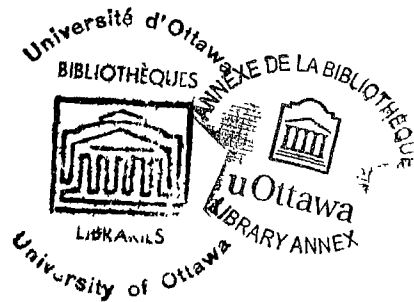


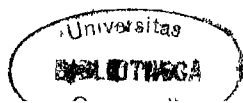
(AN INVESTIGATION OF INTERPERSONAL ASPECTS
OF INDUSTRIAL ACCIDENT AND NON-ACCIDENT MEN)

by (Earl J. Kronenberger)

Thesis presented to the School of
Psychology and Education of the
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CURRICULUM STUDIORUM

Earl J. Kronenberger was born November 22, 1929 in Dayton, Ohio. He received the Bachelor of Science in Education degree from the University of Dayton, Dayton, Ohio, in 1951. The Master of Arts degree in Psychology was conferred upon him by Bowling Green State University, Bowling Green, Ohio, in 1952. The title of his thesis was: The Effect of Practice with Square Span, Phrase Unit and Standard Typography on Rate of Reading and Comprehension.

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INTRODUCTION

Accidents occurring to men and women have been a problem for many years. Recently there has been a movement to determine if some factors are common to those people who have more accidents than they should on a chance expectancy basis.

Many hypotheses have been advanced as to possible causes for a predisposition toward accidents, whether these accidents be in the traffic, aircraft, or industrial areas. The present study was interested in the possibility of an interpersonal factor of "surface" manifestations which might be more common to the accident or non-accident group in an industrial setting.

The first portion of this thesis presents the importance of the study and the rationale which prompted the writer to perform a study of this type. Various hypotheses are given.

A survey of related literature is presented. This survey discusses studies from the traffic, aircraft, and industrial areas and covers the topics of sensory-motor-coordination and personality-habit-attitude research. This will give the reader a knowledge of the depth and scope of the related research to the present time.

The design of the experiment, methods used, population incorporated, and results obtained are given. The writer proceeds to an analysis of the results along with the conclusions.

CHAPTER I

THE PROBLEM AND HYPOTHESES

This study is concerned with the industrial accident problem in general and accident proneness in particular. This chapter will present the rationale for establishing the study and incorporate a few of the previous research studies so as to present a suitable perspective for the survey of literature and the design of the experiment which follow in subsequent chapters. The problem and hypotheses will be presented.

1. Practical and Theoretical Aspects of the Problem

Accidents, whether they be in the aircraft, traffic or industrial fields, have come under investigation by a number of experimenters in the past forty years. The general purpose of the industrial studies has been an attempt to control and reduce the vast waste that occurs each year due to accidents. Ghiselli and Brown¹ pointed out that in a year's time the injuries caused by accidents take a toll of full-time employment amounting to the equivalent of 750,000

¹ Edwin E. Ghiselli and Clarence W. Brown, Personnel and Industrial Psychology, New York, McGraw-Hill, 1955, p. 335.

workers. This can be translated into a total of 220,000,000 employee-days lost each year. The enormity of the situation is difficult to question.

It is apparent that just in terms of sheer frequency of occurrence the accident problem is of utmost importance. Any procedure, therefore, by which accidents can be reduced even by a fraction of one percent must necessarily be considered of great value.²

Organized safety and accident programs received their original impetus from the formation in 1913 of the National Council for Industrial Safety which was later renamed the National Safety Council. The purpose of this organization was an attempt to reduce the number of accidents by advocating greater mechanical safeguards.³

The decade following World War I saw the first scientific studies of accident proneness and accident causes being performed. Greenwood and Woods,⁴ Marbe,⁵

2 Ibid., p. 335.

3 Gilbert E. Teal, "Occupational Safety", in Douglas H. Fryer and Edwin R. Henry, Editors, Handbook of Applied Psychology, New York, Rinehart, 1950, p. 277.

4 M. Greenwood and Hilda M. Woods, "A Report of the Incidence of Industrial Accidents upon Individuals with Special Reference to Multiple Accidents", Industrial Fatigue Research Board, Report No. 4, 1919, 28 p.

5 K. Marbe, Praktische Psychologie der Unfälle und Betriebschaden, München, 1926, as quoted in Morris Viteles, Industrial Psychology, New York, Norton, 1932, p. 340-341.

Newbold,⁶ and Farmer and Chambers⁷ performed studies which support the hypothesis that some people have more accidents than could be attributed to chance. Later Farmer⁸ made a distinction between "accident proneness" and "accident liability", a distinction which will be used in the present study. Accident proneness will signify a personal situation which predisposes an individual to a relatively high accident rate, whereas accident liability will include all of the factors which determine the accident rate.

From these early studies, which established the accident proneness concept, research has taken place in at least three main fields which might be labelled the traffic or vehicular, the aircraft, and the industrial. In an attempt to find what factors contribute to the accident prone individual in these three fields of investigation, research has been done in what might be referred to as the sensory-motor-coordination area and the personal-habit-attitude areas. The former would include such things

⁶ E.M. Newbold, "A Contribution to the Study of the Human Factor in the Causation of Accidents", Industrial Fatigue Research Board, Report No. 34, 1926, iv-76 p.

⁷ Eric Farmer and E.C. Chambers, "A Study of Personal Qualities in Accident Proneness and Proficiency", Industrial Health Research Board, Report No. 55, 1929, iv-84 p.

⁸ Eric Farmer, "Accident Proneness and Accident Liability", Occupational Psychology, Vol. 14, No. 3, July, 1940, p. 121-131.

as reaction-time experiments, tapping, pursuit tests, etc.; the latter, personal factors of the individual such as age, education, marital status, and the like, or emotional factors, intelligence, aptitudes, etc.

After the initial impetus given to this movement during the 1920's, research and hypothesis projection was in evidence during the 1930's. During this period many investigators began to hypothesize that accident proneness, either in the traffic or industrial fields, could be attributed to various causes. Slocombe and Brakeman,⁹ Drake,¹⁰ and Farmer, Chambers and Kirk¹¹ were a few who felt that the sensory-motor area was most important. On the other hand the "emotional" hypothesis became very prominent during this period, being expounded by Hersey,¹² Menninger,¹³ and

9 C.S. Slocombe and E.E. Brakeman, "Psychological Tests and Accident Proneness", British Journal of Psychology, Vol. 21, Part I, July, 1930, p. 29-38.

10 Charles A. Drake, "Accident Proneness: A Hypothesis", Character and Personality, Vol. 8, No. 4, June, 1940, p. 335-341.

11 E. Farmer, E.G. Chambers and F.J. Kirk, "Tests for Accident Proneness", Industrial Health Research Board, Report No. 68, 1933, iv-44.

12 Rexford B. Hersey, "Emotional Factors in Accidents", Personnel Journal, Vol. 15, 1936, p. 59-65.

13 Karl A. Menninger, "Purposive Accidents as an Expression of Self-Destructive Tendencies", The International Journal of Psycho-Analysis, Vol. 16, No. 1, January, 1936, p. 6-17.

Lahy and Kornhold.¹⁴ Neither of these explanations seemed to give an adequate answer to the question set forth by the early experimenters in accident proneness.

The research which has been done in the past twenty years has been an attempt to identify further the factors which contribute to the accident-prone concept. No clear cut trend seemed to be present. Investigators reported findings which helped to substantiate both the sensory-motor and the personality-habit-attitude areas but nothing definite could be ascertained.

The picture which has been presented up to this point is one of ambiguity in results from various research studies. There is still a search for more definite causes of the accident proneness concept.

Miller¹⁵ administered the Rorschach Test to high and low-accident bus and street car operators. He concluded that the Rorschach could not adequately discriminate between the high and low-accident groups because the test

14 J.M. Lahy and S. Kornhold, Recherches Experimentales sur Les Causes Psychologiques des Accidents du Travail, Paris, Conservatoire National des Arts et Metiers, 1936, 73 p., as quoted in Herbert Moore, Psychology for Business and Industry, New York, McGraw-Hill, 1942, p. 361.

15 Carmen Miller, A Comparison of Personality Characteristics of High-Accident and Low-Accident Bus and Street Car Operators, Unpublished Doctoral Dissertation, Western Reserve University, 1952, v-115 p.

was measuring deeper or latent aspects of the personality. He later hypothesized that accident proneness might be due to more surface qualities.¹⁶

The personal aspects of the accident-prone individual have been expounded by many. Few definite conclusions have been reached. Since the industrial situation is one of an interpersonal relationship, could not accident-proneness in an industrial situation be due to some interpersonal difference? Some investigators have suggested this possibility. Transforming the results of Miller from the traffic to the industrial field, could these interpersonal factors be the "more surface" aspect to which Miller was referring?

The Interpersonal Diagnosis of Personality, which gives a rather new approach to the study of personality, was recently presented by Leary.¹⁷ One departure from the more conventional theories of personality is his insistence on a multilevel approach to the dynamic structure of personality. These levels range from the observable to the non-observable. One of these levels, that of Conscious

¹⁶ Carmen Miller, "A Comparison of High Accident and Low-Accident Bus and Street Car Operators", Journal of Projective Techniques, Vol. 19, No. 2, June, 1955, p. 150.

¹⁷ Timothy Leary, Interpersonal Diagnosis of Personality, New York, Ronald, 1957, xix-518 p.

Description (Level II), serves the present study in that it supplies a possible explanation for what Miller suggested as an area for further study. Level II deals with the individual's perceptions of himself and the world about him. Although this is a subjective judgment, the report on how the individual himself says he exists is objective.

One of the instruments used to evaluate this level is The Interpersonal Check List. It is a standardized instrument, adequately reliable and valid. It incorporates the use of 128 adjectives in which the testee checks those adjectives (all relating to interpersonal spheres of activity) which he feels are applicable to himself. The results are then scored on two dimensions of the Interpersonal system: Dominance-Submission (DOM) and Love-Hostility (LOV).¹⁸

2. The Hypothesis

Five hypotheses are postulated which are based upon the two dimensions of the interpersonal system and the components involved in each.

1. There is no significant difference between industrial accident and non-accident groups in self-perception on the "DOM" score of The Interpersonal Check List.

¹⁸ See Appendix 2 for a further discussion of the Interpersonal system.

2. There is no significant difference between industrial accident and non-accident groups in self-perception on the "LOV" score of The Interpersonal Check List.

3. There is no significant difference between industrial accident and non-accident groups in their self-perception of how others feel about them on the "DOM" score of The Interpersonal Check List.

4. There is no significant difference between industrial accident and non-accident groups in their self-perception of how others feel about them on the "LOV" score of The Interpersonal Check List.

5. There is no significant difference between industrial accident and non-accident groups in their self-perception or self-perception of how others feel about them on Dominance (D), Submission (S), Love (L), or Hostility (H) as measured by The Interpersonal Check List.

CHAPTER II

SURVEY OF LITERATURE

A survey of the literature of accidents and accident-proneness could be handled in many different ways. A chronological method provides the reader with a "time setting" with which to organize the findings of various researchers. Four decades will be considered in this survey. The four have been used because they seem to form a natural division for the material to be discussed.

1. The First Decade

Prior to the first decade, between 1913-1919, a few studies were done in an attempt to select safe motor-men for transit firms. One such study was done by Munsterburg.¹ He made an apparatus to test the attention of street car operators. The results showed that those men with more errors in attention and judgment in this "laboratory situation" had more accidents in the actual work situation. Studies such as these were not testing

¹ Hugo Munsterburg, Psychology and Industrial Efficiency, Boston, Houghton-Mifflin, 1913, as quoted in Morris Viteles, "Research in Selection of Motormen, Part I, Survey of the Literature", Journal of Personnel Research, Vol. 4, 1926, p. 100-115.

an accident proneness hypothesis but were mainly concerned with the selection of safe operators and will not be considered in this survey.

The decade of 1919-1929 saw the beginnings of scientific endeavor to understand the meaning of accidents. Greenwood and Woods² performed a study in which they were concerned with accident causation. They investigated the occurrence of multiple accidents in an industrial setting and were the first to examine statistically accident susceptibility in the differentiation of individuals. The subjects used were women employees in a munition factory during World War I. Various groups of women were used ranging in number from 19 to 750. The hypothesis being investigated was that industrial accidents followed a pure chance distribution. From their results they concluded that chance was not a significant factor and that ". . .varying individual susceptibility to 'accident' is an extremely important factor in determining the distribution."³ They discussed the term individual susceptibility and its possible ramifications. No significant difference was found between groups

2 M. Greenwood and Hilda M. Woods, "A Report of the Incidence of Industrial Accidents upon Individuals with Special Reference to Multiple Accidents", Industrial Fatigue Research Board, Report No. 4, 1919, 28 p.

3 Ibid., p. 9.

for age or civil state.

Newbold⁴ carried on in the tradition of Greenwood and Woods by extending their findings into a larger number of industries. She was especially interested in the personal susceptibility hypothesis. Working with 22 factories and 16,000 records, her aim was to examine accident incidences in regard to various personal factors such as age, sex, experience, etc. Her findings collaborated those of Greenwood and Woods.

