LOCUS OF CONTROL IN RELATION TO SUPER'S THEORY OF VOCATIONAL MATURITY DURING ADOLESCENCE

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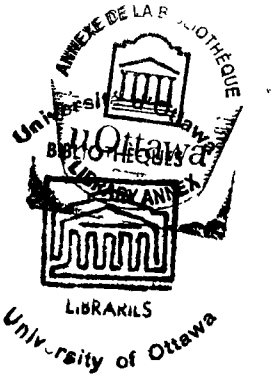

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Janice Lokan was born in Adelaide, South Australia, in 1935. She obtained the Degree of Bachelor of Arts, majoring in Pure Mathematics and English, from the University of Adelaide in 1956, and the post-graduate Diploma of Education from the same university in 1968.

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INTRODUCTION

The process of choosing an occupation in our society has been recognized for some time to be complex, extending over many years of a person's life. One of the most crucial periods in this process occurs during the high school years, when students first meet the need to make decisions which may vitally affect their future careers. In view of the growing number of career possibilities and educational programme options which have become available in recent years, it seems likely that it will become more difficult for many high school students to make career-related decisions wisely. There is, therefore, a pressing need for counselling and guidance personnel to understand the nature of successful pre-vocational coping behaviours, how these behaviours develop, and to what factors they are related.

An important vocational psychology theory focussing on the development of vocationally relevant traits, attitudes and behaviours during adolescence is that of Professor D. E. Super. Super's theory and research have provided detailed expositions of the vocational behaviours deemed appropriate for adolescents in western societies, and the process through which these behaviours are thought to develop. Individual differences in the attainment of these behaviours have been both postulated and demonstrated to exist. While emphasis has been placed on identifying attitudes and behaviours which signify adolescent vocational maturity, however, considerably less is known about factors which facilitate this

maturity. In particular, the domain of personality variables has been virtually neglected in investigations of factors related to vocational maturity in adolescence.

The present thesis is addressed to the problem of identifying, through analysis of relevant theory and a subsequent research study, a personality dimension which may contribute to our understanding of why appropriate vocational attitudes and behaviours are developed more readily by some adolescents than by others. The personality dimension is the locus of control construct arising from the Social Learning Theory of Professor J. B. Rotter. Analysis of theory and research pertaining to this construct, together with an analysis of Super's theory, suggest the existence of a relationship between degree of internality of control and degree of success in attaining the vocational attitudes and behaviours appropriate to adolescence.

The thesis is organized in three parts. Overviews of both Super's and Rotter's theories, with emphasis on the constructs of vocational maturity and locus of control, are given in the first chapter together with a review of relevant research literature. These overviews are followed by a discussion of links between the two theories, and a general statement of the research hypothesis. In the second chapter the instruments selected for use are described, and the design of the study is presented. A description of the data collection methods and an outline of the statistical procedures used are also given. The results of the study are presented and discussed in the third chapter, which is followed by a summary and statement of conclusions.

CHAPTER I

THEORETICAL FRAMEWORK AND REVIEW OF THE LITERATURE

In this chapter, overviews of Super's theory of vocational development and of Rotter's Social Learning Theory of Personality are given. For each theory, the overview is followed by a more detailed discussion of the construct selected for study, and a review of literature relevant to that construct. Connections between the two theories are then discussed in a separate section, together with a review of pertinent research studies. The chapter concludes with a general statement of the research hypothesis.

1. Super's Developmental Theory of Vocational Behaviour.

For most of the first half of this century, man's vocational behaviour was thought to consist merely of the single action of choosing an occupation. This action was considered to occur at a single point in time, usually determined by when the individual finished some phase of his formal education. Vocational guidance was largely a matter of matching the characteristics of people with requirements of jobs.

In the early 1950's, however, building on his own earlier work[1] and current work of Ginzberg and his associates,[2] Super[3] argued that vocational behaviour, far from being a single event, involves a long-term process encompassing most of man's life-time. He suggested that the term "development" be used to describe the process rather than "choice", because it comprehends the concepts of preference, choice, entry and adjustment, all of which he considered to be relevant vocational behaviours.[4]

In the theory, vocational behaviour is defined by Super as:

> "any interaction between an individual and his environment which is significantly related to preparation for, participation in, or retirement from work",[5]

and vocational development is defined as:

> "the process of growth and learning which subsumes all instances of vocational behavior".[6]

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1 Super, D. E., The Dynamics of Vocational Adjustment, New York, Harper, 1942.

2 Ginzberg, E., S. W. Ginsburg, S. Axelrad, and J. L. Herma, Occupational Choice, New York, Columbia University Press, 1951.

3 Super, D. E., "A Theory of Vocational Development", in American Psychologist, Vol. 8, 1953, p. 185-190.

4 Super, D. E., Idem, ibid., p. 187.

5 Super, D. E., J. O. Crites, R. C. Hummel, H. P. Moser, P. L. Overstreet, and C. F. Warnath, Vocational Development: A Framework for Research, New York, Teachers College, Columbia University, 1957, p. 131.

