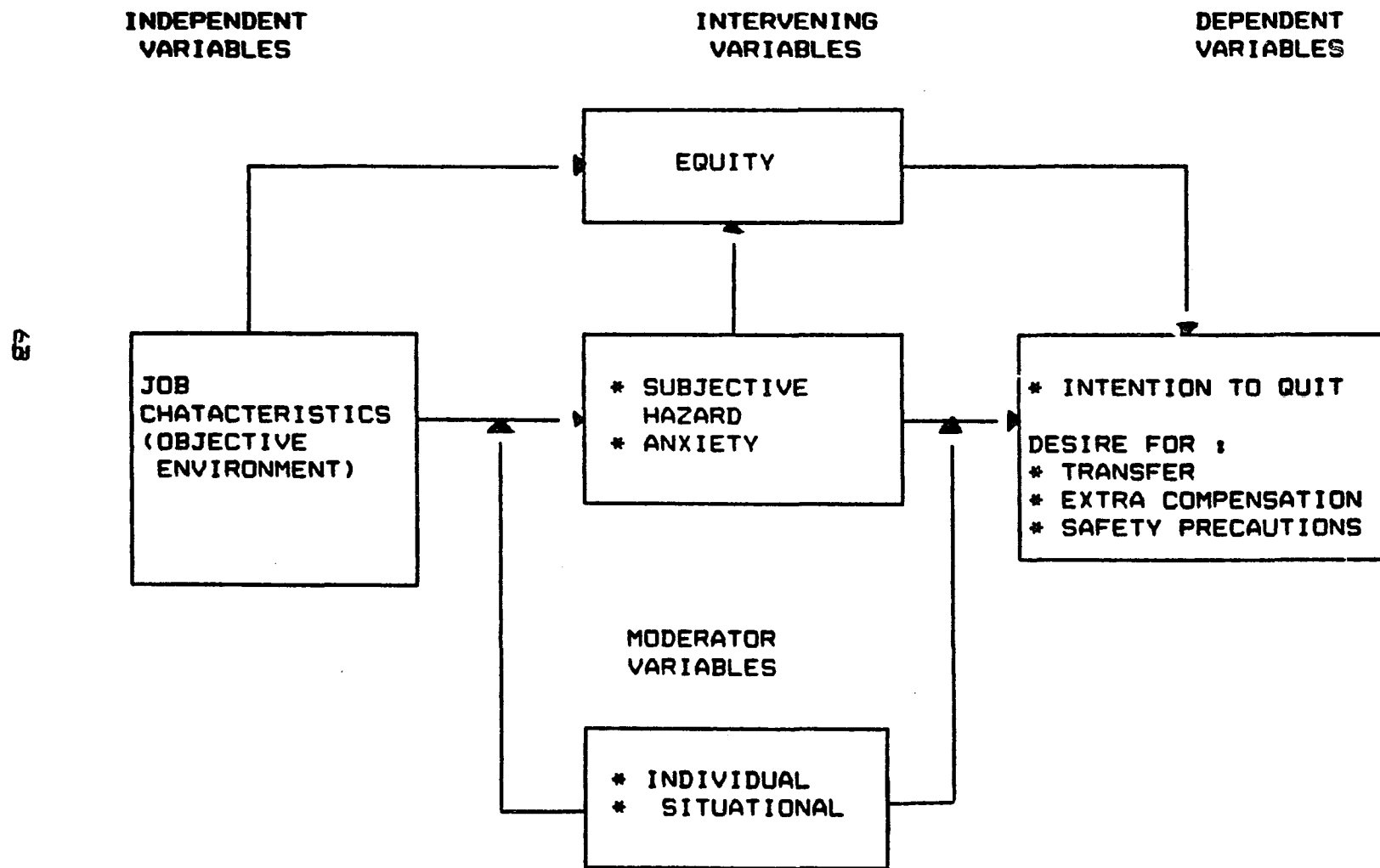


FIGURE (2) : A PROPOSED MODEL

SUMMARY OF HYPOTHESES AND MODELS TO BE TESTED

The following section includes a summary of the hypotheses that are developed previously. The empirical research conducted aims at testing these hypotheses. The empirical investigation also permits testing the superiority of some models. These models include Viscussi (1979), Adam (1965), Walster et. al. (1973), and Anderson and Farkas (1975).

Hypothesis One: In the low to moderate hazard range, the demand for hazard compensation will be linearly related to the perceived hazard and thus hold the relative outcome ($= \text{outcomes} / \text{inputs}$) constant and almost equals one.

Hypothesis Two: At high hazard levels, the workers' demand for hazard compensation is expected to be an accelerating function of the perceived hazard. The relative outcome ($= \text{outcomes} / \text{inputs}$) is expected to be higher at a high hazard levels than at a low hazard levels.

Hypothesis Three: There is a greater perception of inequity in highly hazardous jobs than in lower hazardous jobs. That is more workers are expected to feel inequity at higher than at lower hazard levels. In addition, it is expected that inequity will be felt with greater intensity by workers in higher than in lower hazardous jobs.

Hypothesis Four: There will be a stronger relationship between perceived hazard and willingness to quit in highly hazardous jobs

than in lower hazardous jobs.

Hypothesis Five: Workers who perceive a very high range of hazard will be more willing to forgo additional hazard premium in order to reduce that level of hazard. This attitude will be weaker at lower to moderate hazard levels.

Hypothesis Six: Workers who perceive a very high range of hazard will be less willing to accept any extra hazard compensation and will be more willing to quit their jobs.

A Regression Model:

Assuming equity, the proposed relationship between subjective hazard and demand for compensation (as proposed by hypotheses one, two, five and six) may be explained by an asymptotic regression model in the form of:

$$Y = B_0 - B_1 e^{-B_2 X}$$

Where:

Y: requested hazard premium

X: subjective hazard assessment

B_0, B_1, B_2 : are constants or parameters

e: exponential

This model assumes that the regression line starts as linear and then changes to an accelerating function as the hazard level increases. At a very high level of hazard, the regression line levels off. The line also has a positive intercept which means that workers in hazardous jobs request some compensation even if

the objective hazard level is minimum.

Other Models To Be Tested:

One concern of the present paper is to test various models that are proffered for the prediction of workers' reaction to hazard or to inequity. A comparison among these models should be based on their superiority in predicting quitting behavior.

One model of concern is Viscussii's (1979) model. As had been mentioned earlier, the model attempts to predict quitting behavior as a logistic function of a host of individual and job (including hazard) characteristics.

Other models of concern include three equity models. These are: Adam (1965), Walster et. al. (1973) and Anderson and Farkas (1975).

Therefore the data will be tested in the following models:

Viscussii's (1979) Probability to Quit:

$$P = 1 / (1 + e^{-\theta X})$$

Adams' (1965) Equity Model:

$$(O_A / I_A) = (O_B / I_B)$$

Walster et al.'s (1973) Equity Model:

$$(O_A - I_A) / (|I_A|)^{K_A} = (O_B - I_B) / (|I_B|)^{K_B}$$

Anderson and Farkas's (1975) Equity Model:

$$O_A / (O_A + O_B) = I_A / (I_A + I_B)$$

Where:

O: Outcomes as measured by hazard compensation.

I: Inputs as measured by hazard assessment.

A: Person "A" or self.

B: Person "B" or others as assessed by person "A".

CHAPTER SEVEN

DESIGN OF THE STUDY

I. Subjects: The sample consists of 251 Full time blue collar workers from the chemical industry. Subjects were selected randomly from production departments of three large chemical companies. The three companies are owned by the government and are similar in the types of material used and the internal structure and process. Jobs in the production departments are considered to be above average level of hazard. The government acknowledges the existence of that high level of hazard in the chemical companies by a statute that establishes a hierarchy of hazard premiums correspond to levels of hazard. Specifically production workers receive either 30% or 40% of salaries as extra hazard premium based on the type of chemicals used in the specific department. Administration jobs receive lower hazard premium that count to 10% of salaries, (For more details about the sample characteristics see appendix A).

II. Research Design (data Collection): The research consists of three phases in the following order:

A- Phase One: Current perception and status of workers at time 1: A questionnaire (see appendix c) was administered in order to collect data about demographic characteristics (age, income, marriage, ... etc.), job attitude (e.g. JDI, Facet Free items), anxiety, perception of hazard, equity and a host of other

variables. The questionnaire intends to tap many aspects in order to identify extraneous variables

Items in the questionnaire are drawn from studies that look to working conditions and job attitudes. These studies include the University of Michigan's 1977 quality of employment survey, studies about Three Miles Island's nuclear accident (e.g. Kasl et al 1981), Viscussi's (1974) dissertation and research in equity models and in turnover.

B- Phase Two: Treatment - Workers were randomly assigned to four experimental groups each is supposed to represent a specific level of hazard. Intervention was manipulated by presentation of Labels (see appendix B) on containers of proposed hazardous chemicals. Each worker is therefore exposed to a specific Label information of one chemical and was told that he would use the proposed chemical substance in his current operation. Labels are designed to elicit four levels of hazard, viz; very low level (no apparent chemical hazard: GROUP#1), medium level (GROUP#2), above medium to high level (GROUP#3) and extremely high level (GROUP#4).

C- Phase Three: After treatment - Subjects were first interviewed to make sure that they understand the information in labels. Subjects then were asked to answer part II of the questionnaire (see appendix c) which includes, among others, questions about level of hazard implied by labels and level of compensation requested if the subject is asked to work with the new

chemical (label) in his job.

III. Checking the random assignments to experimental groups.

Chi-square test for independent samples (SPSSX: "Non Parametric Procedure") was used to check group differences. Analysis showed that there is no difference among the four groups in terms of items in part I of the questionnaire. Table (1) shows the results for major variables of interest.

Table (1) Kruskal-Wallis 1-Way ANOVA
Difference among the four experimental groups at time 1.

Variable	Mean Rank				Signif- icance (χ^2)
	Group#1 (N=62)	Group#2 (=63)	Group#3 (=61)	Group#4 (=65)	
Education (EDUC)	128.62	136.03	124.07	115.59	N.S.
Number of children (CHILDNO)	95.45	96.42	93.33	91.00	N.S.
Job hazard perception (HAZARD)	111.94	128.30	132.17	131.39	N.S.
Earning (EARNG)	126.32	121.75	129.87	126.18	N.S.
Anxiety (ANXIETY)	128.28	119.89	128.48	127.42	N.S.
General Satisfaction (FACEFREE)	121.32	123.80	125.19	133.35	N.S.
Job Description Index (FACESPEC)	95.91	102.98	99.78	93.38	N.S.
Job security (SECURITY)	132.50	121.59	119.18	130.48	N.S.
Age (AGE)	110.65	138.17	124.09	130.64	N.S.
Tenure (TENURE)	121.77	125.27	125.77	129.02	N.S.

Table (1) cont.

Variable	Mean Rank				Signif- icance (x ²)
	Group#1 (N=62)	Group#2 (=63)	Group#3 (=61)	Group#4 (=65)	
Marital status (SINGLE)	130.17	127.28	122.04	124.50	N.S.
Searching for an- other job (QUIT)	121.71	102.37	119.17	117.72	N.S.
My pay less than others in private sector (PAYEQTY1)	107.57	93.95	96.91	91.24	N.S.
My pay is less than I deserve (PAYEQTY2)	93.75	101.09	104.68	92.05	N.S.
My hazard compen- sation is fair (EQUITY1)	125.99	124.25	121.02	130.52	N.S.
My hazard compen- sation is fair to private jobs (EQUITY4)	122.50	127.11	120.74	133.20	N.S.
Overall health con- dition (HEALTHPR)	116.16	141.52	127.25	119.17	N.S.

Note: Similar results obtained for all variables as measured at phase one. For more details about these variables see appendix c.

IV. Checking the manipulation of treatment: Subjects were interviewed after being exposed to Label information in order to make sure that label's message (content and aim) is understood. In addition, to make sure about the different impact of hazard levels (the four levels of treatment or groups), a non parametric test (SPSS X) of Kruskal-Wallis one way analysis of variance was administered to test the perceived hazard level associated with

labels shown in a group. Table (2) shows the result of this test.

Table (2) KRUSKAL-WALLIS 1 - WAY ANOVA
Perceived new hazard of experimental labels

New Hazard Stimuli	Number of Subjects	Mean Rank of Perceived New Hazard
GROUP # 1	62	31.78
GROUP # 2	63	95.54
GROUP # 3	61	156.50
GROUP # 4	65	217.77
Chi-square 230.89 Significance <0.01		

Result shows a significant difference ($P < .01$) between the four groups. It is very clear from the table that labels were very successful in eliciting the desired hazard levels. Group number four, for example, reflects the highest hazard level. The mean rank of hazard level in that group, as imposed by the label on container, is almost seven times the level that attached to the hazard in group one. Actually group one may be used as our control group since they are not facing use of an apparent hazardous chemical. This does not mean that group one do not face any hazards. While they are not dealing directly with hazardous chemicals, members in group one consider themselves as still working in a polluted environment. When they were asked later

about any desired hazard compensation, members in group one selected for themselves some values of compensation that they thought to be fair and just.

CHAPTER EIGHT: EMPIRICAL RESULTS

EQUITY CONDITION: HYPOTHESES ONE AND TWO

Both of hypotheses one and two deal with the relationship between hazard level and hazard premium, assuming equity.

Hypothesis One: In the low to moderate hazard range, the demand for hazard compensation will be linearly related to the perceived hazard and thus hold the relative outcome ($= \text{outcomes} / \text{inputs}$) constant and almost equals one.

Hypothesis Two: At high hazard levels, the workers' demand for hazard compensation is expected to be an accelerating function of the perceived hazard. The relative outcome ($= \text{outcomes} / \text{inputs}$) is expected to be higher at a high hazard level than at a low hazard level.

Since the two hypotheses deal with the same two variables, hazard and premium, but at different levels of hazard, low hazard and high hazard, it is decided to examine the shape of trade-off between subjective hazard assessment and subsequent request for hazard premium. Since threshold points at which hazard is perceived as low, as high or as very high is not known, hazard level-hazard premium trade-off should be examined across different levels of hazard along a continuum from very low to very high level of hazard.

Data analysis, then, should include searching for the line of best fit for each of the four levels of hazard, i.e. group #1

through group #4 (see research design). The T-test for polynomial functions shows that the quadratic equation ($y = a + b_1x_1 + b_2x_2^2$: where y is hazard compensation, x is hazard level, a is the intercept and b is the slope) is not significant, while the linear equation ($y = a + bx$) is significant ($p < .0001$). Therefore search for higher levels polynomials (cubic and quartic) was not necessary. (Traditionally, if the quadratic line does not fit the data, analysis should not proceed to other higher level slopes).

The next step in the analysis is the comparison between the linear model and the exponential model. Table (3) shows the result of such comparison across the four levels of hazard.

Table (3): Root mean square error of the linear and exponential models

HAZARD LEVEL	LINEAR MODEL RMSE (a)	EXPONENTIAL MODEL RMSE
Group #1	.2295	.2538
Group #2	.4727	.4783
Group #3	.5574	.6194
Group #4	.2465	.6532

(a) RMSE: root mean square error

Table (3) shows that both the linear and exponential models seem to fit the data. Their root mean square error (RMSE) values

are very small and almost equal for each group as measured by the two models.

However, changes in slopes among experimental hazardous groups show the relationship between hazard assessment and premium requested is not the same across the four levels of hazard. Table (4) shows the slopes of the four regression equations along with tests of the differences among slopes. For example the difference between Gp.#1 and each of Gp.#2, Gp.#3 and Gp.#4 are significant at levels of ($p=.0209$), ($p<.0001$) and ($p<.0001$) respectively.

Table (4): Regression slopes and significance of differences in slopes by experimental groups

HAZARD LEVEL	REGRESSION EQUATION (Slope)	LEVEL OF SIGNIFICANCE OF SLOPE DIFFERENCE		
		GP#1	GP#2	GP#3
GP#1	.8799			
GP#2	1.0833	($p=.0209$)		
GP#3	1.4665	($p<.0001$)	($p<.0002$)	
GP#4	.1653	($p<.0001$)	($p<.0001$)	($p<.0001$)

Table (4) shows that slopes are significantly different among each others. Slopes between GP#1 and GP#2, however, have less difference ($p=.2034$) than differences between any other pairs of groups.

Slopes in the regression equations are representative off the trade-off between hazard assessment and requested hazard

premium. It represents the number of units changed in hazard compensation for every increase of one unit in the value of perceived hazard level. Assuming input and outcome are measured subjectively, then a slope equal to one means that for any increase in input, the participant expects an equal increase in outcome in order to feel equity. A slope of more than one means that a fair outcome should increase at a higher rate than input. While a slope of less than one means that a fair outcome increases at a lower rate.

At the very low level of hazard (i.e. GP#1) the trade-off between incremental increases in hazard and subsequent demands for compensation seems in general to be little less than unity ($\approx .9$). At that level, experience, health or work problems is minimal.

Between low to medium level of hazard (GP#2), the trade-off seems in general to be equal and sometimes workers expecting a little more than unity (≈ 1.1) with each additional unit of hazard. In general, data from groups one and two seem to exhibit a relative outcome (relative outcome equals hazard compensation divided by hazard level) that is almost equal to one. This is in line with hypothesis one.

At a high level of hazard (GP#3), the trade-off takes different rate, than at low level of hazard, for each additional unit of hazard. Workers generally seem to request one and one half units of compensation for each unit of increase in subjec-

tive hazard. Relative outcome is equal to more than one as the hazard increases from medium to high level. Health and work problems and hazard information and experience should be more compelling at that level of hazard. Result for GP#3 supports hypothesis two.

When hazard level becomes very high workers seem to respond differently than before. At a very high level of hazard (GP#4) the rate of change between hazard level and hazard premium is very low ($\approx .2$, table 4). This would ordinarily suggest that workers who face extreme hazards do not respond by requesting very high levels of hazard premium. However, this is deceptive, since the intercept is very high in this group (8.44) which sets the premium demand minimum at almost the maximum of the scale regardless of perceived hazard level.

Figure 3 (p.80) shows the linear model. The lines depict four separate groups with different slopes. However it should be pointed out (see Fig.3) that individual observations in each hazard group overlap with the adjacent lower and higher hazard groups. . or example, the lower limit of GP#3 overlaps with some of GP#2 while the upper limit, GP#3, overlaps with some of GP#4. This actually shows some overlap among the subjective hazard assessments of the four different objective hazard levels.

Figure 4 (p.81) shows the exponential model. Both the linear and exponential models seem to fit the observations very well. Also both of the models show that workers who face a very low

hazard (GP#1) are requesting compensation (i.e. the intercept has a positive value). While not facing direct hazardous substances, workers in this category still feel subject to indirect hazard through air pollution or other contaminations, and apparently demand premiums.

While the linear model may represent a simplest representation of the data reduction, the asymptotic model seems to be more appealing. The exponential curve has more utility in showing hazard level-hazard premium trade-off as a continuum from low to very high hazard levels.