The average number of accidents in a department is influenced by a comparatively small number of multiple accident people, whose accidents seem to be due either to a special tendency in themselves or to special circumstances in their work or their way of doing it.⁵

She found that age was an important factor whereas Greenwood and Woods minimized this aspect. She stated that further studies should take age into consideration. It was her conviction that more detailed scientific studies should be done.

The indications of individual differences seem to be definite enough to justify the further more detailed investigations on the lines of individual study and experimental psychology. . .⁶

⁴ E.M. Newbold, "A Contribution to the Study of the Human Factor in the Causation of Accidents," Industrial Fatigue Research Board, Report No. 34, 1926, iv-76 p.

⁵ Ibid., p. 14.

⁶ Ibid., p. 61.

Marbe⁷ first called attention to the possible existence of an accident habit. It was his conviction that the probability for having an accident was greater if the individual's history showed a number of accidents. Later he presented his findings in a journal article.⁸ He utilized the records of 3,000 German army officers and called attention to the fact that the number of accidents in one period would help to indicate what would probably be suffered in a future period.

Farmer and Chambers⁹ administered eight psychological tests to various workers to see if any trends could be ascertained between a high-accident group and a low-accident group. They gave these tests to 611 boy apprentices and 40 women factory workers. The eight tests were divided into three groups (1) aestheto-kinetic, (2) relation to temperament, (3) reasoning or intelligence. They found that the distribution of accidents was associated in

⁷ K. Marbe, Praktische Psychologie der Unfälle und Betriebschaden, München, 1926, as quoted in Morris Viteles, Industrial Psychology, New York, Norton, 1932, p. 340-341.

⁸ Karl Marbe, "The Psychology of Accidents", The Human Factor, Vol. 9, No. 3, March, 1935, p. 100-104.

⁹ Eric Farmer and E.G. Chambers, "A Psychological Study of Individual Differences in Accident Rates", Industrial Fatigue Research Board, Report No. 38, 1926, iv-46 D.

some way with poor aestheto-kinetic coordination and with temperamental instability. There was no relation between accidents and the reasoning process. The authors were optimistic in that they felt that some positive gains were made by their study and suggested further research. In this endeavor, Farmer and Chambers¹⁰ performed a study in an attempt to refine the data from the previous research. They used thirteen aestheto-kinetic tests which were given to ten different groups of Royal Air Force apprentices and Dockyardmen. Their findings, based upon intercorrelations of tests and accident rates, noted that there was no relationship between simple aestheto-kinetic tests and the Dockyard apprentices.

The small correlations between the tests and the objective criteria seem to indicate that industrial proficiency and accident proneness are dependent on many dominant factors and not upon one predominant factor.¹¹

Wechsler¹² made a study of 250 cab drivers in Pittsburg. These men were given a test for carefulness, a reaction time test, and a mental alertness test which

¹⁰ Eric Farmer and E.G. Chambers, "A Study of Personal Qualities in Accident Proneness and Proficiency", Industrial Health Research Board, Report No. 55, 1929, iv-84, p.

¹¹ Ibid., p. 60.

¹² David Wechsler, "Tests for Taxicab Drivers", Journal of Personnel Research, Vol. 5, No. 1, May, 1926, p. 24-30.

was made up of digit symbol, arithmetical reasoning and picture completion items. It was shown that those men with a slow or fast reaction time tend to have more accidents. High or low on the mental alertness test was also associated with a high accident rate. He noted that the greatest single causative factor in the high accident group was that of carelessness.

Slocombe and Bingham¹³ were interested in the individual aspects of the accident prone individual. They investigated the personal records of motor men and bus operators of a transit system. Such factors as delinquency, abnormal blood pressure, and younger men with limited experience were indicative of high accident rates.

In summary, this was the beginning period. It set the stage for further studies by presenting many problems and showing that some people have more accidents than they should on a normal chance expectancy basis. The investigators seemed to ask a question which they wanted others to answer. What factors might be common to those people who are accident prone?

¹³ C.S. Slocombe and W.V. Bingham, Personnel Journal, Vol. 6, No. 4, December, 1927, p. 251-257.

2. The Second Decade

The movement to substantiate the accident prone-ness hypothesis of the 1920's was carried on in the 1930's. However, in this decade the applicability of the concept became important to many investigators.

Bingham¹⁴ was interested in the traffic offender who was considered to be accident prone. He felt that the accident prone driver should be treated on an individual basis and should not be considered as part of an "accident group". He stated that there was a paucity of research in this area and little is known of accident-proneness.

Slocombe and Brakeman¹⁵ performed a study on men employed at the Boston Elevated Railway. These men were given five tests of sensory-motor-coordination such as tapping, reaction time speed tests, etc. The experimenters found no significant relationship between the test results and the accident records of the men.

Forbes¹⁶ minimized the traffic problem concerning the accident prone driver. He stated that the "normal"

14 Walter V. Bingham, "The Accident-prone Driver", The Human Factor, Vol. 6, No. 5, May, 1932, p. 158-169.

15 C.S. Slocombe and E.E. Brakeman, "Psychological Tests and Accident Proneness", British Journal of Psychology, Vol. 21, Part 1, July, 1930, p. 29-36.

16 T.W. Forbes, "The Normal Automobile Driver as a Traffic Problem", The Journal of General Psychology, Vol. 20, 1939, p. 471-474.

driver constituted 98.7% of all the accidents he investigated that the attack upon any traffic accident problem should begin with this "normal driver".

In a review by Farmer¹⁷, he pointed out that sensory-motor tests have been most efficacious in the area of accident proneness research. It was his conviction that nervous stability was also important and that "the next step forward in the diagnosis of accident proneness will probably come from a direct study of affective processes".¹⁸

Farmer, Chambers, and Kirk¹⁹ carried further the work of Farmer and Chambers²⁰ in an attempt to gain more precision in their studies. Tests of intelligence and sensory-motor skills were applied to groups of boys entering certain skilled trades and their performance was correlated with their subsequent accident rates over a period of years.

17 Eric Farmer, "Accident Proneness and Accident Liability", Occupational Psychology, Vol. 14, No. 3, July, 1940, p. 121-131.

18 Ibid., p. 128.

19 E. Farmer, E.G. Chambers and F.J. Kirk, "Tests for Accident Proneness", Industrial Health Research Board, Report No. 68, 1933, iv-44 p.

20 Eric Farmer and E.G. Chambers, "Study of Personal Qualities in Accident Proneness and Proficiency", Industrial Health Research Board, Report No. 55, 1929, iv-84 p.

The groups consisted of 414 Dockworkers and 163 naval artificers. They found that poor aestheto-kinetic coordination was associated with an undue number of accidents. The authors pointed out, however, that there should not be generalisation to all occupations. They were optimistic in that they felt that they had isolated a small factor in accident proneness.

The degree of association between aesthetokinetic coordination and accident proneness is sufficiently small to make it clear that deficiency in this function accounts for only a small part of the accidents sustained but there is some advantage in having isolated one of the factors involved in accident proneness and measured its importance. Ultimately it may be possible to isolate other factors so that our knowledge as to the nature of accident proneness may not finally be so scanty as it is at the present.²¹

They also noted that intelligence was not related to accidents and not an integral part of the accident proneness concept.

Banister²² made an analysis of all the accidents occurring in a village settlement in England. He took each accident separately and endeavored to find out the cause of the accident by the interview method. He categorized his answers and found that various factors turned

²¹ Ibid., p. 30.

²² H. Banister, "Another Approach to the Problem of Accident Causation", British Journal of Psychology, Vol. 28, Part 3, January, 1938, p. 304-314.

up more prominently than others such as stupidity, foolhardiness, improperly adjusted attention, distraction, hurry, anger and annoyance, worry, and wish fulfillment. He concluded,

It is to be noted that the ordinary tests for accident proneness scarcely touch the fringe of these psychologically determined causes of accidents. . . That is probably the reason why correlations between the test results and accidents are so low.²³

Hersey²⁴ discussed the accident prone problem.

He mentioned various emotional considerations which he felt could influence a person to have an accident such as worries, home problems, etc. He then stated,

Closely connected with these more general emotional factors which apply to most workers come the personality factors which are a part of a man's emotional make up and which cause the largest percentage of accidents to those workers whom we may call 'repeaters'.²⁵

It was his conviction that accidents resulted from extreme emotion rather than more integrated type of organization. Likewise, Lahy and Kornhold²⁶ mentioned that emotional

23 Ibid., p. 314.

24 Rexford B. Hersey, "Emotional Factors in Accidents", Personnel Journal, Vol. 15, No. 2, 1936, p. 59-65.

25 Ibid., p. 65.

26 J.M. Lahy and S. Kornhold, Recherches Experimentales sur les Causes Psychologiques des Accidents du Travail, Paris, Conservatoire National des Arts et Metiers, 1936, 73 p. as quoted in Herbert Moore, Psychology for Business and Industry, New York, McGraw-Hill, 1942, p. 361.

instability might have some effect upon the accident prone individual. Their approach was somewhat different in that they felt that the emotional balance directly effected the adequate sensory-motor responses.

Drake²⁷ performed an interesting study involving the use of five sensory motor tests on 40 female operators from a metal working department of a large industry. He set up an Accident Index which was the number of accidents times the severity divided by the length of service in months. He hypothesized that those people whose muscular reaction was above the level of perception would have a higher Accident Index than those whose muscular reaction was below their perceptual level. "In other words, the person who reacts quicker than he can perceive is more likely to have accidents than is the person who can perceive quicker than he can react."²⁸ A right-right turning test minus a spiral test showed a significant relationship with the Accident Index figures. All others were not significant.

The purposive accident was the theme of a paper presented by Menninger.²⁹ He wrote that many accidents are

27 Charles A. Drake, "Accident Proneness: A Hypothesis", Character and Personality, Vol. 8, No. 4, 1940, p. 335-341.

28 Ibid., p. 339-340.

29 Karl A. Menninger, "Purposive Accidents as an Expression of Self-Destructive Tendencies", The International Journal of Psycho-Analysis, Vol. 16, No. 1, 1936, p. 6-16.

purposively caused by a self destructive motive. In this same psychiatric setting, Selling³⁰ investigated 500 cases of automobile accidents and found that 36% had I.Q.'s of less than seventy and that eleven cases were psychotic. It was his suggestion that automobile accidents might be lowered through better screening of these persons before they receive their automobile driving license.

Dunbar, et.al.,³¹ although concerned with the physical aspects of accidents, showed interest in the psychic phenomenon. Of especial interest to them was a component of impulsiveness which they felt was common to many of the accident group they interviewed in a general hospital setting.

On the basis of our material then, it appeared that at least one factor in the personality which predisposes to accident is this tendency to act out, or the inability beginning in early childhood to inhibit impulsive acts in relation to strong emotion.³²

In like manner, they continued,

30 Lowell S. Selling, "The Psychiatric Findings in the Cases of 500 Traffic Offenders and Accident-Prone Drivers", American Journal of Psychiatry, Vol. 97, No. 1, July, 1940, p. 68-79.

31 H. Flanders Dunbar, Theodore P. Wolfe, Edward S. Tauber and A. Louise Brush, "The Psychic Component of the Disease Process (Including Convalescent), in Cardiac, Diabetic, and Fracture Patients", American Journal of Psychiatry, Vol. 95, No. 6, May, 1939, p. 1319-1342.

32 Ibid., p. 1334.

. . .patients who developed 'accident proneness' had the tendency to 'do something' instead of just keeping their anger bottled up and boiling inside.³³

It was their feeling that this impulsiveness, as an emotional factor in the personality structure of the individual, contributed heavily to the accident prone person.

In summary, this decade contributed a few studies to attempt to answer some of the questions of the previous decade. However, it was more a period of "hypothesis", some of which were tested. There were many suggested possible reasons for the accident prone concept. It was a transitional period between formulation of the hypothesis and active research.

3. The Third Decade

During this decade a large number of research studies were performed; many hypotheses were tested and discussions presented.

In the traffic field, Tillman and Hobbs³⁴ studied forty drivers in London, Ontario. They had twenty drivers each in low and high accident groups. They were interested in the personal histories of these men. Certain personality factors were noted as being important. "The personality

33 Ibid., p. 1335.

34 W.A. Tillman and G.E. Hobbs, "The Accident-Prone Automobile Driver", American Journal of Psychiatry, Vol. 106, No. 5, Nov. 1949, p. 321-331.

with a high record is characterized by aggressiveness and inability to tolerate authority either at the parental or community level."³⁵ They also reported that the childhood of the high accident group was marked with instability and disrespect for authority.

Working in the same locale as Tillman and Hobbs, Wong and Hobbs³⁶ did a study in an industrial setting. They studied accident records in a large brewery. Those men with high accident records had five factors which were considerably different from the low accident group: (1) came from broken homes, (2) conflict with authority, (3) truancy at school, (4) irregular work history, (5) marital discord.

Soddy³⁷ discussed the traffic accident problem in general terms. He proposed more accurate prediction in the dangerous forces which make up the accident prone person. However, he felt that "The tests of temperament and emotional stability used up to now have mostly been a static, question-and-answer type and have not given decisive results".³⁸ He

35 Ibid., p. 327.

36 W.A. Wong and G.E. Hobbs, "Personal Factors in Industrial Accidents", Industrial Medicine, Vol. 18, No. 7, July, 1949, p. 291-294.

37 Kenneth Soddy, "Psychological Aspects of Accidents and Accident Prevention", British Medical Journal, Vol. 2, Oct. 18, 1947, p. 623-627.