6 Super, D. E., et al., Idem, ibid., p. 131.

The theory is built on several basic assumptions. Super views man as a complex organism, constantly interacting with his environment[7] - vocational behaviour is seen as encompassing one class of such interactions. Further, the environment (society) is seen as the context within which the appropriateness of given vocational behaviours is determined.[8] Vocational development is assumed to be an aspect of general development, and thus basic principles of developmental psychology are assumed to be applicable.[9]

Man's vocational development is postulated to occur throughout his entire life span, proceeding in an orderly and, therefore, predictable way.[10] Borrowing a concept from developmental psychology, Super proposes five vocational life stages as a framework within which to describe the vocational development process, with each stage characterized by a set of appropriate vocational behaviours.[11] The patterning of these behaviours is explained through the concept of the vocational developmental task, defined as:

> "a task encountered at or about a certain period in the life of an individual and deriving from the expectation that the members of a social group manifest a relatively orderly behavioral sequence in preparing for and participating in the activity of work".[12]

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7 Super, D. E., et al., Op. Cit., p. 26.

8 Idem, ibid., p. 43.

9 Idem, ibid., p. 63.

10 Idem, ibid., p. 26.

11 Idem, ibid., p. 37.

12 Idem, ibid., p. 131.

By and large, both the life stages and tasks are seen as prescribed for individuals by the demands of the society in which they live.[13]

According to the principles of a developmental theory, the tasks appropriate to one life stage or substage must be accomplished before the tasks of the next stage or substage can be coped with.[14] A person's level of vocational development, then, can be assessed in terms of his degree of success in coping with the developmental tasks characteristic of his particular stage or substage. In order that levels of vocational development among individuals could be assessed, Super introduced the concept of vocational maturity.[15]

Two kinds of vocational maturity are defined in the theory. Vocational Maturity I is

> "the actual life stage of an individual in relation to his expected life stage (based on chronological age)".[16]

This definition implies a ratio approach, in which vocational behaviour is compared with age to ascertain if the observed level of development is appropriate for the age level.

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13 Super, D. E., et al., Op. Cit., p. 45.

14 Idem, ibid., p. 35.

15 Super, D. E., "Dimensions and Measurement of Vocational Maturity", in Teachers College Record, Vol. 57, 1955, p. 151-163.

16 Super, D. E., et al., Op. Cit., p. 132.

Vocational Maturity II is

> "the maturity of an individual's vocationally relevant behavior in his actual life stage (whether or not it is the life stage expected of him) as shown by his behavior in dealing with the vocational developmental tasks as compared with the behavior of others dealing with the same developmental tasks".[17]

In this approach, the individual's maturity is assessed by comparing his behaviour with that of others, not with other aspects of his own development. Super considers the second of these to be the more important, with the result that his research efforts have been directed toward clarifying the nature of Vocational Maturity II as a construct. For the remainder of this paper, the term vocational maturity is used in the sense of Super's definition of Vocational Maturity II.

Although the focus of this study is on the vocational maturity segment of Super's theory, it is useful here to look briefly at another segment, the one involving self concept development. The two are usually presented separately, but it is fundamental to the theory that self concept development occurs along with vocational development, and the various life stages have been linked by Super with the various stages in the evolution of the vocational self concept.[18]

According to Super, each individual has a system of self concepts - pictures of himself in different roles in different types of situations.

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17 Super, D. E., and P. L. Overstreet, The Vocational Maturity of Ninth Grade Boys, New York, Teachers College, Columbia University, 1960, p. 141.

18 Super, D. E., The Psychology of Careers, New York, Harper, 1957.

His vocational self concept, defined as "the constellation of self-attributes which the individual considers vocationally relevant",[19] is only one element of his over-all self concept. When a person expresses a vocational preference, he is putting into occupational terminology his idea of the kind of person he is; when he actually chooses and enters an occupation, he is implementing his vocational self concept; in getting established in an occupation that is consonant with his vocational self concept, he achieves self actualization.[20]

While most of what Super has written about self concept and occupational choice involves the development of a vocational rather than a general self concept, it is clear that he sees the two as inter-related. He postulates that the person's vocational self concept may be the most important element of his over-all self concept system, and that a positive vocational self concept is probably necessary for a positive over-all self concept:

> "If a person cannot 'be himself' in such a major segment of his life, if the (work) role in which he is cast ... is not congenial, it seems unlikely that his life satisfactions can be significant or that his general adjustment can be good".[21]

The person who is well adjusted in vocational matters is the person who is coping satisfactorily with the vocational developmental tasks

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19 Super, D. E., "Toward Making Self-Concept Theory Operational", in Career Development: Self Concept Theory, Princeton, New Jersey, College Entrance Examination Board, 1963, p. 19.

20 Super, D. E., "Self Concepts in Vocational Development", in Career Development: Self Concept Theory, Princeton, New Jersey, College Entrance Examination Board, 1963, p. 1.

21 Super, D. E., Op. Cit., 1957, p. 293.

appropriate to his life stage - that is, the person who is vocationally mature. But the person who is well adjusted in vocational matters is also the person who has a positive self concept. Thus, we have a generaliz picture of the individual who is vocationally mature as having a positive self concept, and as coping well with the tasks required of him at his particular life stage - certainly the vocational developmental tasks, and probably others as well.