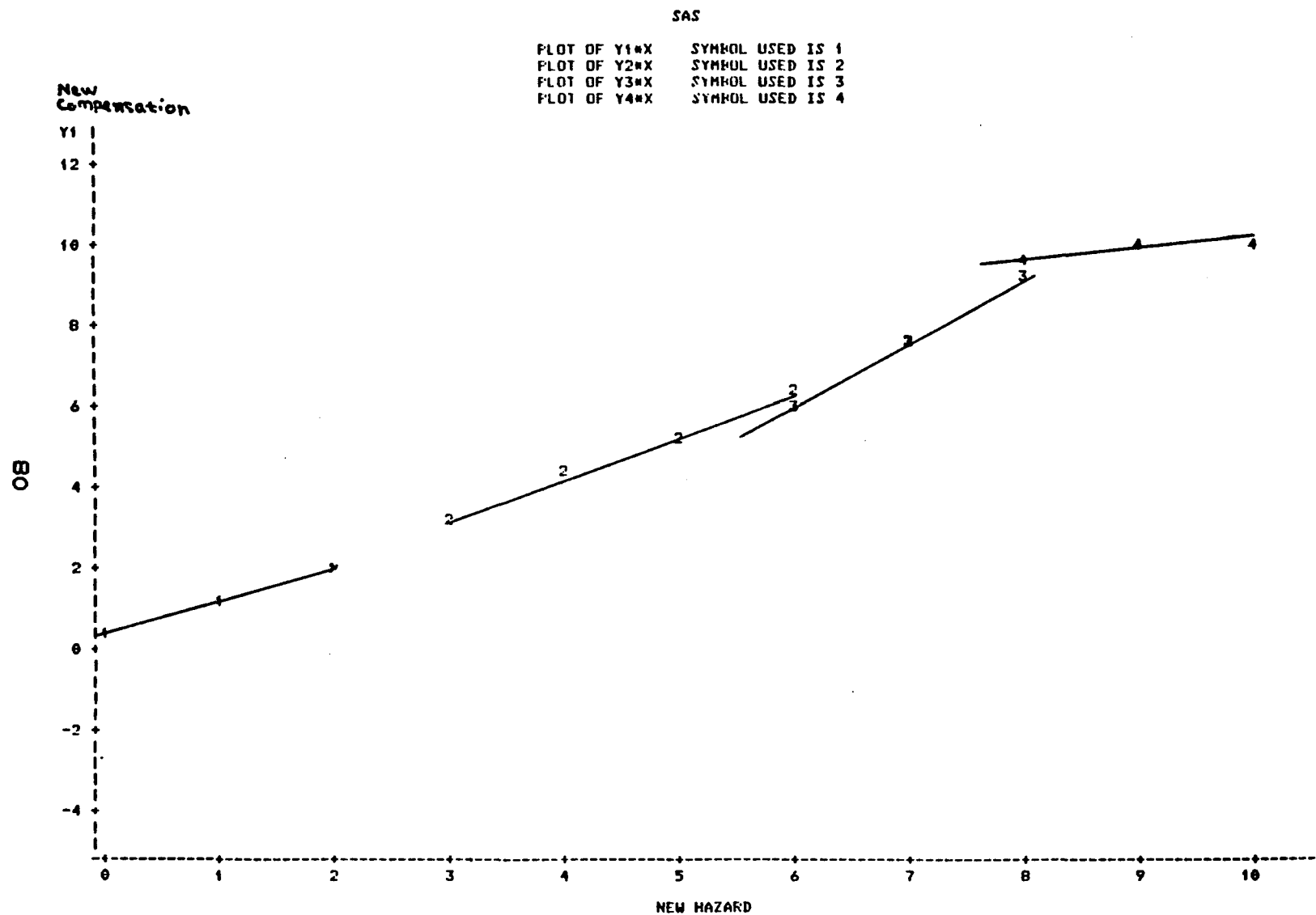
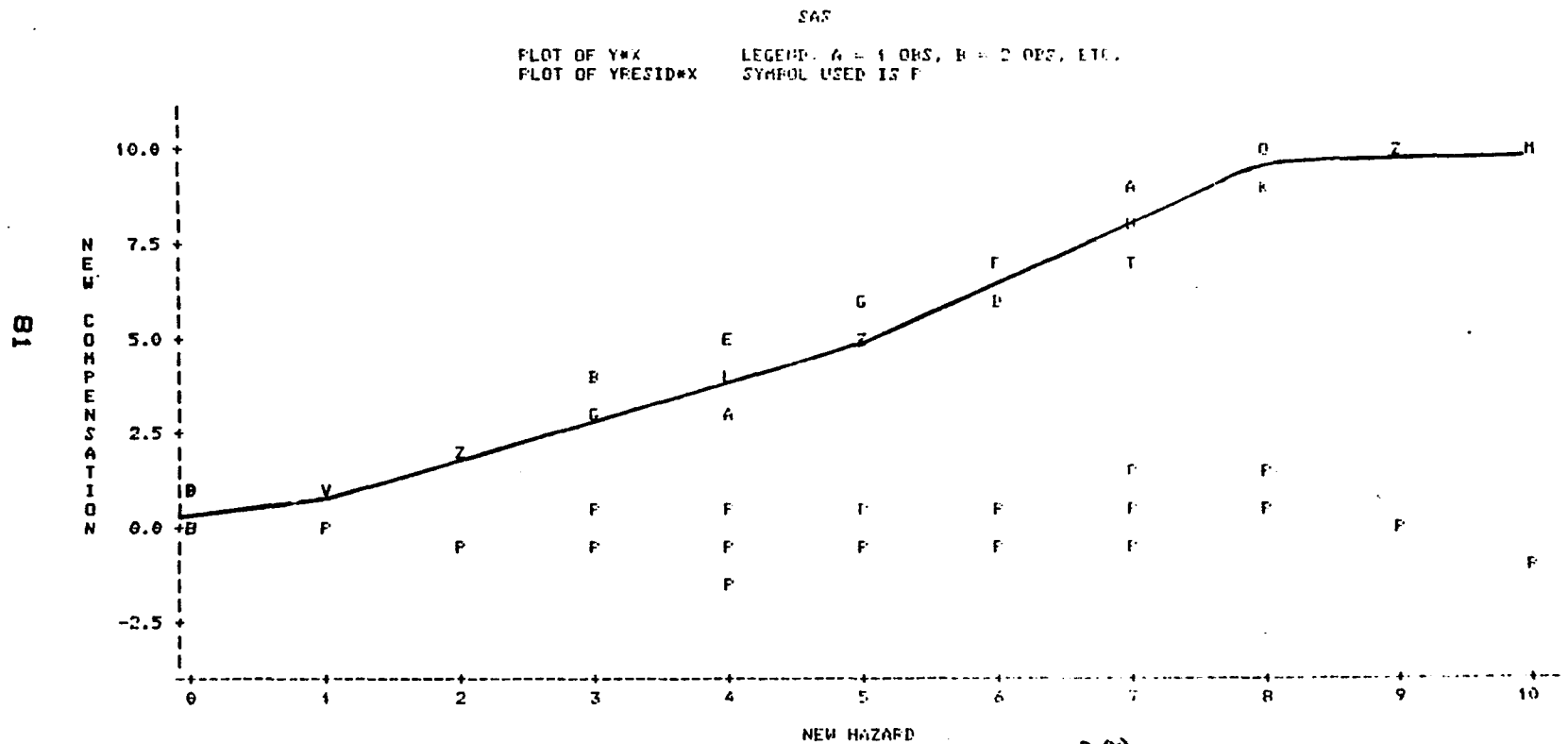


Fig. (3) Linear model: $y = a + bx + e$



NOTE: 243 OBS HIDDEN

Fig. (4) Asymptotic model: $y = B_0 - B_1 e^{-B_2 x}$

INEQUITY CONDITION: HYPOTHESIS THREE

The hypothesis deals with the impact of hazard on feeling of inequity.

Hypothesis Three: There is a greater perception of inequity in highly hazardous jobs than in lower hazardous jobs. That is more workers are expected to feel inequity at higher than at lower hazard levels. In addition, it is expected that inequity will be felt with greater intensity by workers in higher than in lower hazardous jobs.

Major Variables. The hypothesis is tested by using subjective and objective measurements of hazard.

Measure of Objective Hazard (i.e. objective rating of present job hazards before exposure to test labels). An objective assessment of hazard (DEPT) is established by identifying two general levels of hazard. "low hazard" and "high hazard". These levels are based on objective information via interviewing managers and chemists in the companies concerning types of chemical materials used in the production process and level of hazard premium received by workers. The "low hazard" workers use less hazardous chemicals and receive less hazard premium than workers in the "high hazard" group. Table (5) shows the result of a cross tabulation (χ^2) and T-test for the two groups. Analyses reveal that the the two groups are similar in terms of the vari-

ables of education, marital status and children. Also, both groups have similar job opportunities. The analyses also reveal that the high hazard group is in general older than the low hazard group ($p < .01$). While the former group also has a longer length of service with the present employer, the difference is not significant. The high hazard group experiences more hazards, health problems, dissatisfaction with their jobs and job insecurity. An interesting difference is the finding that the high hazard group expresses less trust on the employer as a source of hazard information. Group differences in terms of feelings of inequity and of intention to quit are discussed in the subsequent sections.

Table (5)
Characteristics of workers in two different departments when hazard is measured objectively.

Variables	DEPT1 (low hazard) (N = 109)		DEPT2 (high hazard) (N = 142)		Signi- ficance (X ²)
	Mean	S.D.	Mean	S.D.	
Level of formal education (EDUC); (7 items: 3=completed grade school, 4=some high school, 5=high school, 6=some college)	4.248	.964	4.155	1.013	N.S.
Do you have any children (CHILD); (2 items: 1=yes, 2=no)	1.267	.444	1.247	.433	N.S.
Chance of getting similar job (OPPOR1)	% 56.52	28.77	53.76	30.79	N.S.

Table (5) cont.

Variables	DEPT1 (low hazard) (N = 109)		DEPT2 (high hazard) (N = 142)		Signi- ficance (X ²)
	Mean	S.D.	Mean	S.D.	
Chance of getting different job (OPPOR2)	% 43.3	30.06	42.11	33.05	N.S.
Subjective assess- ment of physical and nervous cond- itions (HEALTHPR); (4 items: 1=no problem, 4=sizeable problem)	1.816	.580	2.633	.956	p<.0001
Assessing overall level of hazard (INPUTS) (8 items: 1=hazard is extremely low, 8=hazard is extremely high)	5.091	1.174	6.60	.803	p<.0001
Degree of trust in employer as a source of information (EMPLOYER) (scale: 1=not at all, 10=very trustworthy)	5.615	2.937	4.190	2.775	p<.0001
All in all, how sat- isfied you are with your job (GENSATIS) (4 items: 1=not at all satisfied, 4=very satisfied)	2.844	.852	2.387	1.003	p<.0001
Job security (SECURIT1) (2 items: 1=yes, 2=no)	1.412	.495	1.676	.485	p<.0001
Age category (AGE) (1=41 and above, 2=31 - 40, 3=21 - 30, 4=20 and less)	2.339	.683	2.070	.813	p<.01
Seniority with pres- ent employer (TENURE) (4 categories: 1=16 or more, 2=11 - 15, 3=6 - 10, 4=5 or less)	2.500	1.081	2.310	1.066	N.S.

Table (5) cont.

Variables	DEPT1 (low hazard) (N = 109)		DEPT2 (high hazard) (N = 142)		Signi- ficance (X ²)
	Mean	S.D.	Mean	S.D.	
Marital status (SINGLE) (2 items: 1=single, 2=married)	1.104	1.219	1.245	1.285	N.S.

Measures of Subjective Hazard (Subjects' subjective rating of present job hazards before exposure to test labels). Subjective assessments include: HAZARD (degree of the perceived hazard: scale from 1 = "no problem at all" to 4 = "great problem"), HEALTHPR (subjective rating of health problems: scale from 1 = "no health problem" to 4 = "great problem"), WORKPR (subjective rating of work problems that resulted from health problems: scale from 1 = "no problem" to 4 = "great problem"), and INPUTS (subjective rating of overall level of hazard: scale from 1 = "hazard is extremely low" to 8 = "hazard is extremely high").

Table (6) shows the intercorrelation among measuring instruments pertain to measure the hazard construct.

Table (6): Spearman Correlation among hazard measurements

	DEPT (objective)	HAZARD	HEALTHPR	WORKPR
HAZARD (subjective)	.597*			
HEALTHPR (subjective)	.447*	.550*		
WORKPR (subjective)	.364*	.475*	.790*	
INPUTS (subjective)	.594*	.580*	.463*	.405*

* p<.0001

While the correlations (Table 6) are high and significant, measurements of subjective and objective hazard are not perfectly correlated. This permits the usage of more than one measuring instruments to measure the same construct.

Equity Measurements. The analysis includes also various measurements of equity. The measurements include questions about internal standard, viz; EQUITY1 (hazard compensation is fair in comparison to hazard condition) and external standards with referent others, viz; EQUITY3 (hazard compensation is fair in comparison to administrative jobs) and EQUITY4 (hazard compensation is fair in comparison to private chemical workers). Equity standards or referent others were established through interviewing a group of workers, participants and non-participants, to find "others" against whom they are comparing their working conditions and hazard compensations. Four external groups were

mentioned by workers as referent others (see appendix C for definitions).

Table (7) shows the cross tabulation analysis of HAZARD with each of measurements of equity; one internal and four external.

Table (7): Cross-tabulation and Chi-square test of HAZARD with each of measurements of equity

Equities		HAZARD (Subjective)		Significance (χ^2)
		Low & moderately high (N=102) ^a	High & very high (N=149) ^a	
EQUITY1	No	48	129	<.00001
	Yes	44	12	
EQUITY2	No	21	36	N.S.
	Yes	61	99	
EQUITY3	No	61	120	<.005
	Yes	22	13	
EQUITY4	No	53	112	<.0001
	Yes	30	13	
EQUITY5	No	27	36	N.S.
	Yes	55	99	

(a):Missing values are omitted. This results in slight differences in number of responses to equity measurements.

Chi-square test (table 7, last column) shows a significant difference in feeling equity between workers who work at different levels of hazard. For example when asked about fairness of hazard compensation with regard to hazardous conditons (EQUITY1: internal comparison), very small number (= 12) of workers in the high hazard group answer positively while there is almost equal numbers who answer either positively or negatively among the lower hazard group. (In each group ther are numbers of subjects who answer "do not know". These are excluded from the analysis).

Workers also feel inequity when they compare themselves against employees who work in administrative jobs (EQUITY3: external equity). Administrative employees (not part of our study) are entitled by law in Egypt, to hazard compensation because of the surrounding polluted environment. While the levels of hazard compensation of the administrative jobs are far below compensation for production jobs, nevertheless the data (table - 7) shows that many workers in the production jobs feel inequity when comparing themselves to the former group. Many production workers express their anger because employees and managers in offices get such compensation without directly facing dangerous chemicals. Table (7) also shows that among production workes, those who work in more hazardous jobs feel more inequity than those who are in low hazard jobs. The difference between the two groups is significance ($p < .005$). The data (not reported in table 7) shows workers in high and very high hazardous jobs over-estimate hazard

compensation received by administrative employees and under-estimate the administrative employees' level of hazard exposure.

In addition, production workers feel inequity when they compare themselves to private sector counterparts (EQUITY4: external equity). Also among production workers, those who work in higher hazard feel more inequity than those in lower hazard (table 7). The difference is significant ($p < .0001$). Later interviews with workers reveal that the major reason for inequity is because private workers, especially those who work in joint ventures between the government and foreign investors, use better equipment and safety precautions. While our subjects work in public organizations, they admit, however, that they receive higher compensation and fringe benefits than their private counterparts. But they perceived that they face higher probability of adverse events due to lack of strict safety precautions and of new safety equipment and clothes. Apparently the higher compensation and fringe benefit that are received by public workers fall short to offset higher probability of adverse events faced by these workers compared to their private counterparts.

The analysis (table 7) shows that subjects express more feeling of "equity" than inequity when they were asked to compare themselves against production co-workers who work either in the same or different departments in the same company (EQUITY2) and when they compare themselves against other occupations in other public organizations (EQUITY5). There were no more difference

between the two levels of hazard in this regard.

Table (8) shows the result when hazard is measured subjectively in terms of health problem as assessed by subjects.

Table (8): Cross tabulation and Chi-square test of subjective hazard with each measure of equity

Equities		HEALTHPR (Subjective)		Significance (X ²)
		None or slight (N=166) ^a	Sizeable or major (=85) ^a	
EQUITY1	No	100	77	<.0001
	Yes	48	8	
EQUITY3	No	100	81	<.005
	Yes	32	3	
EQUITY4	No	95	70	<.0006
	Yes	38	5	

(a):Missing values are omitted. This results in slight differences in number of responses to equity measurements.

The table shows that there is greater feeling of inequity among workers who perceive sizeable health problems than do workers who perceive no or slight health problems. Those who perceive health problems felt less equity, than those who perceive no health problem, as measured by internal and external comparison.

Data (not reported) shows similar result if hazard is

measured subjectively by asking about work problems that resulted from health problems (WORKPR).

Table (9) reflects the result when hazard is measured objectively. The sample is broken down into two groups in terms of level of hazard. Workers in the higher hazard group (Dept. 2) receive higher premium and deal with more hazardous material than workers in the lower hazardous group (dept. 1).

Table (9) Cross-tabulation and Chi-square test of objective hazard with each measure of equity.

		Objective Hazard		Significance (χ^2)
		Dept.#1 (Low hazard) (N=109) ^a	Dept.#2 (High hazard) (N=142) ^a	
EQUITY1	No	59	118	<.0001
	Yes	42	14	
EQUITY3	No	62	103	<.0193
	Yes	26	17	
EQUITY4	No	66	116	<.0006
	Yes	24	11	

(a):Missing values are omitted. This results in slight differences in number of responses to equity measurements.

Objective hazard data (table 9) shows similar result to those reported for subjective hazard.

The hypothesis also predicts that there should be differ-

ences in inequity's intensity among different hazard groups. In other words inequities across different hazard levels should be qualitatively different. This could be tested by examining psychological reactions to inequity.

Table (10) shows the result of cross tabulation of psychological reactions to inequity by both subjective and objective measures of hazard.