38 Ibid., p. 624.

advocated better testing material to uncover factors common to the accident prone person.

Kraft and Forbes,³⁹ in the traffic area, varied considerably from other investigators. They studied 482 street car operators over a four year period. From the records available they worked out an Accident Index for these men. They found that traffic accidents for street car operators were governed by the usual laws of chance. They did find a few personal and medical items which they claimed could not be attributed to chance such as high blood pressure. No statistical analysis was given in the report nor any comment as to how such a conclusion was reached.

Johnson⁴⁰ questioned the validity of many tests used to determine the accident prone driver. He felt that a good physical examination and an analysis of the biographical data were as efficient as tests in uncovering the accident prone person.

³⁹ Merwyn A. Kraft and Theodore W. Forbes, "Evaluating the Influences of Personal Characteristics on the Traffic Accident Experience of Transit Operators", Proceedings of the Highway Research Board, Vol. 24, 1944, p. 278-291.

⁴⁰ H.M. Johnson, "The Detection and Treatment of Accident-Prone Drivers", Psychological Bulletin, Vol. 43, No. 6, November, 1946, p. 487-532.

Ghiselli and Brown⁴¹ studied 67 taxicab drivers in California using high and low accident groups. They administered sensory motor speed tests and an interest inventory. They concluded that the accident group could be predicted by paper and pencil tests. However, the study did not present any tests of significance.

Brown and Ghiselli⁴² did a study on street car motormen. They were interested in accident proneness as a general trait. Their finding was: ". . .it cannot be considered that accident proneness as a general trait of the individual has been substantiated."⁴³

Aircraft accidents are of a unique kind. However, many studies have been done in this area. Gorman and Kunkle⁴⁴ studied 835 pilots who had some type of accident.

⁴¹ Edwin E. Ghiselli and Clarence W. Brown, "The Prediction of Accidents of Taxicab Drivers", Journal of Applied Psychology, Vol. 33, No. 6, December, 1949, p. 540-546.

⁴² Clarence Brown and Edwin Ghiselli, "Accident Proneness Among Street Car Motormen and Motor Coach Operators", Journal of Applied Psychology, Vol. 32, No. 1, February, 1948, p. 20-23.

⁴³ Ibid., p. 23.

⁴⁴ William D. Gorman and E. Charles Kunkle, "Study of the Relation between Minnesota Multiphasic Personality Inventory Scores and 'Pilot Error' in Aircraft Accidents", Journal of Aviation Medicine, Vol. 18, No. 1, February, 1947, p. 31-38.

With the use of the Minnesota Multiphasic Personality Inventory (MMPI) they noted that no significant correlation could be found between the MMPI scores and the involvement in an aircraft accident. "These comparisons indicate that the MMPI is of little use in detecting among rated pilots those individuals who are prone to have 'pilot error'."⁴⁵

Henneman and Mitchell⁴⁶ also presented a pessimistic picture in relation to aircraft studies. They felt that the studies done did not adequately establish any traits in the accident prone person.

Suggested tests for the prediction of accident proneness present a confused picture. Validities are not particularly high nor are the measured traits clearly specified in most cases.⁴⁷

Kunkle,⁴⁸ working on 'Pilot Error', felt that the past history, not the present, was more important in uncovering the accident prone.

In terms of intelligence, reaction time and judgment of speed and distance, the accident prone individual may appear entirely adequate.

⁴⁵ Ibid., p. 36.

⁴⁶ Richard H. Henneman and Philip H. Mitchell, "A Critical Examination of the Concept of 'Accident Proneness' as Applied to Aircraft Pilots", American Psychologist, Vol. 2, No. 8, August, 1947, p. 302.

⁴⁷ Ibid., p. 302.

⁴⁸ Charles E. Kunkle, "The Psychological Background of 'Pilot Error' in Aircraft Accidents", Journal of Aviation Medicine, Vol. 17, No. 6, December, 1946, p. 533-567.

His tendencies to tension under stress, latent hostility, negligence or disobedience of regulation may all be readily suppressed and controlled under the special conditions of the test situation.⁴⁹

In an industrial setting, Adler⁵⁰ utilized 100 accident repeaters and 20 non-accident persons in a study in which she made a complete history of these 120 people. She also utilized tests of manual ability, concentration and reaction time. She found no significant difference between the control group and the experimental group on either the psychometric or constitutional examination. She did state that there was a tendency for the number of accidents to diminish after some change took place in the lives of the worker. It was her contention that,

We can see from all this that a harmonious relation of the worker to his type of work is a fundamental prerequisite in order to avoid accidents to himself and damage to his environment.⁵¹

Utilizing the company records of a large steel producing industry, Whitlock and Crannel⁵² performed a

49 Ibid., p. 537.

50 Alexandra Adler, "The Psychology of Repeated Accidents in Industry", American Journal of Psychiatry, Vol. 98, No. 1, July, 1941, p. 99-101.

51 Ibid., p. 101.

52 John B. Whitlock and Clark W. Crannel, "An Analysis of Certain Factors in Serious Accidents in a Large Steel Plant", Journal of Applied Psychology, Vol. 33, No. 5, October, 1949, p. 494-498.

study on 100 accident men and 200 non-accident men (matched for department in pairs). They investigated various test and non-test material. The non-test material consisted of such factors as age, weight, height, marital status, etc. They found that on the non-test data there were no significant differences between the accident and non-accident groups. There were no significant differences on the Otis and Bennet Mechanical Test scores. However, when comparing the groups on the basis of the Bernreuter Personality Test, three significant differences were noted. It was found that the accident group was less neurotic, less introverted and more self confident.

Jurgensen⁵³ discussed the accident problem in industry and stressed the need for more research. He felt that,

. . . where safety work is ineffective, accident prone individuals become more susceptible to accidents because of emotional upsets, particularly fear, and consequently a biased distribution is found.⁵⁴

He was partial to the theory that some people bring to an industrial situation the predisposition to have accidents. He advocated less theoretical analysis and more practical studies.

⁵³ Clifford E. Jurgensen, "How Much do we know about Accident Causes", National Safety News, Vol. 52, No. 5, November, 1945, p. 26. . . 84.

⁵⁴ Ibid., p. 82.

Kerr⁵⁵ advocated the study of the total psychological climate in which the employee works as an approach to the problem. It was his conviction that the problem faced is one involving group psychological phenomenon as well as individual.

Physical conditions of the industrial worker was the purpose of a study by Tiffin, et.al.⁵⁶ It was their conviction that low visual performance and accidents operated in a direct relationship.

Hirschberg, et.al.,⁵⁷ made a study of 10 accident and 10 non-accident coal miners and stated that conflict with authority was a big factor in the accident group.

Holmes⁵⁸ made a survey of 8,138 records at an arsenal in California. He set up an Accident Index comparable to that of Drake.⁵⁹ He found that a very low

55 Willard Kerr, "Accident Proneness of Factory Departments", Journal of Applied Psychology, Vol. 34, No. 3, June, 1950, p. 167-170.

56 Joseph Tiffin, B.T. Parker and R.W. Habersat, "Visual Performance and Accident Frequency", Journal of Applied Psychology, Vol. 33, No. 5, October, 1949, p. 499-502.

57 J. Cotter Hirschberg, Lawrence Rogers, et.al., "A Study of Miners in Relation to the Accident Problem; I, Psychiatric Evaluation", American Journal of Orthopsychiatry, Vol. 20, No. 3, July, 1950, p. 552-558.

58 Jack Holmes, "Industrial Accident Proneness", Personnel Psychology, Vol. 2, No. 3, Autumn, 1949, p. 369-375.

59 Op. cit.

mechanical aptitude score correlated highly with the Accident Index.

Harris⁶⁰ performed a study on twenty-five industrial accident repeaters matched against twenty-five accident free workers. He used biographical information, Bernreuter Personality items, Multiple Choice Rorschach, and the Rosenzweig Picture-Frustration Study. He found no significant differences in the use of the Multiple Choice Rorschach and the Rosenzweig Picture-Frustration Study. Three items of the Bernreuter were significantly different between the groups. The accident group (1) considered themselves rather nervous, (2) preferred a dance to a play, (3) were inclined to be quick and sure in their actions. In the biographical part of the study, he found three items which were significantly greater in the accident group: (1) got hurt more often, (2) left home earlier, (3) considered themselves better than average drivers. Harris noted that there were limitations to the study, viz. the reliability of the data and the projectives used. His conclusion was ". . .no personality differences were shown to exist between the two groups."⁶¹

⁶⁰ Frank J. Harris, "Can Personality Tests Identify Accident Prone Employees", Personnel Psychology, Vol. 3, No. 4, Winter, 1950, p. 455-459.

⁶¹ Ibid., p. 459.

Bonnardel⁶² had an interesting finding as he reported that intelligence was a factor in the accident prone group which he investigated. Utilizing 153 accident prone workmen, the intellectual factor was more important than chance would allow. It was his contention that intelligence as a pre-employment criteria should be used to separate the accident prone person from his non-accident peer.

Burch⁶³ made a review of the literature in the area of accident proneness. He felt that emotional immaturity and emotional instability could be factors in the accident prone person. In this respect he felt that the psychologist in industry had much to give to the safety movement. Cardell⁶⁴ felt that emotional problems, although important, posed a problem to the experimenter. He pointed out that sensory-motor areas were much more applicable to the study of the accident prone person with particular use of reaction time experiments.

62 P. Bonnardel, "La Psychometrie et La Prevention des Accidents du « Intelligence Concrete »", Le Travail Humain, Vol. 12, No. 1, 1949, p. 1-15.

63 J. Norval Burch, "Probing the Accident Prone", National Safety News, Vol. 50, No. 4, October, 1944, p. 86. + .120.

64 Alfred J. Cardell, "Psychological Factors in Accident Prevention", Personnel Journal, Vol. 25, No. 8, February, 1948, p. 288.

Dunbar^{65,66} suggested a questionnaire on the personal history of the accident prone person. She felt that the life history of the person was important, e.g. such factors as uncompleted education at any level, family history of a broken home, being common to the accident prone group. She again asserted her hypothesis that impulsive behavior was important.

In a study from Hungary, Csillog and Hedri⁶⁷ felt that the accidents which they investigated in a hospital situation had a definite aggressive overtone and that this aspect was very important to the accident prone individual. However, they stated, "The accidents cannot be traced to a single cause, but one of manifold determination."⁶⁸

Discussing possible industrial accident cases, but more concerned with pointing out the emotional

65 Flanders Dunbar, "Medical Aspects of Accidents and Mistakes in the Industrial Army and in the Armed Forces", War Medicine, Vol. 4, No. 2, 1943, p. 161-175.

66 _____, "Susceptibility to Accidents", The Medical Clinics of North America, New York Number, May, 1944, p. 653-662.

67 I. Csillog and E. Hedri, "Personal Factors of Accident Proneness", Industrial Medicine, Vol. 18, No. 1, January, 1949, p. 29-30.

68 Ibid., p. 30.

aspects of the problem, Moorad⁶⁹ was convinced that sub-conscious behavior was important in accident causes. He felt that pathological groups contributed to the high accident rate.

It is estimated that one in four, or exactly 28% of the employees have sufficient personality and emotional disorders to be potentially detrimental to efficient and safe work.⁷⁰

Likewise, Fetterman⁷¹ was interested in accidents in an industrial setting. Dealing with various pathological conditions which employees bring to the work situation, he noted that ". . . man made accidents are the result of emotional and mental problems."⁷² The accident acts as an escape for the individual or, in some way, as a revenge against authority.

In a study on accidents in children, Fuller⁷³ used 30 girls and 31 boys in a nursing school. She was

69 Philip J. Moorad, "Human Factors in Accident Liability", Industrial Medicine, Vol. 16, No. 10, October, 1947, p. 494-498.

70 Ibid., p. 495.

71 Joseph L. Fetterman, "Neuropsychiatric Aspects of Industrial Accidents", Industrial Medicine, Vol. 15, No. 2, February, 1946, p. 96-100.

72 Ibid., p. 99.

73 Elizabeth Mechem Fuller, "Injury Prone Children", American Journal of Orthopsychiatry, Vol. 18, No. 4, October, 1948, p. 708-723.

interested in various facets of their personal history such as age, sex, aloneness, and playing together. The Haggerty-Olsen-Wickman Behavior Rating Schedules were used as a criterion for behavior. She found that the children who got hurt had more problems but found no specific personality traits usually considered undesirable.

In summary, this decade is one in which many studies and possible solutions to the problem of accident proneness were given. There seemed to be a trend to accept some sensory-motor tests as possible indications of the accident prone person. But these are slight. The possibility of an emotional component is suggested more strongly than in the past decades.

4. The Fourth Decade

These few years are characterized by doubt and despair, mixed with some hope which helps to further research. Some of the findings are optimistic, others neutral and still others very pessimistic.

A study was presented by Adelson⁷⁴ in which he casts doubt on the entire accident proneness movement.

⁷⁴ A.M. Adelson, "Accident Proneness: A Criticism of the Concept Based upon an Analysis of Shunters' Accidents", Journal of the Royal Statistical Society, Vol. 115, Part III, 1952, p. 354-400.

Working with 1,452 railroad shunters in England, he found no significant difference between industrial and home accidents, between minor and major injuries, nor did he find that the same men tended to repeat the same kind of accident.