In the present study, the concern is with the life stage, or stages, appropriate for high school students in Canada - that is, for adolescents between thirteen or fourteen years of age and about eighteen years of age. According to Super, the relevant stages are the last two years of the first life stage (the Growth stage) and the first part of the second life stage (the Tentative substage of the Exploration stage).[22] These encompass one of the most critical periods of vocational development, since it is during this period that the vocational self concept is formulated.[23] The vocational developmental task appropriate to this period is crystallizing a vocational preference.[24] This is accomplished through the individual's forming a view of himself in relation to the world of work (formulating his vocational self concept), which is accomplished through the process of Exploration.[25]

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22 Super, D. E., et al., Op. Cit., p. 40.

23 Idem, ibid., p. 91.

24 Super, D. E., "Vocational Development in Adolescence and Early Adulthood: Tasks and Behaviors", in Career Development: Self Concept Theory. Princeton, New Jersey, College Entrance Examination Board, 1963, p. 80.

25 Jordaan, J. P., "Exploratory Behavior: The Formation of Self and Occupational Concepts", in Career Development: Self Concept Theory. Princeton, N. J., College Entrance Examination Board, 1963, p. 60.

Exploration is seen as a psychological process, involving behaviour that is problem-solving in nature, in which the individual engages because of a felt desire or need.[26] During this process, the individual undertakes many kinds of activities, all involving the seeking of information.[27] The information sought may be either new or confirmatory. Exploratory behaviour is described by Jordaan, a colleague of Super's, as characterized by search, investigation, trial, experimentation and hypothesis-testing.[28] Typically, the individual seeks information about himself and jobs, then tests tentative preferences (hypotheses about himself) through role playing, either actual or imagined. As he progresses toward formulating his vocational self concept, he also becomes more concerned with social participation and reality testing.[29]

All exploratory behaviour is seen as basically purposeful, though Jordaan acknowledges that the individual who is engaging in it may or may not be aware of its purpose, its origin, or the fact that he is exploring.[30] To describe exploratory behaviour in more detail, Jordaan proposes ten continua along which an instance of such behaviour may be viewed.[31] These are represented by their poles as:

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26 Jordaan, J. P., Op. Cit., p. 54

27 Idem, ibid., p. 57.

28 Idem, ibid., p. 56.

29 Idem, ibid., p. 51.

30 Idem, ibid., p. 55.

31 Idem, ibid., p. 64.

1)	Intended	Fortuitous
2)	Systematic	Random
3)	Recognized as exploration	Not so recognized
4)	Self-oriented	Environment-oriented
5)	Self-initiated	Other-initiated
6)	Contemporaneous	Retrospective
7)	Motor	Mental
8)	Intrinsic	Extrinsic
9)	Behaviour modifying	Fruitless
10)	Vocationally relevant	Vocationally irrelevant

Jordaan hypothesizes that exploration which is cognitively guided, systematic, and undertaken purposefully is more likely to increase a person's understanding of himself and the world of work than exploratory behaviour which is not.[32] Hence, by comparing attributes in the above list of criteria with Jordaan's description of effective exploration, it can be inferred that the most adequate exploratory behaviour is likely to be intended, systematic, recognized as exploration, self-initiated, mental, intrinsic, behaviour-modifying and vocationally relevant.

The generalized picture of the vocationally mature adolescent as one with a healthy self concept, who is coping well with the process of formulating his vocational self concept, which, in turn, facilitates his crystallization of a vocational preference, can now be expanded. On

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32 Jordaan, J. P., Op. Cit., p. 77.

the basis of theory concerning the nature of effective exploration, the vocationally mature adolescent's behaviour can be described as goal-directe planful, characterized by awareness, and vocationally relevant.

Whereas Jordaan's work focusses on the process, or dynamics, of exploration, Super, in developing his theory on the construct of vocational maturity in adolescence, approaches exploration from a somewhat different point of view. He identifies eleven attitudes and behaviours deemed to be important in the adolescent's crystallization of a vocational preference which by implication must also be important in the exploration process. Some of the attitudes and behaviours facilitate exploration, some are outcomes of exploration and some show the form the exploration takes.[33] The attitudes and behaviours, listed here because they form the basis for Super's elaboration of the vocational maturity construct, are the following

1) Awareness of the need to crystallize
2) Use of resources
3) Awareness of factors to consider in formulating a preference
4) Awareness of contingencies which may affect goals
5) Differentiation of interests and values
6) Awareness of present-future relationships
7) Formulation of a generalized preference
8) Consistency of preference
9) Possession of information concerning the preferred occupation
10) Planning for the preferred occupation
11) Wisdom of the vocational preference.[34]

It follows that vocationally mature adolescents would be expected to have greater degrees of these attitudes and behaviours than adolescents

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33 Jordaan, J. P. Op. Cit., p. 50.