Table (10) Psychological Reaction to inequities and chi-square test

Reaction to inequity*	HAZARD (Subjective hazard)			DEPT. (Objective hazard)		
	Low & moderate (N=102)	High & very high (N=149)	Signif- icance (χ^2)	Low (Dept.1) (N=109)	High (Dept.2) (N=142)	Signif- icance (χ^2)
SATISFACTION	(a) 51	111	<.00001	59	103	<.01
	(b) 51	38		50	39	
HELPLESS	(a) 60	46	<.00001	61	45	<.001
	(b) 42	103		48	97	
TENSION	(a) 72	60	<.00001	76	56	<.00001
	(b) 30	89		33	86	
FUSTRATION	(a) 78	69	<.00001	81	66	<.00001
	(b) 24	80		28	76	
ANGRY	(a) 74	65	<.00001	76	63	<.0001
	(b) 28	84		33	79	
HOSTILITY	(a) 83	68	<.00001	86	65	<.00001
	(b) 19	81		23	77	

* : A modification of the Nowlis and Green (1957) Mood Adjective Check List (MACL) cited in Walster et al (1976). See Appendix C for definition of items.

(a): Number of subjects who answer "Not at all" or "a little"

(b): Number of subjects who answer "Some what" or "very much"

Table (10) shows significant difference between lower and higher hazardous groups in terms of psychological reaction to perceived inequity in hazard compensation. Not only do larger

numbers of workers in the high hazardous jobs feel inequity, but table (10) shows that they also feel less satisfaction, and more helplessness, tension, frustration, angry and hostility. The intensity of these psychological reactions to inequity is less among workers in lower hazardous jobs. In addition, Table (10) shows that this last group (lower hazardous jobs) report more of "Not at all" or "A little", while the former group (higher hazardous jobs) reports more responses of "Some what" or "Very much" negative feeling as a result of feeling inequity. This is especially true for the items of frustration and hostility which seem to exist more strongly among workers in higher hazardous jobs.

Factor analysis (Appendix D) of the items that pertain to the psychological reaction to inequity shown in table (10) reveals that one dimension (factor or construct) does not fit the data, indicating that more than one scale is reflected in the set of items of the MACL. Two common factors are found to be adequately described by the data. The percentage of the total variance accounted for by these two factors are almost seventy-one percent (70.6%). The items of SATISFACTION, HELPLESS, and ANGER loaded highly on the first principle component while the items of FRUSTRATION and HOSTILITY loaded highly on the second principle component. The item TENSION seems to load on the two principle components. The first factor may be labelled "alienation to undercompensation". The second factor may then be labelled as "emotional reaction to undercompensation".

REACTION TO INEQUITY: HYPOTHESIS FOUR

As proposed by hypothesis three, inequity is more to be found in high than in low hazard levels. Also the quality of inequity, as measured by psychological reaction, is also more intense in high hazardous jobs. These factors should make the variable hazard play an important role in quitting high hazard jobs, as predicted by hypothesis four.

Hypothesis Four: There will be a stronger relationship between perceived hazard and willingness to quit in highly hazardous jobs than in lower hazardous jobs.

High hazard, in contrast to low hazard, should also have an independent impact on quitting behavior beside its impact on feeling of inequity.

The analytic technique, in testing hypothesis four, consists of breaking the sample into two objective hazard levels: "low hazard" and "high hazard". This was done based on objective information about types of chemical materials used in the production process and level of hazard premium received by workers (for further explanation see discussion in hypothesis three). Within each group subjective measurements of hazard assessment are regressed on measurements on intention to quit.

Hazard Assessment. Hazard assessment was measured subjectively by three measures; viz; HAZARD (refers to health problems expected to result from work), INPUTS (assessing level of hazard

on a scale of one to eight) and ANXIETY (a scale based on 12 psychophysiological symptoms, modified from Langer's (1962) well-known scale of "psychiatric impairment". See appendix c for variables and item definitions).

Anxiety is a major intervening variable in the proposed model (p.63). Anxiety includes feelings of stress, tension, apprehension, vague expectations of impending disaster or of losing control or dying (Martin 1971). Martin (1971) differentiates between anxiety and fear. Anxiety is an irrational response to a non-specific source while fear is based on reality and is a response to a real hazard. However, Martin (1971) and others (Kasl et al 1981) use the two concepts synonymously. The Galvanic Skin Response (GSR) has been used in measuring both fear and anxiety (e.g. Beam, 1955; Bitterman and Holtzman, 1952 cited in Martin 1971).

Taylor (1953) and Langner (1962) developed items which represent a scale to measure anxiety. Kasl et al (1981) use that scale in measuring feelings of anxiety among employees in the Three Mile Island power plant. The present study used the same procedure in measuring anxiety among the chemical sample. In addition, many of the symptoms of anxiety were expressed verbally by subjects in the interview and in answering the open-ended questions (see questionnaire in appendix A).

Intention to Quit Measurements. They include three questions, viz; QUIT (searching for another job within the next

year), DECIDE1 (decide to take the job if one has the choice again) and TRANSFER (desire to be transferred to a safer job in the same company). (For more information about item definitions see appendix c).

Each hazard variable is regressed on each of the intention to quit measures. This results in nine regression equations for each of the low and high hazard groups. Table (11) shows the result of regression analysis as each of hazard measurement is regressed independently on each of the quitting variables.

Table (11): Regression betas of QUIT, DECIDE1 and TRANSFER on hazard variables for each objective hazard group.

HAZARD VARIABLES	DEPT.#1 (Low objective hazard)						DEPT.#2 (High objective hazard)					
	QUIT		DECIDE1		TRANSFER		QUIT		DECIDE1		TRANSFER	
	BETA	R ²	BETA	R ²	BETA	R ²	BETA	R ²	BETA	R ²	BETA	R ²
HAZARD	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	***	***	***	*	****	****
INPUTS	N.S.	N.S.	*	*	N.S.	N.S.	**	**	***	**	****	***
ANXIETY	N.S.	N.S.	*	*	**	**	****	****	**	**	****	****

Significance Level (R²:F-ratio) (BETA:significant-T): * P<.01

** P<.001

*** P<.0001

**** P<.00001

Table (11) shows that hazard variables have very limited impact on quitting intention among workers in lower hazard jobs.

Results in the high hazard group reveal that expectation about health problems that may result from current job (HAZARD), hazard levels (INPUTS), and ANXIETY explain some significant variance in intention to quit. Desire to transfer to another job (TRANSFER) and intention to quit (QUIT) are mostly affected by health problem expectation (HAZARD) and anxiety (ANXIETY) than by merely subjective hazard assessment (INPUTS).

The data in general supports hypothesis three. We should note however that hazard level per se may not be a significant factor in explaining quitting the hazardous job. Apparently, hazard level should be accompanied by experience of inequity, expectation of (or actual) health problems or anxiety. This is supported by the weak impacts of various subjective hazard assessments upon intention to quit of the chemical workers in Dept.#1 (low objective hazard: table 11). This remark is in line with the idea that workers who accept hazardous jobs will not quit simply because hazard level is high. Workers must experience very high level of hazard or some other negative outcomes, e.g. anxiety or health complication or inequity, in order to decide to quit. The data show that workers in high hazard jobs are experiencing more health problems (see table 5) and anxiety (see table 11) than those in low hazard jobs. The differences were significant. The Spearman Correlation between the variables of subjective hazard (DEPT) and each of anxiety (ANXIETY) and health problem (HEALTHPR) are equal to .47 and .45 respectively. Low

level of health problem and anxiety may explain the weak impact of these factors on intention to quit behavior among low hazardous group (Dept.#1).

REACTION TO A VERY HIGH LEVEL OF HAZARD:

HYPOTHESES FIVE AND SIX

Hypotheses numbers five and six deal with worker's reaction to a very high level of hazard in terms of demand for extra fringe benefit or of desire to change job.

Hypothesis Five: Workers who perceive a very high range of hazard will be more willing to forgo additional hazard premium in order to reduce that level of hazard. This attitude will be weaker at lower to moderate hazard levels.

After exposed to the new hazard stimuli, workers in the four hazard groups were asked to select among a list of fringe benefits. For each fringe benefit, the subject was asked to select either that specific benefit or an appropriate pay raise as a hazard premium. A similar question has been used by the 1977 quality of employment survey. However, the question is modified in order to reflect the equity notion. In the present study the question asks workers to decide whether they would prefer an "appropriate" pay raise or various other job improvements. (The 1977 quality survey talks about "10 percent pay raise". Since a 10 percent pay raise may not be an equitable increase at all hazard levels, the comparison between pay raise and other types of job improvement may not be accurate).

Table (12) shows the result in terms of worker preference for various job improvements over "appropriate" pay raise. The last

column shows the chi-square test for independent samples (see Siegel, 1956).

Table (12): Percent in each experimental group preferring various fringe benefits after experimental labels (new hazard).

Benefit	Percent of Worker Preference For Non-Pay Improvements								Corrected For ties Chi-square Signif- icance
	GP#1 N=(62)	Rank order	GP#2 N=(63)	Rank order	GP#3 N=(61)	Rank order	GP#4 N=(65)	Rank order	
Extra Retirement benefit	% 1.7		6.5		12.3	(4)	16.9	(4)	0.0235
Extra medical insurance	4.9		11.3	(3)	20	(3)	27.9	(3)	0.0033
Flexible Work	6.8	(3)	4.8		7.0		9.5		N.S.
Greater Job Security	19.7	(1)	15.8	(2)	46.6	(2)	57.9	(2)	p<0.00001
Safer Working Condition	8.2	(2)	21.7	(1)	58.3	(1)	79.7	(1)	p<0.00001
More interesting work	5.0		6.5		1.7		3.1		N.S.
More Autonomy	6.6	(4)	8.2	(4)	7.0		9.5		N.S.
More Comfort at work	4.9		1.6		1.7		7.8		N.S.
More paid vacation	5.0		1.6		3.3		7.8		N.S.

Result (table 12) shows a significant difference among the four hazard groups in terms of preference for retirement benefit, medical insurance, job security and safer work. There is an increase preference for each of these benefits over pay increases as the hazard increases from group #1 to group #4. If we rank order the benefits then safer conditions comes first (safety comes second for group #1), job security comes second (security comes first for group #1), medical insurance comes third (flexible work comes third for GP#1) and retirement benefit comes fourth (more autonomy comes fourth for GP#1 and GP#2). Almost 80 percent of group #4 (who faces a very high level of hazard) are willing to forgo hazard premium for safer improvements. Also there is high percentage (58.3%) in the third group who are willing to do that tradeoff. These are higher percentages than it is reported in 1977 quality of employment survey (the percentage was 33.1% for safer conditions) while the quality survey includes a national sample from different occupations, the present study includes only workers in hazardous jobs. Even with term "appropriate" salary increase instead "10 percent" (as it used in the quality survey), there are increases in demand for safety precautions from workers who face high and very high levels of hazards, than it is shown in the quality survey. Occupational safety is likely to be more important for those who are facing high degree of hazard as those in groups number three (GP#3) and four (GP#4). On the contrary, those who face lesser hazard in groups two

(GP#2) and one (GP#1) have lower percentage (21.7 and 8.2 respectively) than the American national sample. Workers at lower to medium levels of hazard (GP#1 and GP#2) are less willing to sacrifice pay increases for safety improvements. Results among this last group may represent a partial deviation from what Frenkell et al (1980) note in their analysis of the 1977 Quality of Employment Survey. "While retirement and medical insurance are universal concerns, occupational safety and health is likely to be important chiefly to those significantly at risk. Consequently, the figures above may underrepresent the willingness of hazard-exposed workers to forgo pay increases for safety improvements. For example, the 1977 data show that previously injured workers are more concerned about safety and health improvements than other groups. ...And, workers who note workplace hazards, or who have specific health symptoms, are generally more willing to sacrifice increased pay for a little more safety and health." p.12. While the quality of employment survey looks primarily at job hazards, the present study includes what is labeled as hazardous jobs. Workers take risk, by entering hazardous jobs, in order to increase positive outcomes, and they prefer safety improvement over financial demands only if hazard becomes very high. This is in the directions of hypothesized difference between "hazardous jobs" and "job hazards".

An interesting finding is the high preference for job security. In interviewing subjects at the end of the study, the

term job security was found to be interpreted by workers in terms of possibility of internal transfer from the production department which may result in losing some hazard premium. Job security then does not mean possibility of losing the entire job (lay off) as it is used in western culture. Internal transfer is usually resulted from lack of performance or from health and work problems. Workers informed the researcher that on some occasions they were reluctant to report work problems that resulted from health problems in order to avoid loss of hazard premium. In sum, the term job security was calibrated by the chemical workers in terms of being able to do their jobs without suffering health and work problems that may result in being transferred to another safer job and the loss of hazard premium.

Hypothesis Six: Workers who perceive a very high range of hazard will be less willing to accept extra hazard compensation and will be more willing to quit their jobs.

Two measures of intention to quit were used and both of them were asked at time 1 and time 2. One measure (DECIDE1) asks the worker if he had the chance again, would he chooses the same job based on current information. This measure has been used as indication of intention to quit (e.g. Viscussi and O'Connor 1984). In fact it may reflect intention to quit as a result of perception of very high hazard more than any other way of measuring quitting. Viscussi & O'Connor (1984) state that "unlike

worker quitting, this job acceptance question is not influenced by transactions cost of job changes, such as seniority rights" P.947.

The other question of measuring intention to quit (APPROVE1) is to ask the workers if he would want his son to work in same job. It is felt that this question captures desirability and satisfaction of the job especially high hazardous job.

Since each subject was exposed to two Levels of hazard (i.e. old hazard at time 1 and new hazard at time 2), the "Wilcoxon Matched-pairs signed-ranks test" was used to measure quit intention changes as a result of change in hazard level faced by the worker especially if he, the worker, is facing a very high range of hazard at time 2.

The Wilcoxon test is designed to test the impact of the same independent variable at two points in time for the same subjects. Each subject had served as his own control and this eliminates all other effect (extraneous) but the treatment. Any change in our measurements between time 1 and time 2 will be, then, due solely to changes in the level of hazard. The Wilcoxon test is one of the most useful tests for the behavioral sciences and gives information about changes in magnitude and direction of the dependent variables (Siegel, 1957). Table (13) shows the result of the Wilcoxon test.

Table (13): Changes in intention to quit as a result of exposure to experimental label (new hazard).

Pair group	Direction of Difference ^(c)			Significance*
	(+)	(-)	(=)	
Group #1 (N=62)	(a)+32 (b)+47	-6 -1	24 14	<.0001 <.00001
Group #2 (N=63)	(a)+24 (b)+12	-1 -3	38 48	<.0001
Group #3 (N=61)	(a)+3 (b)+1	-22 -15	36 44	<.0002 <.0025
Group #4 (N=65)	(a)+2 (b)+2	-31 -24	32 39	<.00001 <.00001

(a): Decide to "choose the same job".

(b): Approve that "son works in similar job".

(c): (+): number of pair cases that changed to "choose the same job" or "letting son works in similar job".

(-): number of pair cases that changed to "not to choose same job" nor "letting son works in similar job".

(=): number of pair cases that did not change choice at time 2.

(*): 2- Tailed significance Level of Z test statistic.

The table shows that workers made significant changes in their choices. At a high and very high Level of hazard, subjects changed their choices about taking the job again. For group #3, 36% of the subject changed their opinion and choose not to take the same job as a result of the new hazard. At a very high level of hazard the percentage is 48%. As analysis (see Hypothesis five) shows, this last group (#4) is also most likely to be unwilling to accept extra hazard compensation for working with the new hazard. The observations in the column designates as (=) represent individuals who perceive similarity between the old

hazard and the new hazard. These groups did not change their opinion or decision (whether it is favorable or unfavorable).

On the contrary, there were changes toward favorable choices of the same job when hazard at time 2 was very low and low. For group #1, 52% of the subjects changed their opinion and decided to take the same job again. The percentage for group #2 is 38%.

Table (13) shows similar results for the question about whether or not the worker approves that his "son may select similar job". There are significant changes in opinion. At high and very high levels of hazard, 25%, and 37%, respectively, of the workers changed to disapproval as a result of the new hazard. On the contrary, 76% of the very low hazard Level group and 19% of low hazard group changed their opinion to approval.

Similar results are found (Table 14) when using T-test to test the difference between pairs of observations.

Table (14): T-test of differences in mean value of intention to quit for each experimental group after exposure to labels.

HAZARD LEVEL		Mean	Mean	Significance*
			Difference ^(c)	
GP#1	(a1)	2.8387		
	(a2)	3.7419	-0.9032	<.0001
	(b1)	1.9194		
	(b2)	3.7742	-1.8548	<.0001
GP#2	(a1)	2.6825		
	(a2)	3.4127	-0.7302	<.0001
	(b1)	1.7778		
	(b2)	2.0794	-0.3016	<.017
GP#3	(a1)	3.0984		
	(a2)	2.1475	0.9508	<.0001
	(b1)	1.9000		
	(b2)	1.4500	0.4500	<.001
GP#4	(a1)	3.1538		
	(a2)	1.8923	1.2615	<.0001
	(b1)	2.0154		
	(b2)	1.2154	0.8000	<.0001

(a1): Decide to choose the same job at time 1 (old hazard): DECIDE1. The higher the number, the more positive the person's decision.

(a2): Decide to choose the same job at time 2 (new hazard): DECIDE2. The higher the number, the more positive the person's decision.

(b1): Approve that his son chooses similar job at time 1 (old hazard): APPROVE1. The higher the number, the more approval the person feels.

(b2): Approve that his son chooses similar job at time 2 (new hazard): APPROVE2. The higher the number, the more approval the person feels.

* : 2 - TAIL Probability

(c) : Mean Difference: Negative value represents amount of change at time 2 towards a positive intention. Positive value represents amount of change at time 2 towards a negative intention.

As table (14) reveals, exposure to very high levels of hazard (GP#4) results in the highest change towards intention to quit i.e. the difference in mean between desire to take the same job at time 1 and time 2 declines by 1.2615 which is the highest difference among the four levels of hazards.

An alternative way to approach our hypothesis is through examining the impact of changes in subjective hazard assessment upon subsequent opinion and intention. While data in tables (13) and (14) above is categorized based on four objective experimental hazard levels (i.e. GP#1 through GP#4) the alternative approach is based on subjective hazard assessment. Subjects are asked to compare the old hazard (old job) against the new hazard (label or proposed new job). Responses are categorized into three groups, viz; (1) the new hazard is higher than the old hazard (N.H.>O.H.), (2) can not decide, or (3) the new hazard is lower than the old hazard (N.H.<O.H.). Within each of these categories (responses), changes in "decide to take the same job again" and "let son works in similar job" are calculated (Wilcoxon test). Table (15) shows the result of this analysis.

Table (15) Wilcoxon Matched-Pairs Signed-Ranks Test: Change in intention to quit among those viewing new hazard greater, equal or less than old hazard.

Pair Group	Direction of Difference ^(c)			Significance*
	(+)	(-)	(=)	
N.H.>O.H. (N=75)	(a)+2 (b)+0	-49 -38	24 37	<.00001 <.00001
Can not decide (N=43)	(a)+1 (b)+1	-1 -4	41 38	N.S. N.S.
N.H.<O.H. (N=133)	(a)+58 (b)+31	-10 -11	65 70	<.00001 <.0000

N.H.: i.e. NEW HAZARD

O.H.: i.e. OLD HAZARD

(a): Decide to choose the same job

(b): Approve that son works in similar job

(c): (+): number of pair cases that changed to "choose the same job" or "letting son works in similar job" at time 2.