These facts lead us to propose that accident proneness is not a general factor but that it operates in a specific type of event in a specific environment, and that it may alter in an individual in accordance with his chances of activity.⁷⁵

Yet he was cautious in his conclusions and went on to state that traits of personality and character might have had some influence in the total situation.

Jacobs⁷⁶ was pessimistic about research in the area of selection of accident prone people in pre-employment procedures. Using the data of Kraft and Forbes⁷⁷ he noted that to gain a 25% reduction in accidents almost half of the transit operators would have had to be discharged. It was his opinion that this was not very profitable.

⁷⁵ Ibid., p. 394.

⁷⁶ Herbert H. Jacobs, "Operational Aspects of the Accident Proneness Concept", Transactions of the New York Academy of Sciences, Series II, Vol. 18, No. 3, January, 1956, p. 261-265.

⁷⁷ Op. cit.

Arbous,⁷⁸ in a review of the literature, discussed the concept of accident proneness. He stressed the point that accidents were not really accidents; rather the cause seemed to be a personal factor. It was his conviction that no definite statements in regard to this area of investigation could be made.

In a study of 178 taxi drivers, Mintz⁷⁹ stated that he was not in favor of increased accident susceptibility with accidents. It was his opinion that accident proneness varied from person to person and was reasonably constant for each person. However, he did say that, "Temporary increase in accident proneness may well be due to emotional stress".⁸⁰

A pessimistic note was also sounded in the aircraft area of investigation. Webb⁸¹ made a perusal of accident studies in this area and felt that little,

⁷⁸ A.G. Arbous, "Accident Statistics and the Concept of Accident Proneness, Part I: A Critical Evaluation", Biometrics, Vol. 7, 1951, p. 340-390.

⁷⁹ Alexander Mintz, "Time Intervals between Accidents", Journal of Applied Psychology, Vol. 38, No. 6, 1954, p. 401-406.

⁸⁰ Ibid., p. 405-406.

⁸¹ Wilse B. Webb, "The Prediction of Aircraft Accidents from Pilot Centered Measures", Journal of Aviation Medicine, Vol. 27, No. 2, April, 1956, p. 141-147.

if anything, had been accomplished. He felt that some method of prediction of the accident prone person should be found; that the prediction would have to be based on measures other than the ones so far explained. "However, the areas of individual differences which can be described as transitory or changeable have not been thoroughly evaluated."⁸² He advocated study in the areas of moods, inattention, temporary physiological states and levels of training.

Working in the area of sensory-motor-coordination in the traffic field, Cation, Mount and Brenner⁸³ were interested in the reaction time of the people involved in automobile accidents. It was their hypothesis that these people with variable reaction times would have more accidents than those whose reaction times were more constant. This hypothesis was rejected.

Two essays on the accident prone concept in the traffic accident field, in which he discussed future experimentation to clarify the present situation, were

⁸² Ibid., p. 146.

⁸³ W.L. Cation, G.E. Mount and R. Brenner, "Variability of Reaction Time and Susceptibility to Automobile Accidents", Journal of Applied Psychology, Vol. 35, No. 2, April, 1951, p. 101-107.

presented by Roche.^{84,85} He mentioned that the behavior of the accident prone individual was so changeable that a psychologist could contribute much to this research.

Parkers,⁸⁶ working with 104 truck drivers, made a dichotomy of accidents as to whether they were preventable or non-preventable. He noted that preventable accidents were more related to psychological test data than accidents of a non-preventable type.

Suhr⁸⁷ used the Cattell 16 P.F. Test with traffic accident violators. He had groups of 30 high and low accident men. He found no significant differences at or below the .05 level of confidence between the groups on any of the factors. However, Factor G (Positive Character-Immature Dependent Character) fell just short of this minimum level requirement.

84 M. Roche, "Le Role du Psychologue Dans la Prevention des Accidents de la Circulation", Le Travail Humain, Vol. 17, No. 1, 1954, p. 97-104.

85 _____, "Remarques sur les Aspects Psychophysiologique des Accident de la Circulation", Revue de Psychologie Appliquee, Vol. 6, No. 1, 1956, p. 29-34.

86 James Parkers, "Psychological and Personal History Data Related to Accident Records of Commercial Truck Drivers", Journal of Applied Psychology, Vol. 37, No. 4, 1953, p. 317-320.

87 Virtus W. Suhr, "The Cattell 16 P.F. Test as a Prognosticator of Accident Susceptibility", Proceedings of the Iowa Academy of Science, Vol. 60, 1953, p. 558-561.

In an attempt to discover if emotional immaturity was correlated with a high traffic accident rate, Gates⁸⁸ made a scale of emotional maturity from statements of authorities in the field of psychiatry. This scale was composed of forty items which were given to 993 subjects. The groups were those of state parolees, university upper-classmen, indigent men, people in jail and church members. He set up a traffic accident rate for the distribution of the population tested. It was his assumption that the greater number of immaturity items would be picked by those people who had a high percentage of accidents. He found that subjects having below average scores on the Scale of Emotional Maturity (immaturity) had a significantly greater percentage of accidents. However, the criterion involved is questionable and the results were not accurately given.

Miller⁸⁹ performed a study on three groups of bus and street car operators in Cleveland and Dallas. He

⁸⁸ William Baylor Gates, An Investigation to Determine the Relationship between Emotional Immaturity and Accident Proneness, Unpublished Doctoral Dissertation, University of Houston, May, 1954.

⁸⁹ Carmen Miller, A Comparison of Personality Characteristics of High-Accident and Low-Accident Bus and Street Car Operators, Unpublished Doctoral Dissertation, Western Reserve University, 1952, p. v-115.

divided the groups into high and low accident groups. The Rorschach was given to all involved. An analysis of the data was made without a definite hypothesis being formulated. His analysis was concerned with Rorschach factors and patterns, and personality configurations. His final conclusion read,

In effect, the results showed no significant differences between the high accident and low accident operators on any of the personal data, factors and patterns, or personality configurations which were considered.⁹⁰

In a later work,⁹¹ in which he utilized these same results, he carried his conclusions further by suggesting a possible reason for his negative findings.

It may be that accident-proneness is related to more 'surface' or manifest qualities of the personality rather than the deeper or latent trends, which one is inclined to emphasize in Rorschach interpretation.⁹²

Chambers⁹³ did a review of some of the work done by the Industrial Fatigue Research Board during the 1920's.

90 Ibid., p. 79.

91 Carmen Miller, "A Comparison of High-Accident and Low-Accident Bus and Street Car Operators", Journal of Projective Techniques, Vol. 19, No. 2, June, 1955, p. 146-151.

92 Ibid., p. 150.

93 E.C. Chambers, "Psychological Tests for Accident Proneness and Industrial Proficiency", Medical Research Council Memorandum, No. 31, 1955, 111-30 p.

It was his intention to summarize some of these reports and to organize the findings. He concluded that the accident proneness concept was a very complex one and that little had been found from simple functions. He was quite positive that tests of sensory-motor coordination seemed to have contributed greatly to an explanation and prediction of accident proneness. "Of all the tests used including those of intelligence only the aestheto-kinetic tests showed a significant or consistent relationship to accidents."⁹⁴

Gemelli⁹⁵ proposed a different approach. He felt that the best way to get at a possible explanation of the accident proneness concept was by the clinical method. That is, he would like to have the accident situation reconstructed and an analysis made of all the factors which contributed to this accident. It was his belief that the total life of the person was important in any accident. Even though Gemelli felt that many aspects of the individual were important, he pointed out that research in the field should be done to recognize certain psychological

⁹⁴ Ibid., p. 24.

⁹⁵ P. Agostino Gemelli, "Le Facteur Humain des Accidents du Travail dans L'Industrie", Bulletin of the World Health Organization, Vol. 13, 1955, p. 649-660.

aspects of the safety of the worker. ". . .they must have recourse to clinical psychology which makes it possible to detect factors liable to threaten the safety of workers."⁹⁶

McLean⁹⁷ also advocated the clinical approach with the idea that psychotherapy might be of some help especially after the first accident. He suggested that the interpersonal relations of the employees were very important in this respect. Himler⁹⁸ also stressed the importance of human relations in the accident prone person. He asserted the importance of personal reactions,

. . .it is generally agreed by safety engineers that upwards of 80% of accidents are due to such personal reactions as carelessness, apathy, inattention, fatigue, disinterest, fear, worry, anxiety, and nervous tension,⁹⁹

He felt that improvement in human relations in industry would contribute to a lower accident rate.

96 Ibid., p. 658.

97 Alan A. McLean, "Accident Proneness--A Clinical Approach to Injury Liability", Industrial Medicine and Surgery, Vol. 24, No. 2, February, 1955, p. 122-126.

98 Leonard Himler, "Human Relations and Accident Prevention", Industrial Medicine and Surgery, Vol. 20, No. 3, March, 1951, p. 121-123.

99 Ibid., p. 121.

Brewster,¹⁰⁰ discussing the emotional aspect of the accident, thought that a character pattern was the basic cause of accidents. He stated, ". . .the high accident individual has a distinctive character pattern which is a causative factor in the accident."¹⁰¹ Since this was a discussion of the field, no experimental study was performed.

LeShan¹⁰² working with 54 accident prone people in industry and the traffic area, pointed out that aggression toward authority and masochism were the driving forces behind the accident prone individual. In another study¹⁰³ of safe people (low accidents) he stated,

Thus, there appears to be two dynamic reasons behind the low accident rate (1) anxiety over castration is put to use to protect the person from environmental danger (2) the same relationship with others, in a way not clearly understood, seems to prevent the acting out of self destructive impulses.¹⁰⁴

100 Henry H. Brewster, "Emotional Factors of Accident Proneness", Pastoral Psychology, Vol. 2, No. 2, February, 1952, p. 20-23.

101 Ibid., p. 23.

102 Lawrence L. LeShan, "Dynamics in Accident-Prone Behavior", Psychiatry, Vol. 15, No. 1, February, 1952, p. 73-80.

103 _____, "The Safety Prone", Psychiatry, Vol. 15, No. 4, November, 1952, p. 465-468.

104 Ibid., p. 468.

Jenkins¹⁰⁵ was interested in the personality characteristics of the accident prone person.

So far, investigators have been fairly successful in determining and measuring relationships between accident-proneness and the sensory, motor and mental abilities. On the other hand, attempts to identify and measure the personality factors or behavior tendencies closely associated with industrial accidents have hitherto been relatively unsuccessful. This failure may be due largely to the fact that, to date, psychological tests have failed to measure many important facets of personality.¹⁰⁶

He did a study at twenty-three different companies using injury repeaters and non-repeaters. No statistical analysis was done. However, he indicated certain trends for the injury group such as less restraint, more negativity and independence and more distractability. He is presently attempting to make a valid and reliable test for accident proneness from this data.

Speroff and Kerr¹⁰⁷ hypothesized that being unwanted by work associates was correlated with a high accident rate. They used 90 Mexican and Puerto Rican

105 Thomas N. Jenkins, "The Accident-Prone Personality", Personnel, Vol. 23, No. 1, July, 1956, p. 29-32.

106 Ibid., p. 29.

107 Boris Speroff and Willard Kerr, "Steel Mill 'Hot Strip' Accidents and Interpersonal Desirability Values", Journal of Clinical Psychology, Vol. 8, No. 1, January, 1952, p. 89-91.

workers at a large steel mill in the proximity of Chicago. Each worker was asked to name the man with whom he would most like to work and the one with whom he would least like to work. They got an interpersonal desirability value for each worker. Their results were quite conflicting and they suggested future experimentation.

Working with children, Krall¹⁰⁸ was interested in aggressiveness of the accident prone child. She used 32 children with three or more accidents and 32 accident free children. A twenty minute doll play session was used as an indication of aggression. Krall found significantly more aggression in the accident group.

In summary, there is an indication that the emphasis in research is moving in the area of personality research as a possible determination for the accident prone person. Some doubt was cast on the entire movement. Yet research must continue to see if more factors can be identified. The present research was done for this specific purpose.

¹⁰⁸ Vita Krall, "Personality Characteristics of Accident Repeating Children", Journal of Abnormal and Social Psychology, Vol. 48, No. 1, 1953, p. 99-107.

CHAPTER III

POPULATION AND PROCEDURES

A presentation of the population used and the procedures involved in the experimental situation will be discussed in this chapter.

All subjects were employed by the AirTemp Division of the Chrysler Corporation, Dayton, Ohio. This division employs between fifteen hundred and three thousand employees. It maintains a modern dispensary with a full time nurse on duty at all times. This dispensary keeps records of every man employed by the division. When a man is involved in any accident or becomes ill during his regular working hours, he is expected and encouraged to report to this dispensary. The nurse keeps a record of the type of accident or illness in individual folders.

Utilizing these individual files on all employees, the Safety Director, first shift nurse, and the writer randomly selected files of men to see if they were involved in three or more factory-caused accidents during the year 1958. A factory-caused accident was one in which the injury was due to or caused by a relationship existing in the factory.

A total of 59 white men from twenty-four manufacturing departments who were involved in three or more

factory-caused accidents in 1958 were selected. From the personnel files of each of the individual departments represented, other names were randomly selected to obtain a non-accident group. To qualify for this group a man must not have had any factory-caused accidents in 1958. A total of 104 non-accident men were chosen.