34 Super, D. E., Op. Cit., 1963, p. 84.

who are vocationally immature. By way of summary, the attributes depict the vocationally mature adolescent as one whose behaviour is characterized by awareness, planfulness, systematic information-seeking activities, and realism - a picture which complements Jordaan's description of the attributes of effective exploratory behaviour.

One further important attribute can be added to the above characteristics of the behaviour of vocationally mature individuals. This attribute, readiness to learn from past experience, arises by inference from other aspects of Super's writing rather than from the list of facilitating attitudes and behaviours already discussed. Vocational development is defined as a process of growth and learning,[35] therefore, by definition, the individual whose vocational development is proceeding satisfactorily must be learning effectively. Super's view of learning is that new behaviour is always based on old behaviour, and that learning takes place when an individual uses his knowledge from past learning experiences to add to or to modify his existing repertoire of behaviours when he is faced with the need to carry out a task.[36] The individual whose attitude is one of readiness to learn from past experience seems more likely to learn effectively, and thus to be more vocationally mature, than the individual who does not have this attitude.

As well as providing a detailed description of vocational development during adolescence and specifying, on a theoretical level, the

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35 Super, D. E., et al., Op. Cit., 1957, p. 131.

36 Idem, ibid., p. 45.

nature of effective coping behaviours in matters relating to this development, Super and his colleagues have conducted a great deal of research directed toward validating their theory. Their research on vocational maturity in adolescence is reviewed in the next section.

2. Dimensions of Vocational Maturity in Adolescence: Review of Research.

From a consideration of behaviours likely to be required in the developmental task of crystallizing a vocational preference, and some preliminary empirical work, Super[37] hypothesized twenty possible indices, or measures, of vocational maturity for the early years of the exploratory life stage. The hypothesized indices and their grouping into six major dimensions are shown in Table I.

To test his hypotheses, Super turned to his on-going Career Pattern Study (CPS). In this study, the vocational behaviours of about 270 boys in a representative New York town were to be followed for twenty years, beginning in 1951 when the boys were in eighth and ninth grades. The proposed indices were mostly assessed from lengthy interviews, conducted initially with the boys who were in ninth grade.[38]

Super reasoned that, for the indices to be regarded as valid measures of a construct, the sets of scores obtained on the indices by a group of individuals should be significantly correlated with each other.

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37 Super, D. E., 1955, Op. Cit., p. 151-163.

38 Super, D. E. and P. L. Overstreet, Op. Cit., p. 35.

Table I.-

Super's Hypothesized Dimensions and Indices of Vocational Maturity in Adolescence.

Dimension I.	Orientation to Vocational Choice
IA.	Concern with Choice
IB.	Use of Resources
Dimension II.	Information and Planning
IIA.	Specificity of Information
IIB.	Specificity of Planning
IIC.	Extent of Planning Activity
Dimension III.	Consistency of Vocational Preferences
IIIA.	Consistency within Fields
IIIB.	Consistency within Levels
IIIC.	Consistency within Families
Dimension IV.	Crystallization of Traits
IVA.	Patterning of Interests
IVB.	Interest Maturity
IVC.	Liking for Work
IVD.	Patterning of Work Values
IVE.	Concern for Rewards of Work
IVF.	Acceptance of Responsibility for Decision Making
Dimension V.	Vocational Independence
VA.	Independence of Work Experience
Dimension VI.	Wisdom of Vocational Preferences
VIA.	Agreement: Ability and Preference
VIB.	Agreement: Interests and Preference
VIC.	Agreement: Interests and Fantasy Preferences
VID.	Agreement: Level of Interests and Preference
VIE.	Socioeconomic Accessibility

Only if the indices were found to be interrelated could they be considered to contribute to a higher order dimension embracing all the indices.[39] Results for the 132 boys whose data were analysed at this stage of the study, however, yielded few of the expected relationships.

Based on the relationships found, only six of the twenty indices were judged to have construct validity for the sample of ninth grade boys studied. Five of these indices were:

1) Concern with choice
2) Acceptance of responsibility for career planning
3) Specificity of information
4) Specificity of planning

and 5) Extent of planning,

all of which Super considered could be clustered together to define an overall dimension of Orientation to Vocational Choice Tasks.[40] The sixth index, Use of Resources, which correlated significantly with three of the five indices listed above, was also retained at this stage as a potentially valid measure.[41] On the basis of these results, which provided only weak support for the hypothesized dimensions, Super concluded that vocational maturity in the ninth grade boys studied consisted of behaviour which might be characterized as preparation for vocational choice. However, few of the boys appeared to be ready to make such a choice at this stage.[42]

As a further step in understanding the structure of the vocational maturity construct, a factor analysis of elements of the four most

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39 Super, D.E., and P. L. Overstreet, Op. Cit., p. 49.