(-): number of pair cases that changed to "not to choose the same job" "nor letting son works in similar job" at time 2.

(=): number of pair cases that did not changed choice at time 2.

(*): 2-tailed significance level of Z test statistics.

Observations in table (15) are broken down based on whether subjects perceive the new hazard as (1) higher, (2) cannot decide, or (3) lower when it is compared to the old hazard. Results show that when the new hazard is perceived as higher than the old hazard 63.3% of the group changed their opinion and decided not to choose the job at time 2 (new hazard), and 50.6%, were not going to approve that their sons may work in similar job. Almost the rest of the sample did not change their previous opinion (whether it is favorable or unfavorable) as a result of the new higher hazard. Some subjects in this last group may be already have unfavorable decisions toward original hazard and

that the new higher hazard is in the same direction. Some others may already have favorable attitude and intention and that increases hazard level may bring to them extra hazard premium. Accordingly they also do not change their opinion.

On the other hand, when the new hazard is perceived as lower than the old hazard, 43.6% of the group adopt favorable attitude towards selecting the same job and 22.7% would let their sons take this job. However 7.5% of this group does choose the same job if hazard level is reduced. Apparently this group will suffer financially if they work in lower hazard jobs which usually provide lower hazard premiums.

While the table shows significant differences in intention to quit when hazard is increased or decreased, there was no difference for the group ("can not decide") who perceive similarity between the two situations.

THE IMPACT OF OLD AND NEW INFORMATION
ON RECENT OPINION AND INTENTION

I. HAZARD ASSESSMENT: An important issue in the present study relates to impact of the old hazard and experience on subject's assessment of the new hazard. The question is whether assessment of the new hazard mainly resulted from the label's information or is affected as well by previous information and experience. Table (16) shows the result of the analysis of variance (ANOVA) in which the dependent variable is workers' hazard assessment of the new hazard, as it resulted from exposure to label information. The independent variables are: Group (objective hazard or the label), old hazard (workers' assessment of the old hazard) and health problems (degree of health problems as reported by workers).

Table (16): ANOVA of change in the assessment of new hazard after exposure to label as function of label, old hazard and health problems.

Source of variation	Sum of squares	Significance of F
Group (Label)	2024.27	0.01
Old hazard	4.22	N.S.
Health problem	5.1	0.027

Table (16) shows that the major source of workers' assess-

ment of the new hazard is the objective hazard (which is the label's information). Old hazard has no impact on new hazard assessment. However the existence of health problem and its degree (sizeable or major) has a significant impact on hazard assessment. Health problems are usually associated with experienced anxiety especially if the worker also experiences uncertainty regarding symptoms of health problems. The sample shows a high association (Spearman = .52, $P < .0001$) between health problem and anxiety.

Apparently it is hard to separate the impact of health problem and anxiety from label's information on assessing the new hazard. Therefore health problem and anxiety should be expected to magnify subjective assessment of hazard. Everything else being equal, workers who experience hazard problem and/or anxiety may perceive a level of hazard as higher than level assigned by their co-workers who have less health problem and/or anxiety.

It may be useful to point again that labels, which were designed especially for the study, were effective enough to nullify the influence of past information (previous hazard). As has been previously discussed, the influence of an information message (label) is affected by both information content and source credibility. To find about worker preference among sources of hazard information, subjects were asked to choose which source of information that they would trust. Table (17) shows the result for source preference.

Table (17): Worker preference for source of information

Source of information	Percent of Workers	Rank
Trainer (or training Program)	48.2	1
Employer (or supervisor)	38.6	2
Labor Union	8.8	3
Media (T.V., Newspaper, etc.)	4.4	4
Total	100.0 (N=251)	

Table (17) shows that nearly half of production workers are more trusting of training program and trainer than other sources of hazard information. It is noticeable that labor union and media are not considered trustworthy. Employer comes second after training program. We do not know the reasons for such preference, whether it is because "source authority" (source has update quality information) or "source impartiality" (objective presentation of information) or both.

II. QUIT INTENTION: Another issue of interest is whether quit intention after the treatment (label) is mainly affected by that treatment (new hazard) or that it is affected as well by old experience and old information. Again the issue here is impact of old and new information on recent opinion and intention. Analysis of variance procedure is executed with intention to quit at time - 2 as the dependent variable. The independent variables

are worker's subjective assessment of both old and new hazard.

Table (18) shows the result of the ANOVA.

Table (18): ANOVA of changes in intention to quit as a function of new hazard and old hazard.

Source of variation	Sum of square	Significance of F
New Hazard	133.19	0.0001
Old Hazard	17.18	N.S.
2-Way Interactions	56.68	N.S.

Table (18) reveals that intention to quit after exposure to new information is not affected by old hazard information or its interaction with new hazard information. The new hazard, that resulted from exposure to label information, shows a significant independent impact on quitting.

MODELS TESTING

I. Equity Models

Equity models are algebraic representations of cognitive process involved in calculating degree of equity/inequity. While the inputs of models are the same, the calculation is different. As a result different degree of equity/inequity may be produced by these models. The purpose of the present section is to compare the predictive power of these models with regard to intention to quit. Equity models should be able to predict quitting behaviors. The relationship between inequity under-payment and turnover is empirically supported in the literature (e.g. Dansereau et al. 1973, Fin and Lee 1972, Planz 1970, Telly et al. 1971, Valenzi 1971).

The analytic technique consists of developing an index for each of the models. Inequity indices are then correlated with measurements of quitting intention. Similar approach is adopted by Vecchio (1982) in predicting worker preformance in inequitable settings.

In order to produce an index of inequity, the two sides of the equity models are transformed into a single ratio by dividing one side by the other side. Following Vecchio (1982), the following procedure should be applied:

$$\text{Adams index} = (O_S / I_S) / (O_O / I_O)$$

$$\text{Walster et al index} = \frac{(O_S - I_S)}{(|I_S|)^{K_S}} \div \frac{(O_O - I_O)}{(|I_O|)^{K_O}}$$

$$\text{Anderson Farkas index} = (O_S / (O_S + O_O)) / (I_S / (I_S + I_O))$$

However, the researcher found that Walster et al index is not defineable if any side of the division equals zero (i.e. $O_S - I_S = \text{zero}$ or $O_O - I_O = \text{zero}$). It is decided therefore to use subtraction instead of division. Table (19) shows Spearman Correlation between equity indices and QUIT ("making a genuine effort to find a new job with another employer within the next year"). Also the table shows the correlations of these indices with a direct equity question; EQUITY4 "do you feel that hazard compensation is fair in comparison to chemical workers in other companies").

Table (19): Correlation among inequity indices and QUIT and EQUITY4 measures.

Inequity Index	QUIT	EQUITY4
Adams	.2852*	.6622*
Walster et al	.2860*	.5972*
Anderson and Farkas	.3535*	.5485*

*:p<.0001

Table (19) shows that the three inequity indices have external validity (Babbie 1979). The correlations between the indices and "EQUITY" variable are high and significant ($p < .0001$). Adams' model has the highest correlation.

Table (19) also shows that all the three indices correlate with intention to quit at a significant level ($p < .0001$).

In terms of relative superiority in predicting intention to quit behavior, Anderson and Farkas' model shows to have the highest predictive power. Similar result were obtained by Vecchio (1982) in predicting change in quantity and quality of performance as a result of inequity under-paid.

Adams and Walster et al's models show similarity to each in terms of predicting quitting.

In addition, EQUITY4, correlates less with intention to quit ($r = .2050$, $p < .001$) than do equity models or indices.

II. Viscussi's (1979) Model.

Viscussi (1979) postulates that the quit intention probabilities (p) can be described by the following logistic probability function

$$p = 1 / (1 + e^{-\theta x})$$

where θ is the n -dimensional parameter vector to be estimated and x is a vector of n attributes of the worker and his job. Table (20) shows the maximum likelihood estimate of θ for quit intention (QUIT).

Table (20): Estimates of Viscussii's Logistic Parameters for Quit Intention Determinants.

Independent variables	Parameters		
	Coefficient	Standard error	Significance(χ^2)
OPPOR1	.288	.075	<.0001
HEALTHPR	.947	.491	<.05
INPUTS	.768	.214	<.0005
EQUITY4	-1.524	.518	<.005
EARNING	-.002	3.4E-04	<.0001
TRAIN (employer provides training program)	-.10	0.385	N.S.
PHYSC (job requires high physical effort)	-.039	0.426	N.S.
SECURITY (job security)	-.057	0.413	N.S.
SINGLE (marital status)	0.467	0.587	N.S.
EDUC2 (years of education)	2.7E-04	.080	N.S.
CHILDND (number of children)	-.017	0.103	N.S.
COMMUTING (length of commuting in minutes)	-2.3E-04	.006	N.S.
AGE (age)	-.051	.051	N.S.
TENURE (years of service with present employer)	-.021	.071	N.S.

The analysis (table 20) provides general support for the model. Chances of getting another job (OPPOR1), experiencing health problem (HEALTHPR), subjective assessment of hazard level (INPUTS) and yearly earning (EARNING) are significant determinants of intention to quit (QUIT). Their coefficients are larger than standard errors and are statistically significant. While OPPOR, HEALTHPR and INPUTS exert positive effect on quitting (i.e. increase intention to quit), earning exerts a negative impact on quitting.

Table (20) also shows that hazard compensation equity (EQUITY4) exerts a powerful negative effect on quitting. Equity was not included in Viscussii's model. This provides further support to the proposed model at the end of Chapter Six.

Some other determinants in Viscussii's model are not found to be statistically significant by the present data. These include: age, education, marital status, children, job security, training program and physical efforts required by job. This may be due to the multi-collinearity between earning and both of age and tenure ($r = .63$ $p < .0001$, $r = .71$ $p < .001$ respectively). Also job security is found to be correlated with health problem ($r = -.39$, $p < .000$). The variable of commuting is added to Viscussii's model, but it does not show an impact on quitting. This is surprising because the companies of concern are found to provide nearby economic housing or transportation as means to discourage their labor force from quitting. Hence the variable of commuting is proposed

as an influential factor in intention to quit.

However the absence of a significant impact of training program on quitting should not be overlooked. Training should enhance the mastery of the task, maximize hazard controlability and minimize physical loss; factors that should reduce quitting hazardous jobs. Such insignificant impact of training may be explained by the finding that while almost forty-eight percent (47.8%) of the sample reported attending training programs, only thirty-seven percent (36.7%) reported they use safety clothes and equipment in work. Many other workers were not able due to product deficiencies (improper size, heavy weight, counter productive or comfortless safety clothes and equipment). In addition, only thirty percent (29.5%) reported that "employer makes sure that I use safety equipment" while thirty percent (29.5%) reported that "sometimes" employer does that. The overall picture that emerges is that there is a lack of support to and awareness of safety and human protection principles in this work environment.

CHAPTER NINE

SUMMARY AND CONCLUSIONS

Discussions and results of the empirical findings may be summarized as follows:

1. Assuming equity, the relationship between the worker's perception of hazard levels and fair hazard compensation takes the shape of a peculiar function. At low to medium levels of hazard, the trade-off, as measured subjectively, between incremental increases in hazard and fair compensation, appears equal to one. Above this level, the relationship seems to show an increasing function that fair compensation is increasing at a higher rate than the rate of change in hazard. Due to a variety of reasons, hazard compensation may fall short to offset the impact of a very high level of hazard.

Besides its impact on equity, a high level of hazard has a direct impact on the variables of intention to quit and desire for job transfers and extra premiums. This is especially true if hazard level is accompanied by experiencing anxiety and/or health problems (potential or real).

These findings provide general support for the proposed structural model in terms of the impact of the variables of equity, hazard level and anxiety upon intention to quit and other dependent variables.

An asymptotic model seems to fit such a peculiar relation-

ship between the hazard level and fair compensation. The model has a positive intercept and it shows an increasing function (slope) up to a point in which the worker experiences a very high level of hazard. After this point, the slope takes the shape of a decreasing function.

2. Further support to the proposed structural model is the finding that the equity variable should be added to the Viscussi (1979) model in order to increase its predictive power. The equity variable was not included in the latter model.

In addition, the successful manipulation of four hazard levels, i.e. the experimental groups, provides general support for the situational factors, e.g. source and content of hazard information, as moderators between the objective hazard stimulus and the subjective assessment. Random assignment of workers to experimental groups does not permit, however, testing the moderating role of individual differences. While it is felt that individual characteristics are less important than non-personal factors, future research should provide better judgement.

3. The Anderson and Farkas (1979) model shows more predictive power of the workers' intention to quit than the models by Adams (1962) and Walster et al (1976). These last two models show similarities to each other in predicting quitting intention. The direct question about fair compensation and equity (e.g. EQUITY4) correlates less with the intention variable than do equity models. Therefore it is advisable to use equity models and indices

in predicting later behavior instead of using a direct question.

4. The following conclusion relates to learning and labeling. First, the field experiment shows that effective labeling, in terms of information and precision, succeeds in minimizing the impact of previous information. However the impact of current experience, e.g. health problems and anxiety, play a significant role in assessing new information. Obviously bad experiences and feelings take a longer time to be mitigated than the duration of the experiment. Second, reliability in the source of information, is essential for the message to be effective. One may speculate that some of the strong impact of the labels used in the present research is that they are presented by an outside researcher who emphasizes, to his subjects, from the very beginning the scientific goals of the study. This may assure reliability and impartiality of source information. In addition the Egyptian workers express their source preference for training and trainer over employer, supervisor, union and media as sources of information. An interesting observation is the finding that many workers who face high levels of hazard (see table) or experience physical problems or symptoms of anxiety have expressed their distrust in employers, union and the media. While the reason behind selecting training and trainer is beyond the scope of this study, it should not be ignored that awareness that the study was being conducted by a scientific researcher may have induced certain demand characteristics on the part of workers.

Orne (1962) is pessimistic about the possibility of eliminating entirely the demand characteristics of the experimental situation. Rather than, Orne argues, the researcher should be aware of the extraneous variables and should try to minimize their impact. It had felt that demand characteristics may threaten the present research in the following situations. Participants may select trainer and training program as the most reliable source of information in order to please the researcher (who introduces himself as a scholar). Participants may also exaggerate their estimations of fair compensation and of hazards in their jobs. This last behavior may serve their, participants, interest more than the purpose of the study. Elaborate precautions were taken to minimize any such demand properties. These include: (1) a stratified random sampling, (2) a cover letter at the beginning of the questionnaire telling subjects that there are no correct or wrong answers to the items in the questionnaire, and that they should be completely honest and that they may not answer any questions that may reveal their identities, (3) a cover story that focuses on the scientific aspects of the research, and (4) the usage of some of the company's employees beside some college graduate students in conducting the questionnaire and the experiment. These persons were not aware of the real purpose or the hypotheses of the study.

A third issue which relates to learning is the existance of learning's support environment. Many workers express aggravation

because of lack of appropriate safety clothes, masks and gloves. Their tools were old, heavy, bulky or counter productive. In fact almost twenty-one percent (20.7%) answered that they did not use safety equipment and forty-three percent (42.6%) answered they sometimes used them. This may explain the finding that worker attendance at training programs does not reduce the percentage of workers intention to quit hazardous jobs. Quit-training correlation is small ($r = -.08$) and insignificant. This finding is in contrast to Viscussi's (1979) data which show that training has a significant negative impact on intention to quit.

The message, however, is clear; companies should increase training program in order to maintain a high level of workers' health and well-being as well as to achieve high production levels. A sufficient condition is the existence of training and learning's support environment.

In addition some general conclusions may also be derived from the empirical analyses and results. First, differentiating between the terms "hazardous job" and "job ahzard" seems to be of critical significance. While the perceived hazard in the work place is found by previous research, e.g. Viscussi (1979), to be a significant determinant of quitting a job, the current research identifies the following variables as significant determinants of potential for quitting hazardous jobs: (1) perception of a very high level of hazard, (2) experience, or the expectation of a health problem, (3) experience anxiety and (4) feeling inequity

regarding hazard compensation. While previous research includes cross-sectional occupations, the current research focuses specifically on a group of hazardous jobs.

Previous discussions of the empirical evidence of hypotheses four, five and six generally support this. People select hazardous activities for a variety of reasons including extra rewards (monetary and psychological) and make that choice as long as they perceive a net benefit (reward minus loss). Empirical evidence of testing hypothesis five, for example, shows that more workers in low to medium hazardous groups (experimental GP#1 and #2), in contrast to high and very high hazardous groups (GP#3 and #4), express their preference for extra hazard compensation and fringe benefits over extra safety precautions and equipment when they are asked to make a choice. The practical importance of these findings lies in the planning of organizational compensation systems that can predict reactions of employees to perceived job hazards. Therefore, organizations will be able to better design their compensation systems.

A second general observation in this summary relates to the overall attitude observed among the Egyptian workers. The last question in the questionnaire is an open-ended "probbing" question that asks "If there is anything else you would like to say that will help us to understand what your job looks like, and what are the feelings and the opinions of those who work in jobs identical to your job?" The chemical sample expresses their deep convic-

tions that their jobs are "significant", "important" or "strategic". The workers correlate these terms with the high degree of hazard they face. However, they feel frustration because managers "...are not respecting the workers' blue dress", and administrative employees "...do not let us enter their offices as if we were carrying dirt in our clothes", and "...there are a lot of bureaucrats who are not producing something important...while we sacrifice our health". In fact, these observations and some other pieces of information which resulted from interviewing workers indicate that feelings of task importance and significance are another outcome of engaging in hazardous occupations and activities, besides monetary compensation.

The the following areas are suggested for future research:

1. Conclusions and results of the present research should be replicated for other hazardous occupations and in other settings especially in both economically advantaged and disadvantaged countries. This is essential to guarantee any generalization of findings.

2. While the present study provides a theoretical contribution in identifying the dimensions of hazard assessment, i.e. probability, severity and immediacy, an empirical investigation is in order. Of particular importance also is the question of how to combine these dimensions into one value that indicates hazard level.

3. The present study will be translated into Arabic and will

be available to the chemical companies, which participated in the research, and workers and unions in the chemical industry. It is the hope of the researcher that the study will provide a modest contribution to the welfare and productivity of the Egyptian workers and all other chemical workers.

To conduct the present research and to get access to public organizations in Egypt, the researcher obtained a formal approval from the Ministry of Mobilization and Statistics. This Ministry's resolution was published in the official government journal, the "Journal of Egyptian Events".

APPENDIX (A)
SAMPLE CHARACTERISTICS

The sample consists of 251 blue collar workers who have full time jobs in production departments in three chemical companies. Hazard levels are not the same across different units in the production department due to differences in raw materials and processes used in these units. However, hazard levels in different production units are above average level, i.e. probability and/or severity of health and physical losses are higher in these jobs than in other "normal" jobs. Evidence of such high level of hazard includes the existence of hazard premiums, hazard labels, warnings and safety precautions, equipment and clothes. Almost ninety-five percent (94.3 %) of the subjects describe their jobs as above average level of hazard (HAZARD).