From this list of both accident and non-accident men, the Safety Director contacted the various department chiefs to obtain one accident and two non-accident men from each department. This ratio was not always kept in each case. Only factory manufacturing departments were used. All men involved were on the first shift. After eliminating such factors as changes in shifts, sickness, layoffs, terminations, etc., a total of 22 accident and 44 non-accident men were available on the day of testing and of this group 18 accident and 35 non-accident white men took part in the experiment. The men who did not appear either failed to get the right directions as to the meeting place or refused to take part in the study. The accident and non-accident groups represented sixteen and eighteen factory departments respectively.

Six groups were organized and scheduled for testing. The first two, of 8 and 10 men each, were from the accident group; the other four were non-accident groups. All meetings were held in the Safety Director's office in which

there were facilities for seating fourteen. Ventilation, heating and lighting were held constant for all groups. The meetings were scheduled at forty-five minute intervals, three each in the morning and afternoon.

When each group was assembled, the Safety Director gave a small lecture on the nature of the study. He stressed that this was voluntary and that any man could leave if he did not wish to cooperate.¹ They were told that the study was being done to see if a check list could be used in an industrial situation. He pointed out that no names would be written on the papers so that any given paper could not be associated with any person. He mentioned that this study had nothing to do with their employment or with the corporation in which they worked. They were urged to work quickly and accurately and that the entire testing situation would last only a few minutes.

The meeting was then turned over to the writer. It was again pointed out to them that their names would not appear and that they should be truthful in their answers. The Interpersonal Check List² was given to each man. The

¹ Only one man left and the excuse offered was his inability to read and write. The legitimacy of this reason was to be questioned since everyone employed at this division is required to pass a written aptitude test and expected to be able to read and write.

² See Appendix 1.

directions were explained to the men in the group situation. The men were told that they were to check the adjective which applied to themselves and leave blank those that did not apply. As each man finished, the booklet was removed and he was given another like the first. He was asked to check the words in the same manner but in relation to how he thought people, in general, felt about him. This change in set was accepted easily by all. When this was finished the men departed from the room and returned to their department. The average time spent in the examining room was about thirty minutes.

CHAPTER IV

PRESENTATION OF RESULTS AND DISCUSSION

This chapter will present a discussion of the scoring techniques involved in the analysis of The Interpersonal Check List for both groups. An evaluation of this data will be made in terms of the hypothesis presented. A discussion of the results will follow the testing of the hypothesis.

1. Scoring The Check List

All of The Interpersonal Check Lists were inspected for any errors. To facilitate the scoring, the answers recorded on the second part of the administration, - i.e. where the subjects were asked to report how they thought others, in general, felt about them, - were transcribed to the first booklet. One booklet, therefore, contained both self-perceptions.

A scoring template was used to increase the accuracy of scoring. This template was placed over the list of adjectives. Transparent columns were then visible to the scorer who could count the number of items that were checked for each octant. The score was the number of times an adjective was checked in an octant. These scores were transferred to columns on the right of the booklet. There

are sixteen possible adjectives to be checked for each octant so the scores have a range from zero to sixteen. A list of these raw scores for the accident and non-accident groups is presented in Appendix 3.

These raw scores were converted into the axis scores of DOM and LOV. Four intermediate scores were obtained, one each for Dominance, Submission, Love and Hostility. The formula for these conversions are as follows:

$$\begin{aligned} D \text{ (Dominance)} &= 0.7 (BC + NO) + AP \\ S \text{ (Submission)} &= 0.7 (FG + JK) + HI \\ L \text{ (Love)} &= 0.7 (JK + NO) + LM \\ H \text{ (Hostility)} &= 0.7 (BC + FG) + DE \end{aligned}$$

From these scores the two axes were computed in the following way:

$$\begin{aligned} \text{DOM} &= D - S \\ \text{LOV} &= L - H \end{aligned}$$

A list of these scores is presented in Appendix 4.

2. Analysis of the Data and Hypothesis

Statistical analysis of the data was done by utilizing the "t" test of significance between the means of the raw scores for the two axes DOM and LOV. The use of raw scores was recommended by Timothy Leary,¹ author

¹ Personal correspondence with Timothy Leary, Director, Kaiser Foundation Psychology Research, Berkeley, California.

of the Interpersonal system. The formula used was that for independent groups:

$$t = \frac{M_1 - M_2}{\sigma_{md}}$$

where the σ_{md} is equal to

$$\sqrt{(\sigma_{m_1})^2 + (\sigma_{m_2})^2}$$

To obtain the σ_{m_1} and σ_{m_2} the following formula was applied:

$$\sigma_m = \frac{s}{\sqrt{N-1}}$$

The first four hypotheses, as given on page 8, were tested with the use of the "t" technique. The results are given in Table I. This table shows that no significant differences were found between the means of these groups on any of the four comparisons. A "t" of 2.67 and 2.00 was needed for the .01 and .05 level of confidence respectively. The value of "t" in each case falls within the chance expectancy limits. Therefore, the null hypothesis cannot be rejected and the results obtained can be attributed to chance fluctuations.

The fifth hypothesis, as given on page 8, was also tested with the use of the "t" technique. Raw scores for the indices D, S, L, and H were used to obtain the necessary

Table I.-

An Analysis of the Accident and Non-Accident Groups for Self-Perception and Self-Perception from Others on the Two Axes of Dominance-Submission (DOM) and Love-Hostility (LOV) from the Raw Scores on The Interpersonal Check List.

Group-Axis-Orientation	N	Mean	σ	σ_{in}	σ_{in}	t
Accident-DOM-Self	18	3.56	3.87	.93	1.13	.48
Non-Accident-DOM-Self	35	4.11	3.84	.65		
Accident-DOM-Other	18	4.13	4.15	1.00	1.19	.37
Non-Accident-DOM-Other	35	4.58	3.80	.65		
Accident-LOV-Self	18	6.31	5.44	1.32	1.49	.87
Non-Accident-LOV-Self	35	7.62	4.18	.71		
Accident-LOV-Other	18	5.38	6.61	1.60	1.84	.77
Non-Accident-LOV-Other	35	6.81	5.33	.91		

values for the testing of the hypothesis. The results are given in Table II. This table shows that no significant differences at the .05 or .01 level of confidence were obtained for any of the differences between the means. It will be noted that the difference between the means for self perception for Hostility, although not significant at the .05 level of confidence, came quite close to being significant at the .10 level. However, the null hypothesis cannot be rejected and, as in the case of the first four hypothesis, the results obtained can be attributed to chance fluctuations.

3. Discussion of Results

The results obtained indicate that there are no significant differences between the groups as measured in relation to the hypotheses tested. Some explanation as to the possibilities for this result are given.

The importance of the small sample cannot be dismissed. Had a larger sample been used the chances of obtaining a significant difference would have been increased. However, in most cases, the "t" values obtained fall very short of the necessary "t" value needed for significance and any increase in the sample would have to be quite large to obtain significance. This brings up the question of practical significance. The practicality of

Table II.-

An Analysis of the Accident and Non-Accident Groups for Self-Perception and Self-Perception from Others on the Four Indices of Dominance (D), Submission (S), Love (L), and Hostility (H) of the two axes of Dominance-Submission (DOM) and Love-Hostility (LOV) from the Raw Scores on The Interpersonal Check List.

Group-Indices-Orientations	N	Mean	σ	σ_m	σ_{m_e}	t
Accident-Dominance-Self	18	14.68	5.64	1.36	1.44	.17
Non-Accident-Dominance-Self	35	14.42	3.69	.63		
Accident-Dominance-Other	18	12.49	5.49	1.33	1.63	.42
Non-Accident-Dominance-Other	35	13.18	5.60	.96		
Accident-Submission-Self	18	11.13	4.83	1.17	1.28	.61
Non-Accident-Submission-Self	35	10.34	3.21	.55		
Accident-Submission-Other	18	8.36	3.84	.93	1.20	.20
Non-Accident-Submission-Other	35	8.60	4.51	.77		
Accident-Love-Self	18	18.87	4.73	1.14	1.35	.57
Non-Accident-Love-Self	35	18.10	4.47	.76		
Accident-Love-Other	18	15.43	7.03	1.70	2.02	.35
Non-Accident-Love-Other	35	16.15	6.48	1.11		
Accident-Hostility-Self	18	12.61	5.11	1.24	1.33	1.64
Non-Accident-Hostility-Self	35	10.42	2.98	.51		
Accident-Hostility-Other	18	9.97	4.67	1.13	1.31	.48
Non-Accident-Hostility-Other	35	9.34	4.07	.69		

such a large sample would be questionable. In any case, it might be assumed that the small sample of this study contributed to the negative findings.

Another important consideration was the use of the "t" test as a measure of the differences between the groups. An assumption was made that the distribution of "t's" from this sort of score followed the distribution of "t's" postulated by the tables of "t" that we use. The results obtained could have occurred because this assumption was not a valid one.

The setting in which the testing took place might have had a large influence on the results. None of the men was aware of the nature of the study. Yet it was quite obvious to them that it had something to do with safety since all of the meetings were held in the Safety Director's office and under his direction. Because industrial safety is so paramount in the workers' milieu, the men might have been more cautious in their answers and might have attempted to answer as they "should" rather than give a more truthful answer. If this were the prevailing tone of many of these men, the scores would tend to group toward the mean with little differences recorded. This aspect is an important one, and, in itself, might account for the differences between the means being so closely associated.

The Interpersonal Check List is an instrument designed and built in a research setting revolving around two specific needs, (1) personality evaluation and (2) psycho-therapeutic value. In each case, the background, research, and orientation has been related to clinical groups or cases. This is somewhat different from the present locale where the instrument was used in an industrial setting. This aspect could be an important factor in the results.

The rationale for this study was that more "surface" factors might be basic to these people involved in industrial accidents as opposed to more "deep" factors as might be measured on projective instruments. Since the List measures a level of personality considered to be "more surface" in nature, this study incorporated the use of the List. Based on these results, it must be stated that within the limits of the present study, these "surface" factors were not found to be significantly different between the groups. It might be possible that neither the "surface" nor "deep", underlying factors are important but rather a combination of both. In this respect the method used was not appropriate; rather than use just one part of the Interpersonal system, the total system might be used to survey various levels of personality.

It is important in this research to point out that no significant differences were found to exist. However, a consideration must be presented. In relation to the first four hypotheses, a trend exists in that in each case the accident group had a lower mean score than the non-accident group. This could be due to chance; but also it might not be chance but be a trend whose magnitude is not great enough to show up amid large chance fluctuations. From these four hypotheses a point can be drawn out, although not statistically significant, a trend in the direction of the accident group scoring lower than the non-accident group seems to exist.

Of greater importance is the analysis as given in Table II. Here again it must be stated that the result is not statistically significant. Yet the direction of the result is interesting. The accident group showed much more hostility toward themselves than the non-accident group. The difference is significant at below the .20 level and very close to the .10 level of confidence. Had the number of subjects in the accident group been somewhat larger and the mean stayed the same, a significant finding might have emerged. The trend reported suggests the possibility that these accident persons might be turning this hostility toward themselves in somewhat of a masochistic nature which involves personal injury.

4. Summary

The results of the experiment were presented and the five hypotheses tested. No significant differences between the means of the DOM and IOV raw scores or the four individual poles of each were shown to exist on any of the five analyses. A discussion of these results was given in the light of such factors as the sample, statistic used, experimental setting, personality level measured, and trends that could be gleaned from the data.

CONCLUSIONS AND SUGGESTIONS FOR FURTHER STUDY

The foregoing research study was done to determine if any "surface" factors could differentiate between an accident and non-accident industrial group on the basis of The Interpersonal Check List. Five hypotheses were tested and in each case the null hypothesis was not rejected. Therefore, it must be concluded that on the basis of the present study, utilizing the List as a measure of interpersonal behavior on a conscious communication level of personality, there are no significant differences between the accident and non-accident groups on the two axes of the Interpersonal system (DOM and LOV) and their four component parts for the two orientations of self description involved.

Two trends were noted. On the basis of the analysis of the DOM and LOV scores, the accident group mean was consistently below the mean of the non-accident group. This difference was quite small. Another, more definite, trend was shown to exist in that the mean score for hostility in the accident group was much higher than the mean in the non-accident group and came close to being significant at the .10 level of confidence. From this it might be concluded that a definite trend exists in that the accident group sees themselves as having greater hostility than the non-accident group.

One of the obvious suggestions for a further study would be to increase the size of the sample. With an accident group of a considerably larger size more accurate results could possibly be obtained.

The control of variables is always a problem in any research study. In the present study the possible knowledge that the testing was being done for some "ulterior" motive (especially to screen out safety risks) could have influenced the results. A study could be done in which there would be little knowledge of its orientation to safety. In this way subjects might be more honest in their answers and greater differences between the groups may become apparent.

The present study was a small one incorporating only one level of the interpersonal system. The hypothesis that accident proneness is a multi-level activity has not been tested. Although the findings in the present study do not suggest any differences between the groups at one level, this does not necessarily presume that there would be no differences if all the levels were considered.

A study specifically designed to elicit scores of hostility might prove to be a very fruitful one. The present study denoted a definite trend that hostility is related in some way to the accident group. The tool used

in this study might be used again in a different setting and with a larger sample with the specific purpose of measuring hostility between the groups.

ANNOTATED BIBLIOGRAPHY

Adelson, A.M., "Accident Proneness: A Criticism of the Concept Based upon an Analysis of Shunters' Accidents", Journal of the Royal Statistical Society, Vol. 115, Part III, 1952, p. 354-400.