40 Idem, ibid., p. 60.

41 Idem, ibid., p. 60.

42 Idem, ibid., p. 63.

adequate indices of vocational maturity (the first four of the six given above) together with elements of one other index (Independence of Work Experience) was carried out. Altogether twenty-seven elements were included in this analysis. Five factors were extracted, accounting for 38% of the variance.[43] The factors were identified as:

1) Planning Orientation
2) Independence of Work Experience
3) The Long View Ahead
4) The Short View Ahead
5) The Intermediate View.[44]

Super concluded from these results that the vocational maturity of his ninth grade subjects appeared to consist of one general factor, Planning Orientation, and three group factors reflecting tendencies to focus on different time periods in the present and approaching life stages.[45]

In keeping with the longitudinal design of the CPS, Super's research on vocational maturity and development moved on after 1960 to studying the coping behaviours characteristic of later vocational life stages and substages. More recently, Super[46] extended his earlier model of vocational maturity for the adolescent years to incorporate changes in the structure of the construct over time - that is, he proposed specifications for a developmental model. The revised model is shown in Table II, in the form of hypothesized correlations between vocational maturity variables at various grade levels and appropriate criteria at age 25.

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43 Super, D. E., and P. L. Overstreet, Op. Cit., p. 67.

44 Idem, ibid., p. 69-71.

45 Idem, ibid., p. 75.

46 Super, D. E., "Vocational Maturity Theory", in Measuring Vocational Maturity for Counseling and Evaluation, Washington, D.C., National Vocational Guidance Association Monograph, 1974, p. 9-21.

Table II.-

Hypothesized Correlations* Between Vocational Maturity Variables at Various Grade Levels and Appropriate Criterion Variables at Age 25.[47]

Dimension or Second Order Factor	First Order Factor	Correlation with Appropriately Varying Criteria at Age 25						
		Grade						
		8	9	10	11	12	13	14
Planfulness or Time Perspective Awareness of Life Stages and Tasks (Attitude)	A) Distant Future	.25	.25	.25	.30	.35	.35	.40
	B) Intermediate Future	.05	.10	.15	.15	.20	.25	.25
	C) Present	.20	.20	.25	.25	.30	.30	.35
Exploration (Attitude)	D) Querying	.25	.25	.25	.30	.30	.35	.40
	E) Resources	.25	.25	.25	.30	.35	.35	.40
	F) Participation	.20	.20	.25	.25	.30	.35	.40
Information Educational and Occupational (Cognitive)	G) Education and Training	.15	.20	.25	.25	.30	.35	.40
	H) Entry Requirements	.05	.10	.15	.20	.25	.30	.35
	I) Duties	.05	.10	.15	.20	.25	.30	.40
	J) Supply and Demand	.05	.10	.15	.20	.25	.30	.35
	K) Conditions	.00	.00	.00	.15	.20	.25	.30
	L) Advancement	.00	.00	.00	.00	.10	.15	.20
Decision Making (Cognitive)	M) Principles	.15	.20	.25	.25	.30	.35	.40
	N) Practice	.10	.15	.20	.25	.30	.35	.40
Reality Orientation (Late-Maturing)	O) Self-Knowledge	.10	.10	.15	.15	.20	.25	.30
	P) Realism	.00	.00	.00	.15	.20	.20	.25
	Q) Consistency	.00	.00	.00	.20	.20	.25	.25
	R) Crystallization	.00	.00	.00	.20	.20	.20	.25
	S) Work Experience	.00	.00	.00	.15	.20	.25	.25
Non Vocational Maturity Traits	Intelligence	.45	.45	.45	.45	.50	.55	.45
	Grades	.50	.50	.50	.55	.55	.55	.45
	SES	.30	.30	.30	.25	.25	.20	.20

* All values are "true" rather than "observed" correlation estimates, hypothesized on the basis of theory and modified by existing data, for a theoretical model which is both hypothetico-deductive and data-inductive.

47 Super, D. E., Op. Cit., 1974, p. 18.

In the evolution of this developmental model, data were collected on theoretically determined variables for the CPS boys in ninth and twelfth grades, and also in about their twenty-fifth year.[48] Further factor analyses were done on the ninth grade data, and on data from the same measures used in twelfth grade. These analyses yielded six factors, largely factors of educational, psychological and economic information, common to both grade levels. Several other factors, involving aspects of planning, independence, crystallization of interests and specification of preferences, showed some similarity at both grade levels. A further four factors appeared to be unique to one or the other grade level. Information about the preferred occupation, independence of work experience, and knowledge of working conditions and job opportunities were all found to increase from ninth to twelfth grades, as did degree of commitment, consideration of alternatives and consistency of preferences.[49] A few indices such as acceptance of responsibility, information on some aspects of the preferred occupation and awareness of contingencies (for example, continued parental financial support or the necessity of military service), were found to develop quite erratically between ninth and twelfth grades.[50] On the whole, however, the findings seem to indicate that vocational maturity is a valid developmental construct, both within and across life stages.

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48 Super, D. E., "Vocational Development Theory: Persons, Positions and Processes", in The Counseling Psychologist, Vol. 1, 1969, p. 2-9.