The average worker age (AGE) is almost thirty-three. The worker averaged a high school education, the years of schooling (EDUC) equal to 12 years. The average length of service with the present employer (TCNURE) is almost eleven years. Over three quarters (79%) of the sample were married (SINGLE) with an average of 2.3 children (CHILDNO).

The average annual earnings (EARNNG) is almost \$1800 with a range equal to \$2600 between the highest and lowest earning values. While earnings are very low in comparison to workers in the U.S., the Egyptian workers in the chemical industry receive high-

er income than many college graduates in the public and private sectors. In addition, the chemical workers are provided with fringe benefits which include profit sharing and health insurance. One of the companies provides economic housing while the other two companies provide private busses to bring workers from different locations.

While the three chemical companies are located in different parts of the country (Egypt), they are similar in many aspects. For example, size, final products and salary and fringe benefit structure are almost the same. In addition, the local environment that surrounds the companies is similar. The local industrial market is characterized by the existence of other similar and unrelated industries that represent the labor market and job opportunities. Almost fifty-five percent (54.70%) of the sample believe it is possible to find another chemical job (OPP0R1). The proportion who believe they can find an unrelated job (OPP0R2) is 42.63%. The chances of getting another job in the surrounding labor market, rather than in another part of the country, could be a major consideration in the decision to quit. Due to population intensity and commuting difficulties, mobility in terms of changing residency does not strongly exist, in comparison to the American market.

Table (21) summarizes the sample characteristics.

Table (21): Sample Characteristics

Variable	Mean or fraction in the sample	Standard Deviation
Level of education (EDUC1); (7 items: 1=none, 2=some grade school, 3=completion of grade school, 4=some high school, 5=high school, 6=some college without de- gree, 7=graduation of junior college)	4.19	.99
Years of education (EDUC2)	11.96 Year	2.10
SINGLE	21.1 %	
Do you have any children (CHILD); (2 items: 1=yes, 2=no)	1.25	.44
Number of children	2.31	2.30
Earning (EARNING)	\$1799.31	673.73
Age (AGE)	33.48 Year	7.61
Tenure (TENURE)	11.60 Year	6.02
Using safty equipment (SAFETY2)	36.7 (Yes) 42.6 (Sometimes) 20.7 (No)	
Assessing overall level of hazard (HAZARD)	34.7 (Very high) 60.6 (High) 4.7 (Low)	
Chance of getting similar job (OPPOR1); (scale: 1=very poor, 10=excellant)	5.49	2.99

Table (21) cont.

Variable	Mean or fraction in the sample	Standard Deviation
Chance of getting different job (OPPOR2); (scale: 1=very poor, 10=excellant)	4.28	3.17
Does job require high phys- ical effort? (PHYS); (5 items: 1=never, 5=nearly all time)	3.71	1.02
Overall physical and nervous problems (HEALTHPR); (4 items: 1=no problem, 4=maior problem)	2.28	.91
How much work problems re- sulted from health problems? (WORKPR); (4 items: 1=no problem, 4=maior problem)	2.25	.84

APPENDIX B

LABELS/TREATMENT

Intervention was manipulated by presentation of labels on containers of proposed hazardous chemicals. This treatment is a modification of a similar procedure that was applied successfully by Viscussi and O'Connor (1984).

Labels were designed to elicit four levels of hazard. Each worker was exposed to label information of one chemical which is not a current part of his job. Each worker was then told that he will use the chemical substance in his current operation.

This form of intervention was chosen because of the familiarity of chemical workers with this form of conveying information about hazardous materials.

Label design. Guidelines for label design are derived from two major sources; Lirtzman (1984, pp. 25-29 and 36-38) and Hadden (1986). Hadden's book focuses mainly on designing labels. These sources were used in order to achieve label effectiveness. Guidelines that were applied in designing the labels include:

A. Pictorial symbols: Pictures that attract attention, require less processing time and are less ambiguous than words.

B. Signal word: e.g. DANGER, POISON, WARNING, CAUTION.

C. Statement of hazard: Name of and information about the nature and effect of hazard, e.g. it may cause cancer, flammable. This

also includes hazard characteristics e.g. long term hazard that may cause cancer. Names and nature of substances were derived from chemists in the participating companies.

D. Instructions for handling and storage in case of accidental exposure: These include precautionary measures such as special clothes, equipment, temperature and special behavior or handling.

Figures (1) through (4) show representation of the four labels which were used in the experiment. The label in Fig.(1) should represent the lowest hazard level, label in Fig.(2) represents a medium hazard level, label in Fig.(3) represents a high hazard level, and label in Fig.(4) represents a very high hazard level.

Label reliability: Reliability of levels of hazard were established through interrater reliability by submitting the designed labels to a group of workers and another group of supervisors.

Label validity: Since subjects were randomly assigned to the four experimental groups, it is presumed that all variables except "label" will be controlled.

Fig. 1 Lower Level of Hazard

WARNING: NONE
NAME OF SUBSTANCE : SODIUM BICARBONATE
INSTRUCTION FOR HANDLING : NONE
HAZARD CHARACTERISTICS : NO HAZARD

Fig (2) Medium Level of Hazard



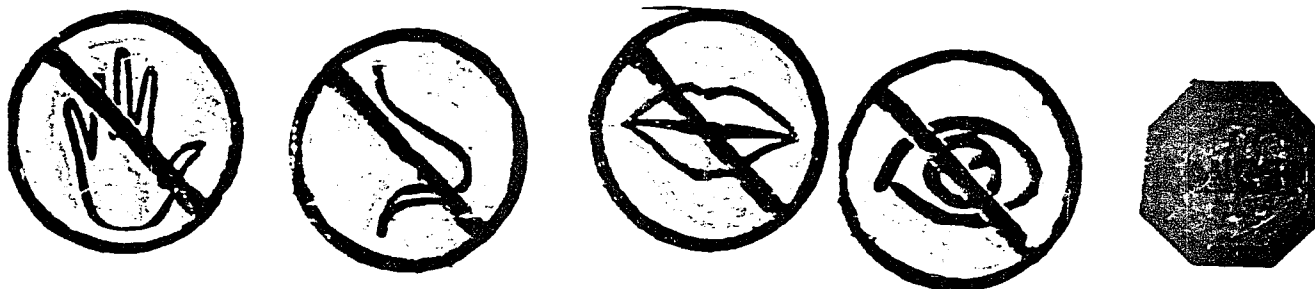
WARNING : POISONOUS IF SWALLOWED, INHALED OR
ABSORBED THROUGH SKIN. DO NOT
GET IN EYES OR ON SKIN.

NAME OF SUBSTANCE : YELLOW ZINC

INSTRUCTION FOR HANDLING : AVOID CONTACT WITH
SKIN. USE GLOVES AND MASK.

HAZARD CHARACTERISTICS : LONG-TERM HAZARDS
MAY CAUSE HEALTH PROBLEM

Fig. (3) High Level of Hazard



138

POISON: POISONOUS IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. DO NOT GET IN EYES OR ON SKIN.
NAME OF SUBSTANCE: concentrated NITRIC ACID
INSTRUCTION FOR HANDLING: AVOID CONTACT WITH SKIN. USE GLOVES AND MASK.
HAZARD CHARACTERISTICS: LONG-TERM HAZARDS MAY CAUSE HEALTH PROBLEM

Fig. (4) Very High Level of Hazard



DANGER: IT MAY CAUSE CANCER IF ABSORBED THROUGH SKIN OR INHALED.
NAME OF SUBSTANCE: ASBESTOS
INSTRUCTION FOR HANDLING: AVOID CONTACT WITH SKIN USE GLOVES, PROTECTIVE CLOTHING AND MASK.
HAZARD CHARACTERISTICS: LONG-TERM HAZARDS MAY CAUSE HEALTH PROBLEM CANCER SUSPECT

Fig. 1 Lower Level of Hazard

تحذير : لا يوجد
اسم المادة : بيكربونات الصوديوم
طرق التعامل : لا توجد
أخطار التعرض : لا توجد

Fig. (2) Medium Level of Hazard



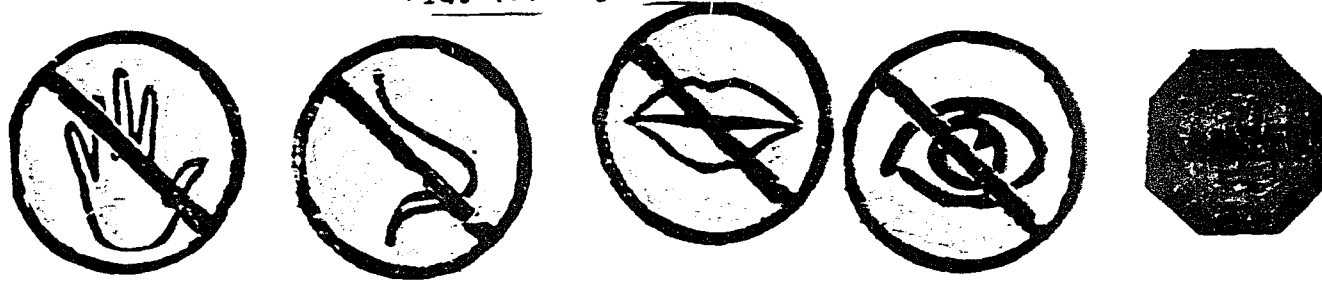
تحذير: سام لو أبتلع - أو عند الشم - أو عند
الدمتصاص منه طريقه الجلد، أبعده عنه العين أو الجلد.

أسم إلماره: مزيل لك أصفر

طوره التعامل: تجنب تعرضه الجلد. أبتعمل قفاز إلماره -
أبتعمل كمامه واقية للتنفس.

نتائج التعرض للخطر: تكرار التعرضه يسبب أضرار صحية
مزمنة

Fig. (3) High Level of Hazard



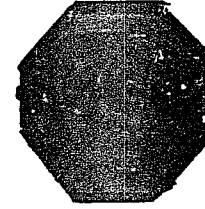
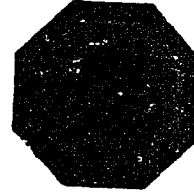
سام : سام لو أبتلع - أو عند الشم - أو عند الامتصاص عنه طريقه
الجلد . أبعد عنه العين أو الجلد .

أسم المادة : حوامه التريلي المركز .

طوره التعامل : تجنب تعرضه الجلد . استعمال قفاز أما -
أستعمل كمامه واقية للتنفس .

نتائج التعرض للخطر : تكرار التعرض يجب أخذ احتياطات عالية منه

Fig. (4) Very High Level of Hazard



خطر: قد تؤدي الى مرض السرطان لو أمتصت عن طريق
الجلد أو الشهيق.

أسم المادة: أسيتوني

طرق التعامل: تجنب تعرض الجلد. أعمل قفاز أمان -
أعمل ملابس واقية - أعمل كمامة واقية للتنفس.

نتائج التعرض للخطر: تكرار التعرض يسبب الإصابة بمرض السرطان

APPENDIX (C)

Table (22) provides detailed definitions of all pertinent variables.

Symbol	Definition
DECIDE1	Decide to take the same job again: 5 decide to take the same job; 3 some second thoughts; 1 not to take.
EDUC1	Level of education.
EDUC2	Years of schooling completed.
AGE	Age in years.
OPPOR1	Chance of getting similar job outside present employer: 1 very poor; 10 excellent.
HAZARD	Job hazard perceptions: 1 if job exposes to no health and physical problem; 2 slight problem; 3 sizeable problem; 4 great problem.
TRAIN	Employer provides training program: 1 yes; 2 no.
PHYS	Job requires high physical effort: 1 never; 5 nearly all the time.
EARNING	Earning per year.
HEALTHPR	Describe your physical and nervous condition: 1 no problem; 2 slight problem; 3 sizeable problem; 4 major problem.

Symbol	Definition
WORKPR	Work problems result from health problem: 1 no problem; 2 slight problem; 3 sizable problem; 4 major problem.
INPUTS	Job hazard perception if one considers all health and safty hazard in ons's job: +4 hazards are extremely high; -4 hazards are extremely low.
OUTCOMS	Hazard compensation perception: +4 compen- sation is extremely high; -4 hazard compensation is extremely low.
INPUT01	Job hazard faced by others in administration jobs: +4 hazards are extremely high; - 4 hazards are extremely low.
OUTCOM01	Hazard compensation received by others in administration jobs: +4 compensation is extremely high; -4 hazard compensation is extremely low.
INPUT02	Job hazard faced by others in private chemical companies: +4 hazards are extremely high; -4 hazards are extremely low.
OUTCOM02	Hazard compensation received by private work- ers: +4 compensation is extremely high; -4 hazard compensation is extremely low.

Symbol	Definition
SATISF ^(a)	Satisfaction feeling regarding levels of hazard and compensation: 1 not at all; 4 very much.
HELPLS ^(a)	Helpless feeling regarding levels of hazard and compensation: 1 not at all; 4 very much.
TENSION ^(a)	Tension feelings regarding levels of hazard and compensation: 1 not at all; 4 very much.
FRUSTR ^(a)	Frustration feelings regarding levels of hazard and compensation: 1 not at all; 4 very much.
ANGRY ^(a)	Angry feelings regarding levels of hazard and compensation: 1 not at all; 4 very much.
HOSTEL ^(a)	Hostile feelings regarding levels of hazard and compensation: 1 not at all; 4 very much.
IDENTIFY ^(b)	Agree with criticism against employer: 1 mostly agree; 5 never.
APPROVE1 ^(b)	Approve that son works in similar job: 5 completely approve; 1 strongly disapprove.
GENSATIS ^(b)	All in all, how much satisfaction with the job: 1 not at all; 4 very satisfied.
EQUITY1	Hazard compensation is fair in view of working condition: 1 no; 2 yes.

Symbol	Definition
EQUITY2	Hazard compensation is fair in view of co-worker compensation: 1 no; 2 yes.
EQUITY3	Hazard compensation is fair in view of administration employee's compensation: 1 no; 2 yes.
EQUITY4	Hazard compensation is fair in view of private chemical worker's compensation: 1 no; 2 yes.
EQUITY5	Hazard compensation is fair in view of non-chemical public worker's compensation: 1 no; 2 yes.
QUIT	Making a genuine effort to find a new job with another employer within the next year: 1 very likely; 5 not likely at all.
NEWHAZAR	Hazard perception resulted from exposure to label information: 0 normal condition that exists in an average job; 10 extremely high hazard.
NEWCOMPE	Hazard compensation requested as a result to exposure to label information: 0 no hazard compensation; 10 extremely high compensation.
TENURE	Length of service with present employer.

Symbol	Definition
APPROVE2	Approve that son works with the new hazardous job: 5 completely approve; 1 completely disapprove.
DECIDE2	Decide to choose the new hazardous job: 5 decide without hesitation to take the job; 1 decide definitely not to take the job.
ENDANGER	Health could be endangered due to the new hazard (label information) more than to the current hazard job: 1 yes; 2 maybe; 3 no.
OPPOR2	Chance of getting different job outside present employer: 1 very poor; 10 excellent.
ANGER ^(c)	Experience frequent periods of extreme anger: 1 yes; 2 no.
STOMAC ^(c)	Experience frequent periods of stomach sickness: 1 yes; 2 no.
WORRY ^(c)	Experience frequent periods of extreme worry: 1 yes; 2 no.
UPSET ^(c)	Experience frequent periods of extreme upset: 1 yes; 2 no.
SLEEP ^(c)	Experience frequent periods of trouble sleeping: 1 yes; 2 no.
CONCENT ^(c)	Experience frequent periods of trouble thinking clearly: 1 yes; 2 no.

Symbol	Definition
SHAKEN ^(c)	Experience frequent periods of feeling shaken: 1 yes; 2 no.
LOAPPT ^(c)	Experience frequent periods of loss of appetite: 1 yes; 2 no.
HIAPPT ^(c)	Experience frequent periods of increase in appetite: 1 yes; 2 no.
DIARR ^(c)	Experience frequent periods of having dia- rrhea: 1 yes; 2 no.
CONSTP ^(c)	Experience frequent periods of having consti- pation: 1 yes; 2 no.
SWEAT ^(c)	Experience frequent periods of swearing spells: 1 yes; 2 no.

(a): Variables represent psychological reaction to equity/inquity

(modified from Walster et al 1976).

(b): Variables represent general attitude (satisfaction) towards

job. They are combined to establish a measure (mean) of

"facet free satisfaction" (Quinn and Shepard 1974).

(c): Variables represent symptoms of anxiety (modified from

Langer 1962).

QUESTIONNAIRE

1. Knowing what you know, if you had to decide all over again whether to take the job you now have, what would you decide?

----Decide without hesitation to take the same job	5
----Have some second thoughts - - - - -	3
----Decide definitely not to take the same job	1

2. How many of schooling have you completed? _____ years

3. What level of formal education do you have?

- (1)---None
- (2)---Some grade school
- (3)---Completion of grade school
- (4)---Some high school
- (5)---High school
- (6)---Some college without degree
- (7)---Graduation of junior college

4. Do you have any children? 1.----Yes 2.----No

5. If yes, what are their ages? ____ years

____ years

____ years

____ years

____ years

____ years

____ years

____ years

____ years

6. Please indicate on a scale of 1 to 10 what you think your chances of getting a similar job outside your present employer with approximately the same income and fringe benefit. Your chances are: 1=very poor; 10=excellent (Please circle answer)

1--2--3--4--5--6--7--8--9--10

7. Please indicate on a scale of 1 to 10 what you think your chances of getting a different job outside your present employer with approximately the same income and fringe benefit. Your chances are: 1=very poor; 10=excellent (Please circle answer)

1--2--3--4--5--6--7--8--9--10

I am going to describe several possible safety and health hazards which exist in many work places. Please indicate whether or not your job exposed you to each of these hazards.

Answer all questions "Yes" or "No" first. Then for items answered "Yes" answer about their degree of health and physical problems.

	1 NO PROBLEM AT ALL	2 SLIGHT PROBLEM	3 SIZEABLE PROBLEM	4 GREAT PROBLEM
8.Dangerous Chemicals? ____ 1.Yes 16. ____		---	---	---
____ 5.No				
9.Air pollution from gas and dust ____ 1.Yes 17. ____		---	---	---
____ 5.No				
10.Dangers from fire ____ 1.Yes 18. ____		---	---	---
____ 5.No				
11.Extremes of tem- perature or humidity indoors ____ 1.Yes 19. ____		---	---	---
____ 5.No				
12.Risk of catching diseases ____ 1.Yes 20. ____		---	---	---
____ 5.No				
13.Radiation ____ 1.Yes 21. ____		---	---	---
____ 5.No				
14.Dangerous work methods ____ 1.Yes 22. ____		---	---	---
____ 5.No				
15.Any other (Specify: _____) ____ 1.Yes 23. ____		---	---	---
____ 5.No				

24.Does your employer make available a training program to improve your skills?