The author performed a study on 1,452 railroad shunters in which he made an analysis of various information as to accident situations. He found no significant differences between home and industrial accidents or that the same men tended to repeat the same kind of accident.

Adler, Alexandra, "The Psychology of Repeated Accidents in Industry", American Journal of Psychiatry, Vol. 98, No. 1, July, 1941, p. 99-101.

This study was concerned with industrial accidents. The author made a complete study of 100 accident repeaters and 20 non-accident persons. Some psychometric tests were given. He found no significant difference between the groups on either the psychometric factors or the examination of the history of the subjects.

Bonnardel, P., "La Psychometrie et La Prevention des Accidents du « Intelligence Concrete »", Le Travail Humain, Vol. 12, No. 1, 1949, p. 1-15.

This study was done on 153 accident prone workmen. The author pointed out that the intellectual factor was important and should be considered as an aspect of the accident prone individual.

Cation, W.L., G.E. Mount and H. Brenner, "Variability of Reaction Time and Susceptibility to Automobile Accidents", Journal of Applied Psychology, Vol. 35, No. 2, April, 1951, p. 101-107.

Reaction time of people involved in automobile accidents was the main theme of this study. The authors hypothesized that those people with variable reaction times would have more accidents than those people whose reaction times were more constant. The hypothesis was rejected.

Drake, Charles A., "Accident Proneness: A Hypothesis", Character and Personality, Vol. 8, No. 4, June, 1949, p. 335-341.

This study attempted to uncover sensory-motor-coordination aspects which might be associated with a high accident figure. Five sensory-motor tests were administered. One small relationship showed significance whereas the others were not significant.

Dunbar, H. Flanders, Theodore P. Wolfe, Edward S. Tauber and A. Louise Brush, "The Psychic Component of The Disease Process (Including Convalescent), in Cardiac, Diabetic, and Fracture Patients", American Journal of Psychiatry, Vol. 95, No. 6, May, 1939, p. 1319-1342.

The authors showed an interest in the psychological aspects of accidents. They suggested that impulsiveness seemed to be common to the accident prone individual. This accident prone group tended to "act out" more than inhibit their responses.

Farmer, Eric and E.G. Chambers, "A Psychological Study of Individual Differences in Accident Rates", Industrial Fatigue Research Board, Report No. 38, 1926, iv-46 p.

The authors were interested in attempting to uncover a possible common factor in those persons who had more accidents than could be attributed to chance. Various tests were given to boy apprentices and women factory workers. Poor aestheto-kinetic coordination was found to be associated with a high accident rate.

Farmer, Eric and E.G. Chambers, "A Study of Personal Qualities in Accident Proneness and Proficiency", Industrial Health Research Board, Report No. 55, 1929, iv-84 p.

This study was intended to gather more data along the line of the previous study by these two authors. They found a very small positive relationship between simple aestheto-kinetic tests and Dockyard apprentices with a high accident rate.

Farmer, Eric, E.G. Chambers and F.J. Kirk, "Tests for Accident Proneness", Industrial Health Research Board, Report No. 68, 1933, iv-44 p.

Tests of intelligence and sensory-motor coordination were administered to a group of boys entering skilled trades. These scores were later correlated with the accident records. They found that poor aestheto-kinetic coordination was associated with an undue number of accidents. They noted that intelligence was not related to accident proneness.

Gates, William Baylor, An Investigation to Determine the Relationship between Emotional Immaturity and Accident Proneness, Unpublished Doctoral Dissertation, University of Houston, May, 1954.

A scale for emotional immaturity was devised by the author. This scale was given to 913 subjects. The traffic accident records of these persons were examined. The results showed that those subjects having a high immaturity score had a significantly greater percentage of accidents.

Greenwood, M. and Hilda M. Woods, "A Report of the Incidence of Industrial Accidents upon Individuals with Special Reference to Multiple Accidents", Industrial Fatigue Research Board, Report No. 4, 1919, 28 p.

This was the first scientific study to consider accident proneness as a specific concept. The authors investigated the hypothesis that multiple industrial accidents followed a chance distribution. They concluded that chance was not so much a factor and that individual susceptibility was important.

Harris, Frank J., "Can Personality Tests Identify Accident Prone Employees", Personnel Psychology, Vol. 3, No. 4, Winter, 1950, p. 455-459.

This study was performed on twenty-five accident and a like number of accident free industrial workers. He used projective tests, objective tests and biographical information. No significant differences were found between the groups on the projective tests. A few significant differences were found with the objective data and the biographical information.

Hersey, Rexford. B., "Emotional Factors in Accidents", Personnel Journal, Vol. 15, No. 2, June, 1936, p. 59-65.

The author discussed the accident prone problem and felt that the emotional aspect was very important in the personality dynamics of the accident prone individual.

Holmes, Jack, "Industrial Accident Proneness", Personnel Psychology, Vol. 2, No. 3, Autumn, 1949, p. 369-375.

The author made a survey of the personnel records of 8,138 men at a government arsenal. He found that a very low mechanical aptitude score correlated highly with the accident index he arranged for this study; the higher the number of accidents the lower the mechanical aptitude score.

Jenkins, Thomas H., "The Accident-Prone Personality", Personnel, Vol. 23, No. 1, July, 1950, p. 29-32.

The author made a study of twenty-three different companies in which he had injury repeaters and non-repeaters. He indicates that certain trends were observed in the injury group such as less restraint and more independence. No statistical analysis was given.

Kraft, Merwyn A. and Theodore W. Forbes, "Evaluating the Influences of Personal Characteristics on the Traffic Accident Experience of Transit Operators", Proceedings of the Highway Research Board, Vol. 24, 1944, p. 278-291.

Some doubt was cast on the personal susceptibility concept by this study. Working with street car operators, the authors found that traffic accidents were governed by the usual laws of chance.

Leary, Timothy, Interpersonal Diagnosis of Personality, New York, Ronald, 1957, xix-518 p.

This work presents the Interpersonal System for the diagnosis of personality. The interpersonal movement is discussed, the various levels and dimensions of personality are presented, and some applications of the system are surveyed.

LeShan, Lawrence L., "Dynamics in Accident-Prone Behavior", Psychiatry, Vol. 15, No. 1, February, 1952, p. 73-80.

The author made an analysis of 54 accident prone individuals in industry and the traffic area. He concluded that aggression toward authority and masochism were the driving forces behind the accident prone individual.

Miller, Carmen, A Comparison of Personality Characteristics of High-Accident and Low-Accident Bus and Street Car Operators, Unpublished Doctoral Dissertation, Western Reserve University, 1952, p. v-115.

The author made a study of groups of bus and street car operators in Cleveland and Dallas. The Rorschach was given to all men involved. Various factors and configurations of the test were analyzed. No significant differences between the high and low-accident groups were found on the personal data, factors or patterns, or personality configurations.

Newbold, E.M., "A Contribution to the Study of the Human Factor in the Causation of Accidents", Industrial Fatigue Research Board, Report No. 34, 1926, iv-76 p.

This study was interested in the personal susceptibility hypothesis of Greenwood and Woods. After a survey of records in twenty-two factories, she found that her results corroborated those of Greenwood and Woods. It was noted that age was an important factor,

Slocombe, C.A. and R.E. Brakeman, "Psychological Tests and Accident Proneness", British Journal of Psychology, Vol. 21, Part 1, July, 1930, p. 29-38.

This research was performed on men employed at the Boston Elevated Railway. Sensory-motor-coordination tests were given to all of the men involved in the study. No significant relationship was found between the test results and the accident records of the men.

Speroff, Boris and Willard Kerr, "Steel Mill 'Hot Strip' Accidents and Interpersonal Desirability Values", Journal of Clinical Psychology, Vol. 8, No. 1, January, 1952, p. 89-91.

The authors hypothesized that being unwanted on the job was correlated with a high accident rate. Ninety workers at a large steel mill were used in the study. An interpersonal desirability value for each worker was ascertained. The results were conflicting and the authors suggested further research.

Suhr, Virtus W., "The Cattell 16 P.F. Test as a Prognosticator of Accident Susceptibility", Proceedings of the Iowa Academy of Science, Vol. 60, 1953, p. 558-561.

The Cattell 16 P.F. Test was given to 30 high and 30 low accident drivers. He found no significant differences below the .05 level of confidence for the two groups on any of the factors. One factor fell just short of the minimum level requirement.

Whitlock, John B. and Clark W. Crannel, "An Analysis of Certain Factors in Serious Accidents in a Large Steel Plant", Journal of Applied Psychology, Vol. 33, No. 5, October, 1949, p. 494-498.

The authors made a study of 100 accident and 200 non-accident men. They investigated psychometric material and also non-psychometric material such as age, weight, height, etc. No significant differences were found between the groups on the non-psychometric material. Some significant differences between the groups were found on the psychometric data.

APPENDIX 1

THE INTERPERSONAL CHECK LIST

The Interpersonal Check List

Name _____ Age _____ Sex _____ Date _____ Testing # _____

Address _____ City _____ Phone _____ Education _____

Occupation _____ Marital Status _____ Referred by _____

Group _____ Other _____

DIRECTIONS: This booklet contains a list of descriptive words and phrases which you will use in describing yourself and members of your family or members of your group. The test administrator will indicate which persons you are to describe. Write their names in the spaces prepared at the top of the inside pages. In front of each item are columns of answer spaces. The first column is for yourself, and there is another column for each of the persons you will describe.

Read the items quickly and fill in the first circle in front of each item you consider to be generally descriptive of yourself at the present time. Leave the answer space blank when an item does not describe you. In the example below, the subject (Column 1) has indicated that Item A is true and item B is false as applied to him.

	Item								
	1	2	3	4	5	6	7	8	
A	●	○	○	○	○	○	○	○	well-behaved
	1	2	3	4	5	6	7	8	
B	○	○	○	○	○	○	○	○	suspicious

After you have gone through the list marking those items which apply to you, return to the beginning and consider the next person you have been asked to describe, marking the second column of answer spaces for every item you consider to be descriptive of him (or her). Proceed in the same way to describe the other persons indicated by the test administrator. Always complete your description of one person before starting the next.

Your first impression is generally the best so work quickly and don't be concerned about duplications, contradictions, or being exact. If you feel much doubt whether an item applies, leave it blank.

This booklet has been prepared by Timothy Leary, Ph.D., and published by the Psychological Consultation Service, 1230 Queens Road, Berkeley 8, California. The Interpersonal Check List was developed by Rolfe LaForge, Ph.D., and Robert Suczek, Ph.D., and other staff members of the Kaiser Foundation Research Project in Psychology.

Column 1 _____

Col. 2 _____

Col. 4 _____

Col. 6 _____

SUBJECT'S NAME

Col. 3 _____

Col. 5 _____

Col. 7 _____

SAMPLE:									
1	2	3	4	5	6	7	8	0	
A	●	○	●	○	●	○	○	○	well-behaved

P	○	○	○	○	○	○	○	○	1	well thought of
P	○	○	○	○	○	○	○	○	2	makes a good impression
A	○	○	○	○	○	○	○	○	3	able to give orders
A	○	○	○	○	○	○	○	○	4	forceful
B	○	○	○	○	○	○	○	○	5	self-respecting
B	○	○	○	○	○	○	○	○	6	independent
C	○	○	○	○	○	○	○	○	7	able to take care of self
C	○	○	○	○	○	○	○	○	8	can be indifferent to others
D	○	○	○	○	○	○	○	○	9	can be strict if necessary
D	○	○	○	○	○	○	○	○	10	firm but just
E	○	○	○	○	○	○	○	○	11	can be frank and honest
E	○	○	○	○	○	○	○	○	12	critical of others
F	○	○	○	○	○	○	○	○	13	can complain if necessary
F	○	○	○	○	○	○	○	○	14	often gloomy
G	○	○	○	○	○	○	○	○	15	able to doubt others
G	○	○	○	○	○	○	○	○	16	frequently disappointed
H	○	○	○	○	○	○	○	○	17	able to criticize self
H	○	○	○	○	○	○	○	○	18	apologetic
I	○	○	○	○	○	○	○	○	19	can be obedient
I	○	○	○	○	○	○	○	○	20	usually gives in
J	○	○	○	○	○	○	○	○	21	grateful
J	○	○	○	○	○	○	○	○	22	admires and imitates others
K	○	○	○	○	○	○	○	○	23	appreciative
K	○	○	○	○	○	○	○	○	24	very anxious to be approved of
L	○	○	○	○	○	○	○	○	25	cooperative
L	○	○	○	○	○	○	○	○	26	eager to get along with others
M	○	○	○	○	○	○	○	○	27	friendly
M	○	○	○	○	○	○	○	○	28	affectionate and understanding
N	○	○	○	○	○	○	○	○	29	considerate
N	○	○	○	○	○	○	○	○	30	encourages others
O	○	○	○	○	○	○	○	○	31	helpful
O	○	○	○	○	○	○	○	○	32	big-hearted and unselfish