49 Idem, Ibid., 1969, p. 5.

50 Idem, ibid., p. 5.

The meaning of the construct of vocational maturity in adolescence was explored still further in the CPS by the inclusion of measures of several other variables hypothesized as correlates.[51] Altogether, twenty-eight additional variables were investigated. Intelligence, and various aspects of socio-economic status, family relationships, level of aspiration and psychological adjustment were all expected to be predictive of vocational maturity presumably in the sense of being determinants.[52] Criteria of achievement in several areas and "miscellaneous" variables such as age, birth order and religious background were also presumed to be correlates. With the total of scores (standardized) on the four most adequate indices, all from the "Orientation to Choice Tasks" dimension, used as the measure of vocational maturity, only about half the expected relationships were found. Super and Overstreet concluded that vocational maturity in the ninth grade boys studied was associated with living in an intellectually and culturally stimulating environment, having the intelligence to be able to respond to that environment, aspiring to higher rather than lower level occupations, and achieving in a variety of adolescent activities.[53] In a further analysis, ninth grade data on social status, intelligence, grades and participation in school and community activities were found to be almost as predictive of vocational success criteria ten years later as they were of ninth grade vocational maturity.[54]

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51 Super, D. E., and P. L. Overstreet, Op. Cit., p. 76.

52 Super, D. E. et al., Op. Cit., 1957, p. 45.

53 Super, D. E., and P. L. Overstreet, Idem, ibid., p. 147.

54 Super, D. E., Op. Cit., 1969, p. 6.

More evidence bearing on the validity of the construct of vocational maturity was provided by analyses in which the ninth and twelfth grade measures were related to criteria of vocational success at age 25. Occupational information in both ninth and twelfth grades, and planning and interest maturity in ninth grade, were found to be significant predictors of various criteria of later vocational success. Other indices, however, such as wisdom and realism of vocational choice (which, in any case, did not have construct validity in grade nine) were found to be unrelated to the later criteria.[55]

In summary, the evidence from Super's research indicates that his theoretical concept of vocational maturity is reasonably well supported. Many of the specified indices for high school students have been shown to increase with grade level and experience during the high school years, as would be expected in a construct hypothesized to be developmental. Further, some evidence of predictive validity for criteria of vocational success in young adulthood has been demonstrated for several of the indices which were considered to have construct validity at grades nine and twelve. From the theory and research, it has been determined that the vocationally mature adolescent is aware of the need to crystallize a vocational preference during his high school years, and is goal-directed and planful in the exploratory activities he undertakes to help himself achieve this crystallization. He is ready to learn from past experiences, engages in a variety of information-seeking activities, and is aware of

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55 Super, D. E., Op. Cit., 1969, p. 6.

his own responsibility in the process of making decisions relevant to his future career. In general terms, he is well-adjusted, with a healthy, realistic self concept.

The theory and research of Super and his colleagues provide thorough accounts of the nature of mature vocational behaviours in adolescence and the process of exploration through which these behaviours are thought to develop. That these behaviours are developed more readily by some individuals than by others, even under conditions of similar levels of opportunity, is widely acknowledged, and supported by research findings. However, only brief attention has been paid in the theory to the topic of factors which might give rise to individual differences in the attainment of vocational developmental tasks. Three groups of factors hypothesized as possibly affecting vocational behaviour have been identified - role expectation factors, personal factors (including intelligence, attitudes and personality variables) and situational factors (including economic and other level of opportunity factors).[56] These groups of factors have been considered more from the older "trait and factor" point of view of what kind of occupation a person might choose than from the point of view of the dynamics of vocational development, however. Almost no explanation is offered in the theory for the question of why individual differences in the attainment of vocational developmental tasks occur.

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56 Super, D. E., et al., Op. Cit., 1957, p. 47-53

Much remains to be known, therefore, about underlying factors which might account for differing degrees of effectiveness of exploratory behaviour during adolescence. It is proposed that some understanding of this question can be gained through an examination of the personality construct of locus of control. A discussion of this construct is given following an overview of the theory from which it arose.

3. Rotter's Social Learning Theory of Personality.

Rotter originally proposed his Social Learning Theory of personality in an endeavour to provide a system of constructs which would enable better description, prediction and control of human behaviour than was possible with other theories existing at the time.[57] His objective, as a clinical psychologist, was to provide an operational theory which, through allowing for the testing of hypotheses, would lead to the advancement of knowledge that could be applied to the "practical problems of human life".[58] In his theory, personality is defined by Rotter as:

> "a term or construct describing the aspect of a unified, complexly organized person that has to do with his characteristic modes of behaving or of interpreting the world in which he lives".[59]

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57 Rotter, J. B., Social Learning and Clinical Psychology, New York, Prentice-Hall, 1954, p. 84.

58 Rotter, J. B., J. E. Chance and E. J. Phares, Applications of a Social Learning Theory of Personality, New York, Holt, Rinehart and Winston, 1972, Preface.