- 1.----Yes
- 2.----No

25.Does your job require high physical effort?

- 1.----never
- 2.----rarely
- 3.----sometimes
- 4.----rather often
- 5.----nearly all the time

26.Does your job require high mental effort?

- 1.----never
- 2.----rarely
- 3.----sometimes
- 4.----rather often
- 5.----nearly all the time

27.How much do you earn on this job? _____

Now I am going to list some problems which people experience from time to time. Please indicate whether any of them bothered you more often.

	YES	NO
28.I often experience periods of great anger	-----	-----
29.I am often sick to my stomach	-----	-----
30.I often experience periods of extreme worry	-----	-----
31.I often experience periods of extreme upset	-----	-----
32.I have trouble sleeping	-----	-----
33.I have trouble thinking clearly	-----	-----
34.I frequently feel trembly or shaken	-----	-----
35.I frequently have diarrhea	-----	-----
36.I frequently have constipation	-----	-----
37.I often experience loss of appetite	-----	-----
38.I often experience increase in appetite	-----	-----
39.I frequently feel sweating spells	-----	-----

40. Your physical and nervous condition. Which of the following best describes your condition:

- 1.----no problem
- 2.----slight problem
- 3.----sizeable problem
- 4.----major problem

41. If you have any health or nervous problems, do you think these problems resulted from your current job?

- 1.----yes
- 2.----no
- 3.----not sure, I don't know

42. When you had any of these problems, did it keep you away from your job for more than two weeks?

- 1.----It did not keep me away
- 2.----two weeks or less
- 3.----more than two weeks

43. In general how much of a problem (health problem) has this been for you in working on your current job?

- 1.----no problem
- 2.----slight problem
- 3.----sizeable problem
- 4.----major problem

Now I would like to know about the overall hazard level in your current job as well as in other jobs that you are familiar with. As you may know, people often differ markedly in how much they face hazards in their jobs. For example: one person may face a very high level of hazard while another person may encounter very little hazard.

44. Now if you consider all health and safety hazards in your present job, how would you describe the hazards in your job? (Circle the correct response)

- +4 Hazards in my job are extremely high
- +3 " " " " " very high
- +2 " " " " " moderately high
- +1 " " " " " slightly high
- 0
- +1 Hazards in my job are slightly low
- +2 " " " " " moderately low
- +3 " " " " " very low
- +4 " " " " " extremely low

45. People may also differ in how much they get out of their work. For example: one person may get little compensation for taking risks on the job while another person may receive a high

compensation for taking risks. Now if you consider all the types of compensations that are resulted directly from working in a hazardous job, how would you describe your outcomes? (Circle the correct response)

- +4 My risk compensation is extremely high
- +3 " " " " very high
- +2 " " " " moderately high
- +1 " " " " slightly high
- 0
- +1 My risk compensation is slightly low
- +2 " " " " moderately low
- +3 " " " " very low
- +4 " " " " extremely low

46.If you consider all health and safety hazards faced by other workers and employees in administration jobs and units, how would you describe these hazards? (Circle the correct response)

- +4 Hazards in administrative jobs are extremely high
- +3 " " " " " very high
- +2 " " " " " moderately high
- +1 " " " " " slightly high
- 0
- +1 Hazards in administrative jobs are slightly low
- +2 " " " " " moderately low
- +3 " " " " " very low
- +4 " " " " " extremely low

47.Now if you consider all types of risk compensation in administrative jobs, how would you describe this compensation? (Circle the correct response)

- +4 Hazard compensation in administrative jobs is extremely high
- +3 " " " " " very high
- +2 " " " " " moderately high
- +1 " " " " " slightly high
- 0
- +1 Hazard compensation in administrative jobs is slightly low
- +2 " " " " " moderately low
- +3 " " " " " very low
- +4 " " " " " extremely low

48. Now if you consider all health and safety hazards faced by other chemical workers who work in jobs similar to your job but in private companies, how would you describe these hazards? (Circle the correct answer)

- +4 Hazards in private chemical jobs are extremely high
- +3 " " " " " " very high
- +2 " " " " " " moderately high
- +1 " " " " " " slightly high
- 0
- +1 Hazards in private chemical jobs are slightly low
- +2 " " " " " " moderately low
- +3 " " " " " " very low
- +4 " " " " " " extremely low

49. Now if you consider all types of compensations that you think private chemical workers receive as a result of working in jobs similar to your job, how would you describe these compensation? (Circle the correct response)

- +4 Hazard compensation in private chemical jobs is extremely high
- +3 " " " " " " " " very high
- +2 " " " " " " " " moderately high
- +1 " " " " " " " " slightly high
- 0
- +1 Hazard compensation in private chemical jobs is slightly low
- +2 " " " " " " " " moderately low
- +3 " " " " " " " " very low
- +4 " " " " " " " " extremely low

Below is a list of words that describe workers moods and feelings. When you think about your job - how much hazard you face and how much you get in return - how does it make you feel? Indicate how well each word describes the way you feel at the moment.

50. How satisfied do you feel?

- 1.----Not at all
- 2.----a little
- 3.----Some what
- 4.----Very much

51. How helpless do you feel?

- 1.----Not at all
- 2.----a little
- 3.----Some what
- 4.----Very much

52.How tense do you feel?

- 1.----Not at all
- 2.----a little
- 3.----Some what
- 4.----Very much

53.How frustrated do you feel?

- 1.----Not at all
- 2.----a little
- 3.----Some what
- 4.----Very much

54.How angry do you feel?

- 1.----Not at all
- 2.----a little
- 3.----Some what
- 4.----Very much

55.How hostile do you feel?

- 1.----Not at all
- 2.----a little
- 3.----Some what
- 4.----Very much

Now I want to ask you some questions about the degree of trust you feel with regard to each of the following sources of information about your job hazards and its impact on your health. For each of the following sources, please indicate how much trust do you feel by circling the appropriate answer.

	Not at all trustworthy									Very trustworthy	
	---	1	2	3	4	5	6	7	8	9	---
56.() Training Program	1	2	3	4	5	6	7	8	9	10	
57.() My Employer	1	2	3	4	5	6	7	8	9	10	
58.() The Media	1	2	3	4	5	6	7	8	9	10	
59.() The Labor Union	1	2	3	4	5	6	7	8	9	10	

60.If you could get information about the danger risk in your job from only one of these sources listed above, from which one would you rather get the information. Just put a check in the box () in front of the organization you most prefer to get the information from.

61. Even if your employer kept you fully informed about the hazard in your job, do you feel that your health is endangered more than usual due to hazard in the work place?

- 1.----Yes
- 2.----No

62. Does your employer provide you with any of the following benefits?

	YES	NO
1. Health Insurance	-----	-----
2. Life Insurance	-----	-----
3. Risk Compensation	-----	-----
4. Hot or Healthy Meals	-----	-----
5. Economic Housing	-----	-----
6. Transportation	-----	-----
7. Other Benefit? Specify _____	-----	-----

I will now ask you how you feel about working for your present company.

63. How do you feel when you hear or read about someone criticizing your employer or comparing it unfavorably with other companies?

Would you say: (Put sign in front of your answer)

- 1.----You mostly agree with the criticism.
- 2.----It doesn't bother you.
- 3.----It gets you a little mad.
- 4.----It gets you quite mad.
- 5.----I never hear or read such criticism.

64. If you have or were to have a son (daughter if respondent is a woman), how would you feel if someone suggested that he/she work for the same company that you work for? Would you say: (Put sign in front of your answer)

----Completely approve.	5
----Generally approve, but with some reservations	4
----Neither approve or disapprove	3
----Disapprove a little	2
----Strongly disapprove	1

I would like to discuss with you how you experience your present job situation and ways it may affect other aspects of your life. (Put sign in front of your answer)

65.All in all, how satisfied would you say you are with your job?

1.----Not at all satisfied

2.----Not too satisfied

3.----Somewhat satisfied

4.----Very satisfied

66.If a good friend of yours told you he/she was interested in working in a job like yours for your employer, what would you tell him/her?

----Advise him/her against this sort of job 1

----Have doubts about recommending this sort of job 3

----Strongly recommend this sort of job 5

67.Do you use safety equipment?

1.----Yes

2.----No

3.----Sometimes

68.If you are not using safety equipment, then give reason for that.

69.Do you feel job security?

1.----Yes

2.----No

70.How long does it take for you to go to your job? ____minutes.

71.How old are you? ____years.

72.How long have you worked for your present company? ____years.

73.What is the name of the section or part of the company in which you work? _____

74.What is your main occupation? (Record full job title)

75.Do you have other experience working in chemical industry?

1.----Yes

2.----No

76.If yes, how many years of experience did you have before joining your present employer? ____years.

77.What is your status?

1.----Married

2.----Single

Think about your job. If the work or phrase in each item below describes your feeling toward your job (work, pay, and so forth), write a Y for YES in the space. If the item does NOT tell how you feeling, write N for NO in the space. If you don't know exactly how you feel about the question, write ? in the space.

78.WORK

___ fascinating
 ___ routine
 ___ satisfying
 ___ boring
 ___ good
 ___ creative
 ___ respected
 ___ hot
 ___ pleasant
 ___ useful
 ___ tiresome
 ___ healthful
 ___ challenging
 ___ on your feet
 ___ frustrating
 ___ simple
 ___ endless
 ___ give sense of
 accomplishment

79.SUPERVISION

___ asks my advise
 ___ hard to please
 ___ impolite
 ___ praises good work
 ___ tactful
 ___ influential
 ___ up-to-date
 ___ doesn't supervise enough
 ___ quick tempered
 ___ tells me where I stand
 ___ annoying
 ___ stubborn
 ___ knows job well
 ___ bad
 ___ intelligent
 ___ leaves me on my own
 ___ lazy
 ___ around when needed

80.PAY

___ income is adequate for
 normal expenses
 ___ barely live on income
 ___ bad
 ___ income provides
 luxuries
 ___ less than I deserve
 ___ highly paid
 ___ under paid

81.PROMOTION

___ good opportunity for
 advancement
 ___ opportunity somewhat
 limited
 ___ promotion on ability
 ___ dead-end job
 ___ good chance for
 promotion
 ___ unfair promotion policy
 ___ infrequent promotions
 ___ regular promotions
 ___ fairly good chance for
 promotion

82.CO-WORKERS

___ stimulating
 ___ boring
 ___ slow
 ___ ambitious
 ___ stupid
 ___ responsible
 ___ fast
 ___ intelligent
 ___ easy to make enemies
 ___ talk too much
 ___ smart
 ___ lazy
 ___ no privacy
 ___ active
 ___ narrow interests
 ___ loyal
 ___ hard to meet

83. Do you feel that your risk compensation (monetary and non-monetary) is fair and just in view of your current work condition?

- 1.----Yes
- 2.----No

84. Do you feel that your risk compensation (monetary and non-monetary) is fair and just in comparison with other workers in similar working conditions in your company?

- 1.----Yes
- 2.----No

85. Do you feel that your risk compensation (monetary and non-monetary) is fair and just in comparison with other risk compensation received by other employees in administrative jobs in your company?

- 1.----Yes
- 2.----No

86. Do you feel that your risk compensation (monetary and non-monetary) is fair and just in comparison with other workers in similar working conditions (chemicals), but in other private companies?

- 1.----Yes
- 2.----No

87. Do you feel that your risk compensation (monetary and non-monetary) is fair and just in comparison with other workers in other working conditions (non-chemical, e.g. steel), but in other public companies?

- 1.----Yes
- 2.----No

88. Taking everything into consideration, how likely is it that you will make a genuine effort to find a new job with another employer within the next year?

- 1.----very likely
- 2.----somewhat likely
- 3.----not at all likely

PART 2

Now I would like to know your opinion with regard to this new chemical. I am going to ask you some questions about your feelings and opinion if we assume that your work involves this new chemical. I also assume that you are informed, through reading the label, about the nature of this chemical and its hazards.

89. Now if you consider all health and safety consequences that may result from working with this new chemical, how would you describe its hazard? (Circle the correct response)

Normal work condition that exists in an average job	Extremely high hazardous job
---	---------------------------------

-----	-----
0 1 2 3 4 5 6 7 8 9 10	

90. Now if you consider all types of compensations that could result from working with the new chemical, which one describes what you would want? (Circle the correct response)

No hazard compensation	Extremely high hazard compensation
---------------------------	---------------------------------------

-----	-----
0 1 2 3 4 5 6 7 8 9 10	

91. Assuming you are working with this new chemical, knowing what you know about this hazard if you had to decide all over again whether to take the job, what would you decide?

-----Decide without hesitation to take the same job	5
-----Have some second thoughts	3
-----Decide definitely not to take the job	1

92. Knowing what you know about this hazard, if someone suggested that your son/daughter work for your employer and deal with these new chemicals? Would you:

- | | |
|--|---|
| ----Completely approve | 5 |
| ----Generally approve, but with some reservation | 4 |
| ----Neither approve nor disapprove | 3 |
| ----Disapprove a little | 2 |
| ----Strongly disapprove | 1 |

93. Do you feel that your health could be endangered due to the new chemicals more than current hazards in the work place?

1. ----Yes
2. ----No
3. ----I don't know

Suppose you are asked to work in that hazardous workplace. Would you prefer an appropriate pay raise or various other job improvements? If you can not decide, check in front of "don't know"

Please check your preference in each of the following list:

94. ____ Increased retirement benefits or ____ pay raise
95. ____ More medical insurance or ____ pay raise
96. ____ Shorter work week or ____ pay raise
97. ____ Greater chance for promotion or ____ pay raise
98. ____ Greater job security or ____ pay raise
99. ____ Healthier working condition or ____ pay raise
100. ____ More interesting work or ____ pay raise
101. ____ Greater freedom to decide work or ____ pay raise
102. ____ Greater comfort at work or ____ pay raise
103. ____ More paid vacations or ____ pay raise

104. Is there anything else you would like to say that will help us understand what your job looks like, and what are the feelings and opinions of those who work in jobs identical to your job.

بسم الله الرحمن الرحيم

الاخ العزيز

لعلك تعلم أنني أقدم بدراسه عليه عن العمل في بعض المهن التي تتميز عن غيرها بأخطار المهنة • ولقد اخترت العاملين في الكيماويات كميدان لبحثي ورأيت أن أطلب رأيك كتابه بشأن طبيعته عليك • وما أقوم فعلا عن ذلك باللقاء بك شخصيا حتى نتناقش في مزيد من التفاصيل •

ومن المهم أن أوضح لك أنني لا أتوقع اجابه معينه عن الامثله التي في هذا الاستقراء • فليس هناك اجابه صحيحه أو اجابه خاطئه • ولكن اهم شيء أن تعبر اجابتك بصدق عن رأيك • وأؤكد لك أنه لن يطلع شخص آخر فيرى على اجابتك وأيضا لن يكون هناك أي شيء يحدد شخصيتك •

(١)

أرجو وضع علامة (✓) في المكان المناسب الذي يجرى عن رأيتك .

١ - والآن بعد علك لفترة في مهنتك الحالية في صناعة الكيمياء فاذن اخلت
ك الفرصة مرة أخرى لاختار مهنتك . . ماذا يكون قسارك ؟

_____ اقدر بدون تردد أن اختار نفس المهنة مرة أخرى .
_____ اكسر بعض القنن قبل أن اختار نفس المهنة .
_____ اقمر بدون تردد أن اختار مهنة أخرى .

٢ - كم عدد السنوات التي قضيها في التلم ؟ _____ منه

٣ - ماهي أعلى درجة تلم وصلت اليها ؟

_____ اعدادية أو مايعاد لها . _____ ثانوية عامة أو مايعاد لها .
_____ دون الثانية العامة . _____ مؤهل عال .

٤ - إذا كان لديك أولاد فما هي أعمارهم ؟

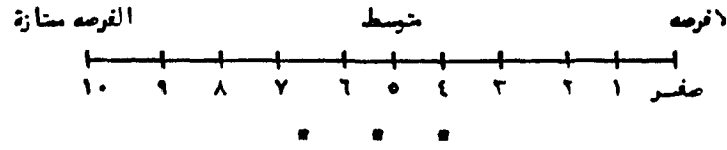
١ - _____ عام
٢ - _____ عام
٣ - _____ عام
٤ - _____ عام
٥ - _____ عام

٥ - في رأيك ماهي فترة الحصول على حل حائل لملك الحالي ولكن في شركة
أخرى ؟ نيم دائرة حول الرقم المناسب في القياس الذي امامك .

لأفمه _____ خبطة _____ لفمه متارة
١٠ ٩ ٨ ٧ ٦ ٥ ٤ ٣ ٢ ١ صفر

٦ - في رأيك ماهي فرصة الحصول على عمل غير مماثل لعملك الحالي ولكن في شركة

أخرى ؟ ضع دائرة حول الرقم المناسب في القياس الذي أمامك .



أسئلة خاصة بعلاوة طبيعة العمل : كما تعلم فإن العاملين الذين يتعرضون لخطر

المهنة يتقاضون علاوة طبيعة عمل أو امتيازات معينة وذلك بالإضافة الى الاجر الاساسي

والأسئلة التالية تتعلق بشعورك تجاه هذه الامتيازات التي تتقاضاها عند مقارنتها

بالامتيازات التي يتقاضاها العاملون في أعمال خطره مماثلة في الشركات الاخرى .

أرجو وضع علامه (✓) أمام الأجابه التي تعبر بصدق عن رأيك .

لاعلى الاطلاق قليلا بعض الشيء كثيرا جدا

4 3 2 1

٧ - أشعر بالرضا تجاه امتيازات الخطر

التي تحصل عليها الآن ؟

٨ - أشعر بأنني لست أستطيع أن تتدخل

لتحديد مقدار الامتيازات التي تعتقد

انك تستحقها ؟

٩ - أشعر بالضييق تجاه حجم امتيازات

الخطر التي تحصل عليها الآن ؟

١٠ - أشعر بالفين تجاه حجم امتيازات

الخطر التي تحصل عليها الآن ؟

١١ - أشعر بعدم الرضا تجاه حجم

امتيازات الخطر التي تحصل عليها الان ؟

١٢ - أشعر بأنك مضطرب لقبول ما تحدده

الشركة لك من امتيازات الخطر ؟

١٣ - ماذا يكون شعورك عندما نسمع او نقرأ نقد ضاد للشركة التي تعمل بها ؟

- ١ - _____ تشعر عموما بالموافقة على ما يقال .
- ٢ - _____ لا يثرني هذا النقد تأثيرا سيئا عليك .
- ٣ - _____ تشعر بالتفضي بـ بعض الشيء .
- ٤ - _____ تشعر بالتفضي الكثير .
- ٥ - _____ لا ألتفت أبدا الى هذا النقد .