○	○	○	○	○	○	○	○	○	33	often admired
○	○	○	○	○	○	○	○	○	34	respected by others
○	○	○	○	○	○	○	○	○	35	good leader
○	○	○	○	○	○	○	○	○	36	likes responsibility
○	○	○	○	○	○	○	○	○	37	self-confident
○	○	○	○	○	○	○	○	○	38	self-reliant and assertive
○	○	○	○	○	○	○	○	○	39	businesslike
○	○	○	○	○	○	○	○	○	40	likes to compete with others
○	○	○	○	○	○	○	○	○	41	hard-boiled when necessary
○	○	○	○	○	○	○	○	○	42	stern but fair
○	○	○	○	○	○	○	○	○	43	irritable
○	○	○	○	○	○	○	○	○	44	straightforward and direct
○	○	○	○	○	○	○	○	○	45	resents being bossed
○	○	○	○	○	○	○	○	○	46	skeptical
○	○	○	○	○	○	○	○	○	47	hard to impress
○	○	○	○	○	○	○	○	○	48	touchy and easily hurt
○	○	○	○	○	○	○	○	○	49	easily embarrassed
○	○	○	○	○	○	○	○	○	50	lacks self-confidence
○	○	○	○	○	○	○	○	○	51	easily led
○	○	○	○	○	○	○	○	○	52	modest
○	○	○	○	○	○	○	○	○	53	often helped by others
○	○	○	○	○	○	○	○	○	54	very respectful to authority
○	○	○	○	○	○	○	○	○	55	accepts advice readily
○	○	○	○	○	○	○	○	○	56	trusting and eager to please
○	○	○	○	○	○	○	○	○	57	always pleasant and agreeable
○	○	○	○	○	○	○	○	○	58	wants everyone to like him
○	○	○	○	○	○	○	○	○	59	sociable and neighborly
○	○	○	○	○	○	○	○	○	60	warm
○	○	○	○	○	○	○	○	○	61	kind and reassuring
○	○	○	○	○	○	○	○	○	62	tender and soft-hearted
○	○	○	○	○	○	○	○	○	63	enjoys taking care of others
○	○	○	○	○	○	○	○	○	64	gives freely of self

○	○	○	○	○	○	○	○	○	65	always gives
○	○	○	○	○	○	○	○	○	66	acts impolitely
○	○	○	○	○	○	○	○	○	67	bossy
○	○	○	○	○	○	○	○	○	68	dominating
○	○	○	○	○	○	○	○	○	69	boastful
○	○	○	○	○	○	○	○	○	70	proud and arrogant
○	○	○	○	○	○	○	○	○	71	thinks only of self
○	○	○	○	○	○	○	○	○	72	shrewd and calculating
○	○	○	○	○	○	○	○	○	73	impatient with others
○	○	○	○	○	○	○	○	○	74	self-seeking
○	○	○	○	○	○	○	○	○	75	outspoken
○	○	○	○	○	○	○	○	○	76	often unfriendly
○	○	○	○	○	○	○	○	○	77	bitter
○	○	○	○	○	○	○	○	○	78	complaining
○	○	○	○	○	○	○	○	○	79	jealous
○	○	○	○	○	○	○	○	○	80	slow to forgive
○	○	○	○	○	○	○	○	○	81	self-punish
○	○	○	○	○	○	○	○	○	82	shy
○	○	○	○	○	○	○	○	○	83	passive and unassertive
○	○	○	○	○	○	○	○	○	84	meek
○	○	○	○	○	○	○	○	○	85	dependent
○	○	○	○	○	○	○	○	○	86	wants to be liked
○	○	○	○	○	○	○	○	○	87	lets others take advantage
○	○	○	○	○	○	○	○	○	88	easily fooled
○	○	○	○	○	○	○	○	○	89	too easily influenced
○	○	○	○	○	○	○	○	○	90	will confide in others
○	○	○	○	○	○	○	○	○	91	fond of even the smallest favors
○	○	○	○	○	○	○	○	○	92	likes everybody
○	○	○	○	○	○	○	○	○	93	forgives easily
○	○	○	○	○	○	○	○	○	94	oversympathetic
○	○	○	○	○	○	○	○	○	95	generous to others
○	○	○	○	○	○	○	○	○	96	overprotective

- 1 2 3 4 5 6 7 8 97
 tries to be too successful
- 1 2 3 4 5 6 7 8 98
 expects everyone to admire him
- 1 2 3 4 5 6 7 8 99
 manages others
- 1 2 3 4 5 6 7 8 100
 dictatorial
- 1 2 3 4 5 6 7 8 101
 somewhat snobbish
- 1 2 3 4 5 6 7 8 102
 egotistical and conceited
- 1 2 3 4 5 6 7 8 103
 selfish
- 1 2 3 4 5 6 7 8 104
 cold and unfeeling
- 1 2 3 4 5 6 7 8 105
 sarcastic
- 1 2 3 4 5 6 7 8 106
 cruel and unkind
- 1 2 3 4 5 6 7 8 107
 frequently angry
- 1 2 3 4 5 6 7 8 108
 hard-hearted
- 1 2 3 4 5 6 7 8 109
 resentful
- 1 2 3 4 5 6 7 8 110
 rebels against everything
- 1 2 3 4 5 6 7 8 111
 stubborn
- 1 2 3 4 5 6 7 8 112
 distrusts everybody
- 1 2 3 4 5 6 7 8 113
 timid
- 1 2 3 4 5 6 7 8 114
 always ashamed of self
- 1 2 3 4 5 6 7 8 115
 obeys too willingly
- 1 2 3 4 5 6 7 8 116
 spineless
- 1 2 3 4 5 6 7 8 117
 hardly ever talks back
- 1 2 3 4 5 6 7 8 118
 clinging vine
- 1 2 3 4 5 6 7 8 119
 likes to be taken care of
- 1 2 3 4 5 6 7 8 120
 will believe anyone
- 1 2 3 4 5 6 7 8 121
 wants everyone's love
- 1 2 3 4 5 6 7 8 122
 agrees with everyone
- 1 2 3 4 5 6 7 8 123
 friendly all the time
- 1 2 3 4 5 6 7 8 124
 loves everyone
- 1 2 3 4 5 6 7 8 125
 too lenient with others
- 1 2 3 4 5 6 7 8 126
 tries to comfort everyone
- 1 2 3 4 5 6 7 8 127
 too willing to give to others
- 128
 s people with kindness

Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8
Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials
P							
P	AP	AP	AP	AP	AP	AP	AP
A							
A	BC	BC	BC	BC	BC	BC	BC
B							
B	DE	DE	DE	DE	DE	DE	DE
C							
C	FG	FG	FG	FG	FG	FG	FG
D							
D	HI	HI	HI	HI	HI	HI	HI
E							
E	JK	JK	JK	JK	JK	JK	JK
F							
F	LM	LM	LM	LM	LM	LM	LM
G							
G							
H	NO	NO	NO	NO	NO	NO	NO
H	D						
I	S						
I							
J	L						
J							
K	H						
K							
L							
L	DOM	DOM	DOM	DOM	DOM	DOM	DOM
M							
M	LOV	LOV	LOV	LOV	LOV	LOV	LOV
N							
N							
O							
O							

APPENDIX 2

A BRIEF SUMMARY OF THE INTERPERSONAL SYSTEM

The Interpersonal system of Timothy Leary¹ is based on the assumption that behavior is of an interpersonal nature and each individual varies on an interpersonal continuum and functions at different levels. The Interpersonal system is composed of eight octants of a circle with each octant being a composition of an "adaptive" and a "maladaptive" function. These octants with their code designations are as follows:

AP	Managerial- - -Autocratic
BC	Competitive- - -Narcissistic
DE	Critical- - -Sadistic
FG	Skeptical- - -Distrustful
HI	Self-effacing- - -Masochistic
JK	Docile- - -Dependent
LM	Conventional- - -Overconventional
NO	Responsible- - -Hypernormal

These eight categories are then refined into two axis of a circular interpersonal framework. These axis or dimensions are called Dominance-Submission (DOM) and Love-Hostility (LOV).

To obtain a score on these axis the following formulas are used:

$$\begin{aligned} \text{DOM} &= \text{AP} - \text{HI} + .7(\text{NO} + \text{BC} - \text{FG} - \text{JK}) \\ \text{LOV} &= \text{LM} - \text{DE} + .7(\text{NO} - \text{BC} - \text{FG} + \text{JK}) \end{aligned}$$

where AP is the score in octant AP, HI is the score in

¹ Timothy Leary, Multilevel Measurement of Interpersonal Behavior, A Manual for the Use of the Interpersonal System of Personality, Berkeley, California, Psychological Consultation Service, 1956, p. vii-110.

ectant Hi, etc. On The Interpersonal Check List these scores are obtained from the number of times the individual checks those adjectives which apply to himself.

APPENDIX 3

RAW SCORES FOR OCTANTS

Table III.-

Raw Scores for the Accident Group in each Octant for The Interpersonal Check List including Number of Paper and Orientation of Answering Subject (N = 18).

Number of Paper	Orientation	Octant							
		AP	BC	DE	FG	HI	JK	LM	NO
1	Self	4	6	5	1	4	5	13	7
	Other	6	5	6	1	4	4	13	10
2	Self	4	5	6	3	2	9	5	6
	Other	1	2	2	0	0	3	3	8
3	Self	6	8	12	7	5	8	7	5
	Other	7	9	10	6	4	4	8	5
4	Self	3	5	6	4	5	4	9	7
	Other	3	4	8	2	3	5	13	5
5	Self	7	6	6	7	3	4	6	7
	Other	8	6	7	7	4	7	5	7
6	Self	4	3	6	2	0	2	7	9
	Other	2	1	3	1	0	1	2	3
7	Self	2	5	3	3	2	7	13	8
	Other	2	3	4	4	3	9	12	9
8	Self	4	4	5	1	1	6	7	3
	Other	2	1	3	0	0	3	4	1
9	Self	14	12	11	10	12	10	12	15
	Other	9	5	9	3	5	7	6	6
10	Self	6	4	5	5	2	5	11	6
	Other	6	5	5	2	2	8	9	7
11	Self	2	3	2	1	5	5	11	6
	Other	2	4	2	1	3	4	8	3
12	Self	5	10	6	2	4	7	10	8
	Other	9	10	7	3	4	6	12	8

Table III.-

Raw Scores for the Accident Group in each Octant for The Interpersonal Check List including Number of Paper and Orientation of Answering Subject (N=18).

Number of Paper	Orientation	Octant							
		AP	BC	DE	FG	HI	JK	LM	NO
13	Self	6	6	8	0	3	6	10	8
	Other	5	5	3	0	3	2	5	4
14	Self	3	5	2	4	7	8	11	9
	Other	4	4	4	0	8	9	12	9
15	Self	6	1	4	4	3	5	4	4
	Other	5	2	1	9	3	2	1	4
16	Self	9	8	7	3	5	7	13	13
	Other	9	7	7	2	4	8	13	14
17	Self	4	8	6	4	5	10	7	9
	Other	5	8	6	2	3	5	7	6
18	Self	6	6	7	4	7	6	8	7
	Other	2	3	4	1	3	4	2	4

Table IV.-

Raw Scores for the Non-Accident Group in each Octant of
The Interpersonal Check List including Number of Paper
 and Orientation of Answering Subject (N=35).

Number of Paper	Orientation	Octant							
		AP	BC	DE	FG	HI	JK	LM	NO
1	Self	9	7	6	2	1	9	11	7
	Other	6	9	7	2	2	7	10	5
2	Self	5	6	5	4	6	7	10	8
	Other	5	6	5	3	6	5	7	7
3	Self	4	4	3	1	5	7	10	8
	Other	1	1	0	1	3	2	2	1
4	Self	6	3	6	2	6	7	5	7
	Other	6	3	6	2	6	6	9	10
5	Self	3	5	6	4	4	4	9	7
	Other	5	6	7	4	4	4	10	8
6	Self	5	8	6	6	6	9	7	6
	Other	6	7	5	5	5	5	9	5
7	Self	5	6	4	5	5	4	6	8
	Other	4	6	2	1	1	3	4	2
8	Self	6	6	3	1	1	6	10	6
	Other	5	3	3	1	1	1	6	3
9	Self	5	4	5	3	4	4	4	5
	Other	2	2	4	1	4	3	2	4
10	Self	5	4	5	3	4	4	4	5
	Other	2	2	4	1	4	3	2	4
11	Self	7	4	4	0	4	8	11	7
	Other	7	3	3	0	3	5	11	7
12	Self	7	7	5	3	2	4	11	8
	Other	5	4	0	2	0	4	9	9

Table IV.-

Raw Scores for the Non-Accident Group in each Octant of
The Interpersonal Check List including Number of Paper
 and Orientation of Answering Subject (N = 35).

Number of Paper	Orientation	Octant							
		AP	BC	DE	FG	H1	JK	LM	NO
13	Self	4	3	4	2	3	6	9	6
	Other	6	5	3	4	3	7	11	6
14	Self	4	3	3	3	6	3	7	1
	Other	4	3	3	1	6	2	5	2
15	Self	6	5	6	2	4	7	8	5
	Other	7	4	4	1	5	8	7	3
16	Self	10	7	7	8	7	6	13	11
	Other	12	11	7	8	11	12	13	16
17	Self	5	6	7	3	4	5	6	7
	Other	5	6	6	2	5	5	7	7
18	Self	2	3	3	1	10	7	9	8
	Other	2	1	2	0	3	7	12	3
19	Self	9	7	10	3	10	7	14	14
	Other	13	6	9	4	11	10	15	15
20	Self	2	3	2	2	2	4	6	1
	Other	6	7	3	3	2	2	8	1
21	Self	8	4	4	0	2	8	9	6
	Other	5	4	4	0	0	7	9	8
22	Self	4	7	2	1	4	4	7	7
	Other	3	8	4	1	1	5	6	4
23	Self	5	6	5	2	3	9	14	11
	Other	6	4	5	1	0	6	12	11
24	Self	4	6	7	1	4	7	10	7
	Other	3	4	5	2	3	5	9	7

Table IV.-

Raw Scores for the Non-Accident Group in each Octant of
The Interpersonal Check List including Number of Paper
 and Orientation of Answering Subject (N = 35).