59 Rotter, J. B., Op. Cit., p. 82.

Although he realized that theories of animal behaviour were too simplistic to describe complex human behaviour, Rotter's own theory was based on the reinforcement approach to learning because he felt that this approach had the advantage of leading readily to testable hypotheses.[60] To come closer to his objective of accounting for human behaviour in relatively complex situations, however, he attempted to integrate cognitive elements, for which he acknowledged his indebtedness to Adler, Tolman and Lewin, with the reinforcement elements of his theory.[61]

Rotter's Social Learning Theory (SLT) is one of several theories which postulate that virtually all human behaviour is learned, that this learning involves other people as well as the learner (hence the term "social") and that reinforcement plays a crucial role in what is learned. In specifying a number of basic principles and corollaries, Rotter postulates that the unit of investigation for the study of personality is the interaction of the individual and his meaningful environment.[62] Behaviour is assumed to be learned, to change with experience, and therefore to be modifiable.[63] Rotter postulates that psychological constructs, independent of constructs from any other field for their explanation, are sufficient for describing most instances of human behaviour.[64] They are not sufficient, however, for describing all such instances; for example, unlearned drives and reflexes cannot usefully be described in this way.[65]

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60 Rotter, J. B., et al., Op. Cit., Preface.

61 Idem, ibid., p. 1.

62 Rotter, J. B., Op. Cit., 1954, p. 85.

63 Idem, ibid., p. 86.

64 Idem, ibid., p. 88.

65 Idem, ibid., p. 92.

Behaviour which can usefully be described in terms of personality constructs presupposes particular levels or stages of development.[66]

In the theory a person's experiences, or interactions with his meaningful environment, are seen as influencing each other, with new experiences being partly a function of meanings acquired from past experiences, and old acquired meanings being changed by new experiences.[67] In general, behaviour as described by personality constructs is assumed to be motivated, or directed toward goals with the potential to satisfy the person's needs.[68] The person's needs, in turn, are seen as determined partly by his interaction with his meaningful environment.[69] For example, the goal of seeking a career is regarded as arising from a psychological need for social recognition,[70] but this need, in turn, is thought to be largely determined by the person's perceptions of the expectations of the society in which he lives.

In formal terms, Rotter proposes a system of four basic constructs to describe human behaviour and its determinants. The concept of reinforcement, which is featured in the definitions of three of the four basic constructs, is crucial to the exposition of the system. However, in providing a formal definition of the term "reinforcement" itself,

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66 Rotter, J. B., Op. Cit., 1954, p. 92.

67 Idem, ibid., p. 94.

68 Idem, ibid., p. 97.

69 Idem, ibid., p. 98.

70 Rotter, J. B., M. Seeman, and S. Liverant, "Internal Versus External Control of Reinforcements: A Major Variable in Behavior Theory", in Decisions, Values and Groups, N. F. Washburne (Ed.), London, Pergamon Press, 1962, p. 502.

Rotter uses one of the four basic constructs. An element of circularity is thus introduced into the system.

The formal definitions of the basic constructs and of the concept of reinforcement, presented in the order used by Rotter, are as follows:

1) Behaviour Potential (BP):

> "the potentiality of any behavior's occurring in any given situation or situations as calculated in relation to any single reinforcement or set of reinforcements"

2) Expectancy (E):

> "the probability held by the individual that a particular reinforcement will occur as a function of a specific behavior on his part in a specific situation or situations"

3) Reinforcement Value (RV):

> "the degree of the person's preference for that reinforcement to occur if the possibilities of occurrence of all alternatives were equal"

and 4) The Psychological Situation (s):

> "that which is experienced by the subject with the meanings that the subject gives to it".[71]

"Reinforcement" itself is defined as:

> "something that changes behavior in some observable way by either increasing or decreasing the potentiality of its occurrence".[72]

By definition, an event increasing the potential for a response to occur is regarded as a positive reinforcement; conversely, an event decreasing the potential for a response to occur is regarded as a negative reinforcement.

Both Behaviour Potential and Reinforcement Value are seen as relative concepts, existing only in relation to the rest of the set of behaviours or the set of preferences available to the individual. Reinforcement Value and Expectancy are considered to be systematically independent of

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71 Rotter, J. B., Op. Cit., 1954, p. 111.

72 Idem, ibid., p. 112.

each other, and none of the concepts is thought of as static. Rotter[73] postulates that, as a person meets new experiences, his expectancies and reinforcement values, and therefore his behaviour potentials, change.

The determinants of behaviour and the potential of a given behaviour to occur are thus considered in the theory to exist within functionally related systems. The relationship among the variables is indicated in the following simplified expression:

$$BP_s = f\ (E\ \&\ RV)$$

Stated verbally, the probability that a given behaviour or pattern of behaviours will occur in specific situations depends on the person's expectations concerning the outcomes of the behaviour(s) and his perceived values of those outcomes.

In any given situation, the theory presumes that the behaviour with the highest potential will be the one that actually occurs.[74] If all goals (reinforcements) were equally valued by a person, he would be expected to select the behaviour associated with his highest expectancy. Similarly, if all expectancies for a set of behaviours were equal, then the behaviour associated with the most valued goal would be selected. In reality, however, both expectancies and reinforcement values of each of a set of goals vary for a given individual, so that a combination of expectancy and reinforcement value for each goal needs to be considered. Although he refrains from specifying an exact formula for this combination, Rotter indicates that the best evidence available now suggests a multiplicative relationship .[75]

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73 Rotter, J. B., et al., Op. Cit., 1972, p. 16.