١٤ - اذا كان لديك ابن واقتراح أحد الأشخاص أن يعمل ابنك في عمل ما مثل

لعملك فماذا يكون شعورك ؟

- ١ - _____ أوافق على الاطلاق .
 - ٢ - _____ لا أوافق بعض الشيء .
 - ٣ - _____ من الصعب تحديد شعوري .
 - ٤ - _____ أوافق عموما مع بعض التحفظات .
 - ٥ - _____ أوافق تماما .
- ملحوظة : ضع علامة (/) أمام الاجابة المناسبة .

١٥ - هل تعتقد أن الشركة التي تعمل بها تدك بمعلومات كافية عن أى أخطار

أو ظروف غير صحيحة قد تتعرض لها خلال عملك ؟

- ١ - _____ نادرًا
- ٢ - _____ احيانًا
- ٣ - _____ تقريبا في كثير من الاحيان
- ٤ - _____ في جميع الاحيان

١٦ - هل تشعر بالثقة في المعلومات الخاصة بأخطار المهنة والتي تدك بها الشركة ؟

- ١ - _____ نعم
- ٢ - _____ لا
- ٣ - _____ يَحْتَمِل
- ٤ - _____ لا أعرف

١٧ - بوجه عام هل تشعر بالرضا نحو عليك ؟

- ١ - _____ لا أشعر بالرضا على الإطلاق
- ٢ - _____ لا أشعر بالرضا بعض الشيء
- ٣ - _____ أشعر بالرضا بعض الشيء
- ٤ - _____ أشعر بالرضا تماماً

١٨ - إذا أخبرك صديق عزيز عليك أنه يرغب في الالتحاق بعمل مائل لعملك

فماذا يكون رأيك ؟

- ١ - _____ لا أنصح بذلك إطلاقاً .
- ٢ - _____ يحتمل أن أنصح في الحصول على عمل مائل .
- ٣ - _____ أنصح بشدة في الحصول على عمل مائل .

١٩ - هل تشعر أن بدل طبيعته العمل (أو أي امتيازات خاصة بخطوره المهنة)

الذي تتقاضاه يتناسب مع ظروف عملك بالمقارنة بما يحصل عليه العاملون نفس
نفس شركتك ؟

- ١ - _____ نعم
- ٢ - _____ لا
- ٣ - _____ يحتمل

٢٠ - هل تشعر أن بدل طبيعته العمل (أو أي امتيازات خاصة بخطوره المهنة)

الذي تتقاضاه يتناسب مع ظروف عملك وذلك بالمقارنة بما يحصل عليه العاملون
في ظروف تشابه ظروف عملك ولكن في شركات أخرى (قطاع عام أو خاص أو استثماري)

- ١ - _____ نعم
- ٢ - _____ لا
- ٣ - _____ يحتمل

٢١ - هل نضع في ذلك بعض أهم شيء في حياتك ؟

- ١ - _____ على أهم شيء في حياتي على الإطلاق .
- ٢ - _____ هناك أمور أخرى أهم في حياتي من علي .
- ٢ - _____ على شأني في أميئة اهتماماتي الأخرى .
- ٤ - _____ على الحال ليس أهمهم في حياتي إطلاقا .

ملحوظة : أرجو وضع علامة (✓) في المكان المناسب :

٢٢ - هل لديك الباشا	نعم	لا	أجابا
- بآاك عن رأيك	_____	_____	_____
- يدع عليك الطبيب	_____	_____	_____
- يشرح لك أخطائك	_____	_____	_____
- تنص في محادثة معك	_____	_____	_____
- من في محادثة معك	_____	_____	_____
- يترن عليك باستمرار	_____	_____	_____
- مركز الخططه في بيته	_____	_____	_____
- يعطي المعلومات والتوجيهات	_____	_____	_____
- اللازمه لأداء العمل بكفاءه	_____	_____	_____
- يعطي التعليمات والتوجيهات	_____	_____	_____
- التي توفر سلاسل الشخصيه	_____	_____	_____
٢٣ - توجيه العمل الذي أقوم به :	نعم	لا	أجابا
- أن على موظفي	_____	_____	_____
- أن على ممثل	_____	_____	_____
- انني أعمل دائما تحت رحمة	_____	_____	_____
- المطور في قطاعه العمل	_____	_____	_____
- أن على رئيسي	_____	_____	_____
- أن على مشوقي	_____	_____	_____

_____	_____	_____	- ان على شعب
_____	_____	_____	- ان على صحن
_____	_____	_____	- ان على بشير التحدى
_____	_____	_____	- ان الجوحا رنى على
_____	_____	_____	- ان على يتطلب أن اقوف
_____	_____	_____	على قدم
_____	_____	_____	- ان على مزعم
_____	_____	_____	- ان على يعطى الانحياز
_____	_____	_____	بتحقيق السندات
_____	_____	_____	- اننى أريد الانتقال من على
_____	_____	_____	الحالى الى عمل أقل خطورة

٢٤ - الترقية فى شركته :

نعم	لا	احيانا	_____
_____	_____	_____	- هل نرسم الترقية محدودة ؟
_____	_____	_____	- هل الترقية على اساس الكفاءة ؟
_____	_____	_____	- هل نظام الترقية غير عادل ؟
_____	_____	_____	- هل الترقية تطول رغم احتياجها ؟
_____	_____	_____	- هل تترقى فى الموعد المحدد ؟

٢٥ - ما هو رأيك فى العمال والموظفين العاملين فى الادارة أو القسم ؟

نعم	لا	احيانا	_____
_____	_____	_____	- ممتازون
_____	_____	_____	- ملبين
_____	_____	_____	- غير الكفاء
_____	_____	_____	- لديهم احساس بالمسئولية
_____	_____	_____	- من السهل أن يتنبوا أمدقنا
_____	_____	_____	- كمسولين

نعم	لا	اجابنا
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

٢٦ - المرتب : ماهو رأيك بالنسبة للمرتب الذي تحصل عليه :

[illegible]

٢٧ - حالتك المحبة : نغم علامه (✓) أمام العبارة التي تصف حالتك الصحية :

- ١ - _____ لا مشاكل صحيه
- ٢ - _____ مشاكل صحيه طفيفه أو بسيطه
- ٣ - _____ مشاكل صحيه عديده
- ٤ - _____ مشاكل صحيه جسيمه

٢٨ - من نتجت هذه المشاكل الصحيه من عندك الحالي ؟

- ١ - _____ نعم
- ٢ - _____ لا
- ٣ - _____ لا أدري

٢٩ - من تسببت هذه المشاكل الصحيه في تفليك عن العمل ؟

- ١ - _____ نعم
 - ٢ - _____ لا
- ما عسى المـــعدده ؟

١ - _____ اسبوعين أو أقل - ٢ - _____ أكثر من اسبوعين .

٣٠ - نتيجة لهذه المشاكل الصحيه ما عسى أهم المشاكل التي تعانيها القيام بعملك ؟

- ١ - _____ لا مشاكل
- ٢ - _____ مشاكل طفيفه أو بسيطه
- ٣ - _____ مشاكل عديده
- ٤ - _____ مشاكل جسيمه

٣١ - من يتأكد رئيسك من استعمالك لمهمات الأمن الصناعي اللازمه لعملك ؟

- ١ - _____ نعم
- ٢ - _____ لا
- ٣ - _____ أحياناً

٣٢ - هل تستعمل مبيعات الامن الصناعي؟

١ - _____ نعم

٢ - _____ لا

٣ - _____ احياناً

إذا كنت تستخدم مبيعات الامن فما هي أسباب ذلك؟ _____

٣٣ - هل تشعر بالأمان والاستقرار في عملك ؟ _____

١ - _____ نعم

٢ - _____ لا

٣٤ - كم تأخذ من الوقت للذهاب من مقر شركتك الى عملك ؟ _____ دقيقة .

٣٥ - السن : _____ عام

٣٦ - الدرجة : _____

٣٧ - عدد السنوات التي قضيتها في عملك الحالي (الخبرة) : _____ عام

٣٨ - ادارة أو قسم أو وحدة : _____

٣٩ - الوظيفة : _____

٤٠ - هل لديك خبرة سابقة (مع شركات أخرى) في الصناعات الكيماوية :

١ - _____ نعم

٢ - _____ لا

٤١ - إذا كان لديك خبرة سابقة في مجال الصناعات الكيماوية فما هي عدد سنوات

هذه الخبرة ؟ _____ عام .

٤٢ - ماهي حالتك الاجتماعية ؟ (امر / ام / اذنيه / الخ)

١ - _____ متزوج

٢ - _____ غير متزوج

٣ - _____ أرملة

٤ - _____ مطلق

والآن أريد أن اسألك بعض الأسئلة الخاصة بقدر الثقة التي تضعها في مصادر المعلومات التي يمكن أن ترد إليك حول أخطار هذه المهنة على صحتك ونجد أمامك اسماً بعض الجهات التي تعدك بمعلومات عن تأثير الأخطار الكيميائية على صحتك . وأمام كل مصدر نجد مقياس لقدر الثقة التي نشعر بها تجاه كل مصدر معلومات . وال المطلوب منك أن تضع دائرة حول درجة الثقة التي نشعر بها تجاه كل مصدر معلومات .

أشعر بالثقة

أشعر بالثقة

على الإطلاق

الكامل

- ٤٣ - () برناج تدريبي ١ ٢ ٣ ٤ ٥ ٦ ٧ ٨ ٩ ١٠
- ٤٤ - () الشركة التي عمل بها ١ ٢ ٣ ٤ ٥ ٦ ٧ ٨ ٩ ١٠
- ٤٥ - () الجرائد اليومية ١ ٢ ٣ ٤ ٥ ٦ ٧ ٨ ٩ ١٠
- ٤٦ - () نقابة العمال ١ ٢ ٣ ٤ ٥ ٦ ٧ ٨ ٩ ١٠

والآن إذا كنت متحصل على معلومات عن أخطار المهنة من جهة واحدة فقط من الجهات السابقة ، فمن تكون هذه الجهة ؟ ضع علامة (✓) في المربع الموجود أمام مصدر المعلومات الذي تختاره .

٤٧ - هل تعتقد أن صحتك معرضة للخطر نتيجة العمل الذي تقوم به حتى لو توفرت المعلومات لديك بخصوص مخاطر مهنتك ؟

١ - _____ نعم

٢ - _____ لا

٤٨ - هل تتوفر أي من الميزات التالية في عملك الحالي ؟ ضع علامة (✓) تحت الإجابة الخاصة .

- ١ - تأمين صحي _____ نعم _____ لا
- ٢ - تأمين على الحياة _____
- ٣ - بدل طميمة عمل (لا إضافة المبيت) _____
- ٤ - وجبات غذائية _____

الاسئلة التاليه تتعلق بأنواع اخطار المهنة المختلفه التي قد تتعرض لها خلال
 عملك الحالي . أجب " نعم " في حاله تواجد هذه الاخطار و " لا " في
 حاله عدم تواجدها . وفي حاله اجابتك بنعم ضع علامه (✓) تحت درجه
المشاكل الصحيه التي يمكن أن تنتج من هذه الاخطار .

لا مشاكل مشاكل صحيه مشاكل صحيه مشاكل
 صحيه الخلقه بسيطه عبيده صحيه

٤٩ - خطر كيميائى _____ نعم _____ لا _____

لا _____

٥٠ - خطر نلوث _____ نعم _____ لا _____

انهاواء من الفاازات
 والانسرسه
 لا _____

٥١ - خطر الحرائق _____ نعم _____ لا _____

لا _____

٥٢ - درجه حرارة أو _____ نعم _____ لا _____

رطبيه عاليه
 لا _____

٥٣ - خطر النقاط مرئى _____ نعم _____ لا _____

لا _____

٥٤ - خطر اشعاعى _____ نعم _____ لا _____

لا _____

لا مشاكل صحية مشاكل صحية مشاكل صحية مشاكل
الحلقات بسيطة عديدة جسمية

٥٥ - معدات وأجهزة خطيرة نعم لا

٥٦ - أي أنواع من الاخطار نعم لا

(ماهي :)

* * * * *

٥٧ - قياس درجة خطورة المهنة : هناك اختلاف شديد في درجة اخطار المهنة

التي يواجهها كل شخص منا . فمثلا قد يواجه شخص ما أخطار مهنة عالية جدا

بينما يواجه شخص آخر أخطار مهنة قليلة جدا .

والان اذا اعتبرنا جميع أخطار المهنة (اخطار كيميائية ، تلوث الهواء ، الخ)

الناتجة عن عملك الحالي فكيف تصنف حجم هذه الاخطار ؟ (نضع دائرة حول

الاجابة الصحيحة التي تختارها من بين الاجابات التالية) :

+ ٤ أخطار على شديده وعالية للغاية

+ ٣ أخطار على عالية جدا

+ ٢ أخطار على عالية

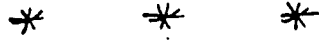
+ ١ أخطار على عالية بعض الشيء

- ١ أخطار على قليلة بعض الشيء

- ٢ أخطار على قليلة

- ٣ أخطار على قليلة جدا

- ٤ أخطار على منخفضة وقليلة للغاية



٥٨ - قياس بدل طبيعة العمل : وهناك أيضا اختلاف شديد في مقدار بدل طبيعة العمل أو بدل المذاخر التي يحصل عليها كل شخص منا نتيجة تعرضه لخطر المهنة فمثلا قد يحصل شخص ط على بدل طبيعة عمل (أو مواد عينية) طال أو طال جدا بينما يحصل شخص آخر على بدل طبيعة عمل منخفض أو منخفض جدا .

والآن اذا اخبرت أي بدلات أو امتيازات أو مواد عينية تحصل عليها نتيجة تعرضك لخطر عملك الحالي فيكف تصف مقدار هذه الامتيازات ؟

(نضع دائرة حول الاجابة الصحيحة التي تختارها من بين الاجابات التالية) .

- ١ + مقدار الامتيازات عالي ومجز للغاية
- ٣ + مقدار الامتيازات طالى جدا
- ٢ + مقدار الامتيازات عالى
- ١ + مقدار الامتيازات عالي بعض الشيء
- ١ - مقدار الامتيازات منخفض بعض الشيء
- ٢ - مقدار الامتيازات منخفض
- ٣ - مقدار الامتيازات منخفض جدا
- ٤ - مقدار الامتيازات ضئيل ومنخفض للغاية

٥٩. والآن اذا اخبرت جميع أخطار المهنة (اخطار كيميائية ، تلوث الهواء ، الخ)
الناتجة عن الوظيفة ، فكيف نصف حجم هذه الاخطار ؟ (ضع دائرة حول
الاجابة الصحيحة التي تختارها من بين الاجابات التالية) :

- + ٤ أخطار عليهم شديده وعلية للغاية
- + ٣ أخطار عليهم علية جدا
- + ٢ أخطار عليهم عالياة
- + ١ أخطار عليهم علية بعض الشيء
- ١ أخطار عليهم قليلة بعض الشيء
- ٢ أخطار عليهم قليلة
- ٣ أخطار عليهم قليلة جدا
- ٤ أخطار عليهم منخفضة وقليلة للغاية

٦٠. والآن اذا اخبرت أى بدلات أو امتيازات أو مواد عينية يحصل عليها العاملون من
بمسألة نتيجة تعرضهم لاطار عليهم الطل فكيف نصف مقدار هذه الامتيازات ؟

(ضع دائرة حول الاجابة الصحيحة التي تختارها من بين الاجابات التالية) .

- + ٤ مقدار الامتيازات على ريجز للغاية
- + ٣ مقدار الامتيازات على جدا
- + ٢ مقدار الامتيازات عالى
- + ١ مقدار الامتيازات على بعض الشيء
- ١ مقدار الامتيازات منخفض بعض الشيء
- ٢ مقدار الامتيازات منخفض
- ٣ مقدار الامتيازات منخفض جدا
- ٤ مقدار الامتيازات نرهل ومنخفض للغاية

٦٦- ولأن إذا اعتبرت جميع أخطار المهنة (أخطار كيميائية ، تلوث الهواء ، ... الخ)
الناتجة عن وظائف مماثلة ، فكيف نصف حجم هذه الأخطار ؟ (ضع دائرة حول
الإجابة الصحيحة التي تختارها من بين الإجابات التالية) :

- + ٤ أخطار عليهم عديدة وغالبه للغاية
- + ٣ أخطار عليهم غالبه جدا
- + ٢ أخطار عليهم عابثة
- + ١ أخطار عليهم غالبه بعض الشيء
- ١ أخطار عليهم قليلة بعض الشيء
- ٢ أخطار عليهم قليلة
- ٣ أخطار عليهم قليلة جدا
- ٤ أخطار عليهم منخفضة وقليلة للغاية

٦٧- ولأن إذا اعتبرت أي بدلات أو امتيازات أو مواد عينية يحصل عليها العاملون

في إقصاء مخاطرهم لاخطار عليهم الحالي فكيف نصف مقدار هذه الامتيازات ؟

(نضع دائرة حول الإجابة الصحيحة التي تختارها من بين الإجابات التالية) .

- + ٤ مقدار الامتيازات عالي ومجز للغاية
- + ٣ مقدار الامتيازات عالي جدا
- + ٢ مقدار الامتيازات عابثة
- + ١ مقدار الامتيازات عالي بعض الشيء
- ١ مقدار الامتيازات منخفض بعض الشيء
- ٢ مقدار الامتيازات منخفض
- ٣ مقدار الامتيازات منخفض جدا
- ٤ مقدار الامتيازات ضعيف ومنخفض للغاية

٦٧- هل تتوفر لك الفرصة أى برامج تدريبية بهدف زيادة مهاراتك ؟

١ - _____ نعم

٢ - _____ لا

٦٨- هل تعتقد أن عليك يتطلب مجهود بدنى طال للغاية ؟

١ - _____ لا أعتقد على الإطلاق .

٢ - _____ نادرا ما يتطلب ذلك .

٣ - _____ يتطلب فى بعض الاوقات .

٤ - _____ يتطلب فى اوقات كثيرة .

٥ - _____ يتطلب فى جميع الاوقات .

٦٩ - هل تعتقد أن عليك يتطلب مجهود ذهنى طال للغاية ؟

١ - _____ لا أعتقد على الإطلاق

٢ - _____ نادرا ما يتطلب ذلك

٣ - _____ يتطلب فى بعض الاوقات

٤ - _____ يتطلب فى اوقات كثيرة

٥ - _____ يتطلب فى جميع الاوقات

الجزء الثاني

=====

ملحوظة : والآن أريد أن أسألك بعض الأسئلة التي تتعلق بشعورك تجاه
ظروف عملك مع افتراض أن عملك سيخضع التعامل بالتعبئة الكيميائية
الجديدة . وأنا افترض أن لديك الآن معلومات كافية عن طبيعة
هذه المواد والأخطار الناتجة عنها والآن يعد افتراض تعرضك
لأخطار جديدة خلال عملك فأننى أريد أن أسألك بعض الأسئلة
لمعرفة شعورك ورأيك تجاه هذه الأخطار الجديدة :

١ - والآن اذا اخذت في الحسبان جميع اخطار المهنة التي يمكن أن تنتج عن
المواد الكيميائية الجديدة فكيف تصف حجم هذه الأخطار ؟ (ضع دائرة حول
الاجابة الصحيحة التي تختارها من بين الاجابات التالية ؟

الأخطار الجديدة مديدة وطاية للغاية

٩
٨
٧
٦
٥
٤
٣
٢
١

الأخطار الجديدة منخفضة بغاية ن بها لن نلذ عمل العادي

٢- ولأن اذا قارنت بين جميع اخطار المهنة التي يمكن أن تنتج عن هذه المواد الكيميائية الجديدة وبين اخطار تلك الحالي بدون اضافة هذه الاخطار فهل يكون رأيك أن الاخطار الجديدة أعلى أو مساوية أو أقل من الاخطار الصحية الحالية الناتجة عن تلك الحالية ؟ (نعم علامة ✓ امام الاجابة التي تختارها) .