Number of Paper	Orientation	Octant							
		AP	BC	DE	FG	HI	JK	LM	NO
25	Self	6	8	4	3	5	5	9	10
	Other	6	7	5	2	2	2	9	9
26	Self	9	5	7	1	5	7	12	7
	Other	4	3	6	2	3	3	6	6
27	Self	6	5	4	3	2	6	9	7
	Other	8	8	5	4	4	9	13	8
28	Self	9	7	7	2	7	9	11	7
	Other	7	6	7	2	7	5	10	9
29	Self	5	8	6	1	4	6	12	7
	Other	6	5	6	1	3	7	11	7
30	Self	4	6	2	2	5	7	9	7
	Other	2	4	0	1	6	4	7	3
31	Self	4	6	5	5	5	7	6	8
	Other	3	1	2	3	4	3	8	5
32	Self	4	5	3	2	2	1	6	7
	Other	6	5	6	3	1	2	5	3
33	Self	6	5	6	1	2	5	8	6
	Other	4	5	3	3	1	3	7	2
34	Self	7	7	5	3	5	5	7	9
	Other	8	7	7	4	5	5	8	10
35	Self	6	6	5	2	2	4	6	5
	Other	6	5	5	1	2	3	5	3

APPENDIX 4

SCORES FOR VERTICAL AND HORIZONTAL INDICES

Table V.-

Scores for the Accident Group on the Two Interpersonal Axes of Dominance-Submission (DOM) and Love-Hostility (LOV) including Individual Scores for Dominance, Submission, Love and Hostility. The Number of Paper and Orientation of the Answering Subject are given (N = 18).

Number of Paper	Orientation	Indices					
		D	S	L	H	DOM	LOV
1	Self	13.5	8.2	21.4	9.9	4.9	11.5
	Other	16.5	7.5	22.8	10.2	9.0	12.6
2	Self	11.7	10.4	15.5	11.6	1.3	3.9
	Other	8.0	2.1	10.7	3.4	5.9	7.3
3	Self	15.1	15.5	16.1	22.5	-.4	-6.4
	Other	16.8	11.0	14.3	20.5	5.8	-6.2
4	Self	11.4	10.6	16.7	12.3	.8	4.4
	Other	9.3	7.9	20.0	12.2	1.4	7.8
5	Self	16.1	10.7	13.7	16.1	5.4	-1.4
	Other	17.1	13.8	14.8	16.1	3.3	-1.3
6	Self	12.4	2.8	14.7	9.5	9.6	5.2
	Other	4.8	1.4	4.8	4.4	3.4	.4
7	Self	11.1	9.0	23.5	8.6	2.1	14.9
	Other	10.4	12.1	24.6	8.9	-1.7	15.5
8	Self	8.9	5.9	13.3	8.5	3.0	4.8
	Other	3.4	2.1	6.8	3.7	1.3	3.1
9	Self	32.9	26.0	29.5	26.4	6.9	3.1
	Other	16.7	12.0	15.1	13.6	4.7	.5
10	Self	13.0	9.0	18.7	11.3	4.0	7.4
	Other	14.4	9.0	19.5	9.9	5.4	9.6
11	Self	8.3	9.2	18.7	4.8	-.9	13.9
	Other	6.9	6.5	12.9	5.5	.4	7.4

Table V.-

Scores for the Accident Group on the Two Interpersonal Axes of Dominance-Submission (DOM) and Love-Hostility (LOV) including Individual Scores for Dominance, Submission, Love and Hostility. The Number of Paper and Orientation of the Answering Subject are given (N = 18).

Number of Paper	Orientation	Indices				DOM	LOV
		D	S	L	H		
12	Self	17.6	10.3	20.5	14.4	7.3	6.1
	Other	21.6	10.3	21.8	16.1	11.3	5.7
13	Self	15.8	7.2	19.8	12.2	8.6	7.6
	Other	11.3	4.4	9.2	6.5	6.9	2.6
14	Self	12.8	15.4	22.9	8.3	-2.6	14.6
	Other	13.1	14.3	24.6	6.8	-1.2	17.8
15	Self	9.5	9.3	10.3	7.5	.2	2.8
	Other	9.2	10.7	5.2	8.7	-1.5	-3.5
16	Self	23.7	12.0	27.0	14.7	11.7	12.3
	Other	23.7	11.0	28.4	13.3	12.7	15.1
17	Self	15.9	14.9	20.3	14.4	1.1	5.9
	Other	14.8	7.9	14.7	13.0	6.9	1.7
18	Self	15.1	14.0	17.1	14.0	1.1	3.1
	Other	6.9	6.5	7.6	6.8	.4	.8

Table VI.-

Scores for the Non-Accident Group on the Two Interpersonal Axes of Dominance-Submission (DOM) and Love-Hostility (LOV) including Individual Scores for Dominance, Submission, Love and Hostility. The Number of Paper and Orientation of the Answering Subject are given (N = 35).

Number of Paper	Orientation	D	S	L	H	DOM	LOV
1	Self	18.8	8.0	21.5	12.3	10.8	9.2
	Other	15.8	8.3	18.4	14.7	7.5	3.7
2	Self	14.8	13.7	20.5	12.0	1.1	8.5
	Other	14.1	11.6	15.4	11.3	2.5	4.1
3	Self	12.4	11.6	20.5	6.5	1.8	14.0
	Other	2.4	5.1	4.1	1.4	-2.7	2.7
4	Self	13.0	12.3	14.8	9.5	.7	5.3
	Other	16.5	11.6	20.2	10.9	4.9	9.3
5	Self	11.4	9.6	16.7	12.3	1.8	4.4
	Other	14.8	9.6	18.4	14.0	5.2	4.4
6	Self	14.8	16.5	17.5	15.8	-1.7	1.7
	Other	14.4	12.0	16.0	13.4	2.4	2.6
7	Self	14.8	11.3	14.4	11.7	3.5	2.7
	Other	9.6	3.8	7.5	6.9	5.8	.6
8	Self	14.4	5.9	18.4	7.9	8.5	10.5
	Other	9.2	2.4	8.8	5.8	6.8	3.0
9	Self	13.5	13.0	21.9	9.6	.5	12.3
	Other	11.4	8.6	20.2	5.8	2.8	14.4
10	Self	11.3	8.9	10.3	7.8	2.4	.4
	Other	6.2	6.8	6.9	6.1	-.6	.8
11	Self	14.7	9.6	21.5	6.8	5.1	14.7
	Other	14.0	6.5	19.4	5.1	7.5	14.3

Table VI.-

Scores for the Non-Accident Group on the Two Interpersonal Axes of Dominance-Submission (DOM) and Love-Hostility (LOV) including Individual Scores for Dominance, Submission, Love and Hostility. The Number of Paper and Orientation of the Answering Subject are given (N=35).

Number of Paper	Orientation	D	S	L	H	DOM	LOV
12	Self	17.5	6.9	19.4	12.0	10.6	7.4
	Other	14.1	4.2	18.1	4.2	9.9	13.9
13	Self	10.3	8.6	17.4	7.5	1.7	9.9
	Other	13.7	10.7	20.1	9.3	3.0	10.8
14	Self	6.8	10.2	9.8	7.2	-3.4	2.6
	Other	7.5	8.1	7.8	5.8	-.6	2.0
15	Self	13.0	10.3	16.4	10.9	2.7	5.5
	Other	11.9	11.3	14.7	7.5	.6	7.2
16	Self	22.6	16.8	24.9	17.5	5.8	7.4
	Other	30.9	25.0	32.6	20.3	5.9	12.3
17	Self	14.1	9.6	14.4	13.3	4.5	1.1
	Other	14.1	9.9	15.4	11.6	4.2	3.8
18	Self	9.7	15.6	19.5	5.8	-5.9	13.7
	Other	4.8	7.9	19.0	2.7	-3.1	16.3
19	Self	23.7	17.0	28.7	17.0	6.7	11.7
	Other	27.7	20.8	32.5	16.0	6.9	16.5
20	Self	4.8	6.2	9.5	5.5	-1.4	4.0
	Other	11.6	5.5	10.1	10.0	6.1	.1
21	Self	15.0	7.6	18.8	6.8	7.4	12.0
	Other	13.4	4.9	19.5	6.8	8.5	12.7
22	Self	13.8	7.5	14.7	7.6	6.3	7.1
	Other	11.4	5.2	12.3	10.3	6.2	2.0

Table VI.-

Scores for the Non-Accident Group on the Two Interpersonal Axes of Dominance-Submission (DOM) and Love-Hostility (LOV) including Individual Scores for Dominance, Submission, Love and Hostility. The Number of Paper and Orientation of the Answering Subject are given (N = 35).

Number of Paper	Orientation					DOM	LOV
		D	S	L	H		
23	Self	16.9	10.7	28.0	10.6	6.2	17.4
	Other	16.5	4.9	23.9	8.5	11.6	15.4
24	Self	13.1	9.6	19.8	11.9	3.5	7.9
	Other	10.7	7.9	17.4	9.2	2.8	8.2
25	Self	18.6	10.6	19.5	11.7	8.0	7.8
	Other	17.2	4.8	16.7	11.3	12.4	5.4
26	Self	17.4	10.6	21.8	11.2	6.8	10.6
	Other	10.3	6.5	12.3	9.5	3.8	2.8
27	Self	14.4	8.3	18.1	9.6	6.1	8.5
	Other	19.2	13.1	24.9	13.4	6.1	11.5
28	Self	18.8	14.7	22.2	13.3	4.1	8.9
	Other	17.5	11.9	19.8	12.6	5.6	7.2
29	Self	15.5	8.9	21.1	12.3	6.6	8.7
	Other	14.4	8.6	20.8	10.2	5.8	10.6
30	Self	13.1	11.3	18.8	7.6	1.8	11.2
	Other	6.9	9.5	11.9	3.5	-2.6	8.4
31	Self	13.8	13.4	16.5	12.7	.4	3.8
	Other	7.2	8.2	13.6	4.8	-1.0	8.8
32	Self	12.4	4.1	11.6	7.9	8.3	3.7
	Other	11.6	4.5	8.5	11.6	7.1	-3.1
33	Self	13.7	6.2	15.7	10.2	7.5	5.5
	Other	8.9	5.2	10.5	8.6	3.7	1.9

Table VI.-

Scores for the Non-Accident Group on the Two Interpersonal Axes of Dominance-Submission (DOM) and Love-Hostility (LOV) including Individual Scores for Dominance, Submission, Love and Hostility. The Number of Paper and Orientation of the Answering Subject are given (N = 35).

Number of Paper	Orientation	Orientation				DOM	LOV
		D	S	L	H		
34	Self	18.2	10.6	16.8	12.0	7.6	4.8
	Other	19.9	11.3	18.5	14.7	8.6	3.8
35	Self	13.7	6.2	12.3	10.6	7.5	1.7
	Other	11.6	4.8	9.2	9.2	6.8	0.0

APPENDIX 5

ABSTRACT OF

An Investigation of Interpersonal Aspects of Industrial Accident and Non-Accident Men¹

The industrial accident has caused a considerable number of problems for psychologists and industrial personnel workers. The cost of industrial accidents each year is prohibitive. Many studies have been performed in an attempt to determine common factors in those men who are considered to be accident prone. These are men who have had more accidents than can be attributed to them on a chance expectancy basis. Although many possibilities have been suggested, few definite patterns have been determined.

The possibility of "surface" or conscious aspects of the personality (as contrasted with "deep" or unconscious factors) being paramount to the accident prone personality has been suggested. Recently the Interpersonal System of Diagnosis postulated that various levels of personality exist, one of which is that of conscious communication. This level is analogous to the "surface" aspects as mentioned above. One measure of this level of personality is The Interpersonal Check List. On the basis of this List as a measure of a level of personality

¹ Earl J. Kronenberger, Unpublished Ph.D. thesis, presented to the School of Psychology and Education of the University of Ottawa, Ontario, June, 1959, vi-87 p.

considered to be "surface", are there any differences between industrial accident and accident free groups?

Industrial accident and non-accident groups of 18 and 35 white men respectively were chosen at random from the manufacturing division of a large industrial firm. The accident group was composed of men who had three factory incurred industrial accidents during 1958 whereas the non-accident group had none. Both groups were administered The Interpersonal Check List in which the men were asked to check those adjectives as they applied to themselves and, again, as they felt others, in general, felt about them.

The results were analyzed utilizing the "t" test of significance on raw scores for the axes of the interpersonal system called DOM (Dominance-Submission) and LOV (Love-Hostility) and the four components involved. Five null hypotheses were tested. No significant differences were noted; the hypotheses were not rejected and the differences between the means of the groups could be attributed to chance. The "t" for Hostility-Self between the two groups came close to being significant at the .10 level of confidence. This trend toward hostility of self in the accident group was noted along with a slight trend that the accident group scores were constantly lower on the DOM and LOV axes. The results were discussed considering various factors involved in the study.