- _____ الاخطار الجديدة اكبر من اخطار على الحالية .
- _____ الاخطار الجديدة مساوية لاطار على الحالية .
- _____ الاخطار الجديدة أقل من الاخطار الحالية لعملية .

٣- ولأن اذا اُخبرت أي بدلات أو امتيازات أو مواد عينية تعتقد أنك ستحققها مقابل تعاملك وشعركم هذه المواد الكيميائية الجديدة فكيف تصف مقدار هذه الامتيازات ؟

(نعم دائرة حول حجم الامتيازات التي تعتقد أنها مناسبة من بين الاجابات التالية)

مقدار امتيازات الحد الجديد يجب أن تكون طلبة ويجزيه للغاية .

٩
٨
٧
٦
٥
٤
٣
٢
١
٠

لدى امتيازات الحد الجديد

جـ - مع افتراض أن عمالك سيتضمن التعامل مع هذه المواد الكيميائية الجديدة وما يتربط عليها من أخطار صحيه • والآن أريد أن أسألك عن مدى رغبتك في هذه المهنة وذلك إذا أعطيت لك الفرصة لتقرر من جديد المهنة التي ترغب فيها (نضع علامة ✓ أمام الاختيار المناسب) •

- ١ - _____ بدون شك، سأختار نفس المهنة إذا منحت لي الفرصة مرة ثانية لاختيار مهنتي حتى مع وجود الأخطار الجديدة •
- ٢ - _____ انني غير متأكد انني سأختار نفس المهنة إذا منحت لي الفرصة مرة ثانية لاختيار مهنتي •
- ٣ - _____ من المؤكد إلا اختار نفس المهنة وذلك إذا كانت سأعرض لهذه الأخطار الجديدة •

ز - ماذا يكون شعورك، أو رأيك إذا اقترح أحدهم أن يعمل ابنك، أو أخيك، نفس مهنتك، في الشركة التي تعمل بها مع افتراض أنه سيتعامل في هذه المواد الكيميائية الجديدة ؟

- ١ - _____ أوافق تماماً
- ٢ - _____ أوافق، لكنه عامه مع بعض التحفظات
- ٣ - _____ > أدرى إذا كنت أوافق أو لا أوافق
- ٤ - _____ لا أوافق، بعض الشيء
- ٥ - _____ > أوافق بشدة

٦- والآن فلنفرض أنه طلب منك أن تعمل في مكان به أخطار مهنية وصحية عالية للغاية . هل تفضل زيادة في المرتب بمقدار ١٠ % (عشرة في المائة) أو تفضل بعض المزايا الأخرى ؟

في كل من الاسئلة التالية قارن بين زيادة مرتبك بمقدار ١٠ % وبين احدى المزايا التالية الاخرى (تجمعه علامه ✓ أمام اختياراته) .

- _____ ١٠ % زيادة في الاجر أو _____ زيادة في الممـاش
- _____ ١٠ % زيادة في الاجر أو _____ زيادة في التأمين الصحي
- _____ ١٠ % زيادة في الاجر أو _____ تقليل ساعات أو ايام العمل
- _____ ١٠ % زيادة في الاجر أو _____ زيادة نوص الترقية
- _____ ١٠ % زيادة في الاجر أو _____ زيادة استقرار وأمن وظيفتك
- _____ ١٠ % زيادة في الاجر أو _____ زيادة ظروف العمل الصحية
- _____ ١٠ % زيادة في الاجر أو _____ ومعدات الأمان
- _____ ١٠ % زيادة في الاجر أو _____ جعل العمل مشوقا اكثر
- _____ ١٠ % زيادة في الاجر أو _____ اعطائك مزيد من السلطة
- _____ ١٠ % زيادة في الاجر أو _____ في عطلة
- _____ ١٠ % زيادة في الاجر أو _____ زيادة في الاجازات والراحات

* * *

_____ هل هناك أي شيء آخر تريد أن نضيفه كي نفهم به اريقه أحسن حقيقة
تعبير بأراء العاملين في شبه مثل مهنتك ؟ من فضلك اكتب ماتجده مناسباً .

APPENDIX (D)

Factor Analysis of Reaction to Inequity Items

Items	Factor Loadings	
	Factor1	Factor2
SATISFACTION	-.52	-.24
HELPLESS	.54	.21
TENSION	.75	.51
FRUSTRATION	.37	.92
ANGER	.82	.41
HOSTILITY	.42	.85
Eigen value	3.31	.93
Percentage of variance	55.2	15.4
Cumulative Percentage = 70.6 %		

BIBLIOGRAPHY

- Adams, J. S. Inequity in social exchange. In L. Berkowitz (Ed.), Advances in Experimental Social psychology, 1965, 2, 267-299.
- Adams, S. J. Toward an understanding of inequity. Journal of Abnormal and Social Psychology, 1963, 67, (5), 422-436.
- Adams, J. S. and Freedman, S. Equity Theory Revisited: Comments and Annotated Bibliography. In Berkowitz, L. and Walster, E. (eds) Equity Theory: Toward a General Theory of Social Interaction. Advances In Experimental Social Psychology, 1976, 9, 231-244.
- Adams, J. S. and Rosenbaum, W. E. The relationship of worker productivity to cognitive dissonance about wage inequities. Journal of Applied Psychology, 1962, 46, 161-164.
- Akin, G. The Phenomenology of Risk. Unpublished Phd dissertation, University of California at Los Angeles, 1975.
- Anderson, N. H. Equity Judgements as Information Integration. Journal of Personality and Social Psychology, 1976, 33, 3, 291-299.
- Anderson, N. H. and Farkas, A. J. Integration theory applied to models of inequity. Personality and Social Psychology Bulletin, 1975, 1, 588-611.
- Austin, W., Walster, E. and Utne, M. K., Equity and the Law: The Effect of a Harmdoer's "suffering in the act" of Liking and Assigned Punishment. In Berkowity, L. and Walster, E. (eds) Advances in Experimental Social Psychology, 1976, 9, 231-244. New York: Academic Press.
- Babbie, E. The Practice of Social Research. Second Edition. Wadsworth Publishing Co., Inc.: Belmont, California 1979.

- Backman, C. W. and Secord, P. F. The compromise process and the affect structure of groups. In C. W. Backman and Secord, P. F. (eds), Problems in Social Psychology. New York: McGraw Hill, 1966.
- Beattie, J. R. Risk to the population and the individual from iodine releases. Nuclear Safety, 1967, 8, 573-576.
- Blau, P. M. Exchange and Power in Social Life. New York: John Wiley. 1964 (a).
- Blau, P. M. Justice in social exchange. Sociological Inquiry, 24 (Spring), 1964 (b).
- Combs, B. and Slovic, P. Causes of death: biased newspaper coverage and biased judgements. Journalism Quarterly, 1976, 56, 837-849.
- DesJardins, R. B., Bigoness, W. J. and Harris, R. L. Labor-Management Aspects of Occupational Risk. Annual Review of Public Health, 1982, 3, 201-224.
- Deutsch, M. Equity, Equality, and Need: What Determines Which Value Will Be Used as the Bias of Distributed Justice? Journal of Social Issues, 1975, 31, (3), 137-149.
- Farkas, A. J. and Anderson, N. H. Multidimensional Inputs in Equity Theory. Journal of Personality and Social Psychology, 1974, 37, (6), 879-896.
- Festinger, L. A Theory of Cognitive Dissonance. Evanston, Ill.: Row Peterson. 1957.
- Finn, R. H. and Lee, S. M. Salary Equity: Its Determination, Analysis, and Correlates. Journal of Applied Psychology, 1972, 56, (4), 283-292.
- Forrest, C. R., Cummings, L. L. and Johnson, A. C. Organizational Participation: A Critique and Model. Academy of Management Review, 1977, 2, 586-601.

- Frenkell, R. L., Priest, W. C. and Ashford, N. A. Occupational Safety and Health: a report on workers perceptions. Monthly Labor Review, 1980, (September), 11-14.
- Geer, J. Fear and autonomic arousal. Journal of Abnormal Psychology, 1966, 71, 253-255.
- Goodman, P. S., Salipante, P. and Paransky, H. Hiring, training and retaining the hard core unemployed: a selected review. Journal of Applied Psychology, 1975, 60, 313-317.
- Gouldner, A. W. The norm of reciprocity: a preliminary statement. American Sociological Review, 25, (April), 1960.
- Hadden, S. G. Read the Label. Colorado: Westview Press, Inc., 1986.
- Hakkinen, S. and Toivainen, Y. Psychological Factors Causing Labour Turnover among Underground Workers. Occupational Psychology, 1960, 27, 38-42.
- Harris, R. J. Handling Negative Inputs: On the Plausable Equity Formula. Journal of Experimental Social Psychology, 1976, 12, 194-209.
- Hebb, D. O. Drives and C. N. S. Conceptual nervous system. Psychological Review, 1955, 62, 243-254.
- Hebb, D. O. On the nature of fear. Psychological Review, 1946, 53, 259-276.
- Homans, G. C. The Human Group. New York: Harcourt and Brace, 1950.
- Homans, G. C. Commentary. In Berkowitz, L. and Walster, E. (eds). Advances In Experimental Social Psychology, 1976, 9, 231-244. New York: Academic Press.

- Kahn, R. L., Wolfe, D. M., Quinn, R. P., and Snoeck, J. D. Organizational Stress: Studies in Role Conflict and Ambiguity. New York: John Wiley and Sons, 1964.
- Kasl, S. V., Chisholm, M. and Eskenazi, B. The Impact of the Accident at the Three Mile Island on the Behavior and Well Being of Nuclear Workers. American Journal of Public Health, 1981, 71, 472-495.
- Kelly, J. F. and Harrell, T. W. Job Satisfaction Among Coal Miners. Personnel Psychology, 1949, 2, 161-170.
- Kinchin, G. H. Assessment of hazards in engineering work. Proceedings of the Institute of Civil Engineers, 1978, 64, 431-438.
- Kogan, N. and Wallach, M. A. Risk taking as a function of the situation, the person, and the group. In: New Direction in Psychology, III. New York: Holt, Rinehart, and Winston, 1967.
- Langer, E. J. The illusion of Control. Journal of Personality and Social Psychology, 1975, 32, 311-328.
- Legant, P. Equity Theory and the Law: Suggestions for Future Research. Symposium presented at the of the American Psychological Association, Montreal, August, 1973.
- Leventhal, G. S. What Should Be Done With Equity Theory? In: Gergen, K. J. Greenberg, M. S. and Willis, R. H. (eds.) Social Exchange; Advances in Theory and Research. New York: Plenum Press, 1980.
- Leventhal, G. S., Allen, J. and Kemelgor, B. Reducing inequity by reallocating rewards. Sychonomic Science, 1969, 14, 295-296.
- Lichtenstein, S., Slovic, P., Fischhoff, B., Layman, M. and Combs, B. Judged Frequency of Lethal Events. American Psychologist, 1978, 4, 555-578.

- Lirtzman, S. I. Labels, Perception and Psychometrics. In O'Connor, C. and Lirtzman, S. I. (eds) Handbook of Chemical Industry Labeling. Park Ridge, N.J.: Noyes Publishing Co. 1984.
- Lirtzman, S. I. and O'Connor, C. J. A Pilot Study of the Potential Effect of Label Characteristics and Reader Attitudes About Hazard Warnings. Working paper. Baruch College, CUNY, 1980.
- Lirtzman, S. I. and Ami, A. Credibility of Sources of Communication on Products Safety Hazards. Psychological Reports, 1986, 58, 707-718.
- MacCorquodale, K. and Meehl, P. E. On a distinction between hypothetical construct and intervening variables. Psychological Review, 1948, 55, 95-107.
- Mabley, W. H., Griffeth, R. W., Hand, H. H. and Meglino, B. H. Review and conceptual analysis of the employee turnover process. Psychological Bulletin, 1979, 86, 493-522.
- March, J. G. and Simon, H. A. Organization. John Wiley, New York, 1958.
- Martin, B. Anxiety and Neurotic Disorders. John Wiley and Sons, Inc.:New York, 1971.
- Orne, M. T. On the social psychology of the psychological experiment: with particular reference to demand characteristics and their implications. American Psychologist, 1962, 17, 776-783.
- Otway, H. J. Maurer, D. and Thomas, K. Nuclear power: the question of public acceptance. Future, 1978, (April), 109-118.
- Patchen, M. A conceptual framework and some empirical data regarding comparisons of social rewards. Sociometry, 1961, 24, 136-156.

- Pettman, B. O. Some factors influence labour turnover: a review of research literature. Industrial Relations Journal, 1973, 4, 43-61.
- Planz, C. A. Perceived Equity and its Relation among Early Career Male Teachers in Selected School Districts. Unpublished doctoral dissertation, State University of N. Y. at Buffalo, 1970.
- Pochin, E. E. Problems Involved in Developing an Index of Harm. ICRP 27, Oxford: Pergomon, 1977.
- Porter, L. W. and Steers, R. M. Organizational, work and personal factors in employee turnover and absenteeism. Psychological Bulletin, 1973, 80, 151-176.
- Pritchard, R. D. Equity theory: a review and critique. Organizational Behavior and Human Performance, 1969, 4, 176-211.
- Rose, M., Thibaut, J. and Evenbeck, S. Some determinants of the intensity of social protest. Journal of Experimental Social Psychology, 1971, 7, 401-418.
- Rowe, W. D. An Anatomy of Risk. New York: Wiley, 1977.
- Siegal, S. Non-parametric Statistics for the Behavioral Sciences. Tokyo: McGraw Hill Kogakusha, Ltd., 1956.
- Slovic, P. Information processing, situation specificity, and the generality of risk-taking behavior. Eugene: Oregon Research Institute, Research Bulletin, volume II, no. 3, 1971.
- Slovic, P., Fischhoff, B. and Lichtenstein, S. Rating the Risks: The structure of expert and lay perceptions. In Hohenemser, Ch. and Kasperson, J. K. (eds). Risk in the Technological Society. Colorado: Westview Press, 1982.
- Smith, P. C. et al., Cornell Studies of Job Satisfaction: I-VI. Mimeo, Cornell University, circa 1965.

- Smith, R. S. Compensation Wage Differentials and Public Policy: A Review. Industrial and Labor Relations Review, 1979, 32, (3), 339-351.
- Starr, Ch. General philosophy of risk-benefit analysis. In Ashley, H., Rudman, R. L. and Whipple, C. (eds). Energy and the Environment: A Risk-Benefit Approach. New York: Pergaman Press, 1976.
- Starr, Ch., Rudnam, R. and Whipple, C. Plilosophical basis for risk analysis. Annual Review of Energy, 1976, 629-662.
- Steinbrugge, K. V., McClure, F. E. and Snow, A. J. Studies in Seismicity and Earthquake Damage Statistics. Report COM-71-00053, Washington, D.C. : U.S. Department of Commerce, 1969.
- Taylor, J. A. A personality scale of manifest anxiety. Journal of Abnormal and Social Psychology. 1953, 18, 285-290.
- Telly, C. S., French, W. L. and Scott, W. G. The relationship of inequity to turnover among hourly workers. Administrative Science Quarterly, 1971, 16, 164-172.
- Thaler, R. and Rosen, S. The value of saving a life: Evidence from the labor market. In: Terleckyj, Nestor (ed). Household Production and Consumption. New York: National Bureau of Economic Research, 1975.
- Tversky, A. and Kahneman, D. Availablity: A heuristic for judging frequency and probability. Cognitive Psychology, 1973, 4, 207, 232.
- Vecchio, R. P. An Individual Differences Interpretation of the Conflicting Predictions Generated by Equity Theory and Expectancy Theory. Journal of Applied Psychology, 1981, 66, (4), 470-481.
- Viscusi, W. K. Job Hazards and Worker Quit Rates: An Analysis of Adaptive Worker Behavior. International Economic Review, 1979, 20, 29-58.

- Viscusi, W. and O'Connor, C. Adaptive Responses to Chemical Labeling: Are Workers Bayesian Decision Makers? The American Economic Review, 1984, 741, 942-957.
- Vlek, C. and Stallen, P. Rational and Personal Aspects of Risk. Acta Psychologica, 1980, 45, 273-300.
- Wagenaar, W. A. Decision making and numerical structuring. In H. Jungermann and G. de Zeeuw (eds.), Decision Making and Change in Human Affairs. Dordrecht: Reidel, 1977.
- Wahba, M. A. Preferences among alternative forms of equity: the apportionment of coalition reward in the males and females. Journal of Social Psychology, 1972, 87, 107-115.
- Walster, E., Aronson, V., Abrahams, D., and Rottman, L. Importance of physical attractiveness in dating behavior. Journal of Personality and Social Psychology, 1966, 4, 308-316.
- Walster, E. and Piliavin, J. Equity and the innocent bystander. Journal of Social Issues, 1972, 28, 165-189.
- Walster, E., Berscheid, E. and Walster, G. W. New Directions in Equity Research. In Berkowitz, L. and Walster, E. (eds). Advances in Experimental Social Psychology, 1976, 9, 1-38. New York: Academic Press.
- Walster, F., Berscheid, E. and Walster, G. W. New Directions in Equity Research. Journal Of Personality and Social Psychology, 1973, 25, 151-176.
- Walster, G. W. The Walster Et Al. (1973) Equity Formula: A Correction. Representative Research in Social Psychology, 1975, 6, 65-67.
- Weick, K. E. and Nasset, B. Preferences among forms of equity. Organizational Behavior and Human Performance, 1968, 3, 400-416.

Weiner, B. Human Motivation. Holt, Rinehart and Winston: New York, 1980.

Weinstein, N. D. Unrealistic Optimism About Future Events. Journal of Personality and Social Psychology, 1980, 39, 806,820.

Wortman, C. B. Some Determinants of Perceived Control. Journal of Personality and Social Psychology, 1975, 31, 282-294.

Zuckerman, M. Sensation seeking and anxiety, traits and states, as determinants of behavior in novel situations. In: I. G. Sarason and C. D. Spielberger (eds.), Stress and Anxiety, III, Washington, D. C. : Hemisphere 1976.