74 Idem, ibid., p. 15.

75 Idem, ibid., p. 16.

To summarize: Rotter describes man's behaviour as directed toward goals which, in general, are learned from his interaction with his meaningful environment. The occurrence of reinforcements is deemed to play a crucial role in determining what learning takes place. Reinforcements are presumed to act to strengthen an individual's expectation, or expectancy, that a particular behaviour will be followed by that reinforcement again in the same or similar situations in the future. Thus, the three important antecedents of behaviour in Rotter's theory are specified as the value the individual places on a particular reinforcement for himself, his expectancy that the reinforcement will occur, and his perception of his psychological situation at the time of the behaviour. All three of these variables are described in detail in Rotter's theory; only the expectancy variable, which is of particular interest in the present study, is discussed further here.

Expectancy is defined in the theory as a probability held by an individual that a specific reinforcement will occur in a given situation - in other words, it is defined as a subjective probability.[76] The subjective qualification is necessary, in Rotter's opinion, because expectancies are considered to depend not only on the individual's past history of reinforcements in the same or similar psychological situations, but also on his generalizations from related past experiences.[77] The large number

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76 Rotter, J. B., et al., Op. Cit., 1972, p. 24.

77 Idem, ibid., p. 24.

of level-of-aspiration studies which have clearly shown that marked and consistent individual differences occur among subjects in their expectancy statements, even under identical reinforcement patterns in an experiment, is cited by Rotter as evidence supporting the need for a generalization term as well as a specific term in the derivation of expectancies.[78]

In more formal terms, Rotter states that an individual's expectancy that a specific reinforcement will occur in a given situation (E_{s1}) is

> "a function of probability of occurrence based on past experience in situations perceived by S as the same (E'_{s1}) and his generalization of expectancies for the same or similar reinforcements to occur in other situations for the same or functionally related behaviors (GE)",
>
> or $E_{s1} = f(E'_{s1} \& GE)$.[79]

Thus, expectancy is seen as a function of both the expectancy specific to the situation and the generalized expectancy from a variety of other related situations. Rotter further proposes that the more experiences an individual has had in the same situation, the less his expectancy is influenced by his generalization from other situations. This relation is expressed formally as:

$$E_{s1} = f(E'_{s1} \& \frac{GE}{N_{s1}}),$$

where N_{s1} denotes a non-zero function of the number of experiences in the specific situation.[80]

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78 Rotter, J. B., et al., Op. Cit., 1972, p. 25.

79 Idem, ibid., p. 24.

80 Idem, ibid., p. 24-25.

Changes in expectancy are presumed to occur as a result of experience. Two general variables are hypothesized as operating to affect the size of expectancy changes, one being the surprise value of an occurrence of a reinforcement, the other being the number of the subject's previous experiences in the same situation.[81] Formally, Rotter states that the increment of a specific expectancy ($\Delta E'$) is a function of the difference between the actual occurrence and the previously held expectancy and that this increment diminishes as the subject has more experience in that specific situation.[82] This relationship is expressed as:

$$\Delta E' = f(\frac{O-E}{N}),$$

where O is the occurrence of the reinforcement (for a specific reinforcement, this would be 1.0 for occurrence, 0.0 for non-occurrence), E is a specific expectancy (expressed as a probability) and N is a non-zero function of the number of previous experiences in a given situation.[83]

In addition to the above two hypothesized variables, however, a further dimension has been found to exert considerable influence on expectancy changes. This dimension is the extent to which the subject perceives the situation as one in which the occurrence of the reinforcement depends on his own actions.[84] Since this dimension, frequently referred to as the skill-chance dimension of situations, and the closely related personality construct of internal versus external control of reinforcement are central to the present research, they will now be considered in some detail.

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81 Rotter, J. B., et al., Op. Cit., 1972, p. 28.

82 Idem, ibid., p. 28-29.

83 Idem, ibid., p. 29.

84 Idem, ibid., p. 30.

Originally, it was assumed in SLT that the occurrence of reinforcements, either positive or negative, would always affect a person's expectancies for the reinforcements to occur again. However, in practice it was observed that

> "clinical analysis of patients suggested that while some patients appear to gain from new experiences or to change their behavior as a result of new experiences, others seem to discount new experiences by attributing them to chance or to others and not to their own behavior or characteristics".[85]

This observation prompted Rotter and his colleagues to consider the possibility that under certain conditions the occurrence of a reinforcement either would not change expectancies, or would change them less than under other conditions. Their consideration led to the proposition that situations vary in the degree to which people perceive the occurrence of reinforcements as dependent on their own behaviour or characteristics rather than as dependent on the behaviour or characteristics of others.[86] An example given by Rotter involves a reinforcement which a person would construe as occurring by chance - finding a $5 bill on the pavement - contrasted with a reinforcement construed as being due to his own skill - being told that he played an excellent game of ping pong for someone just learning. In the first case the person probably would not continue to look for $5 bills on the pavement, but in the second case he would quite likely persist with learning to play ping pong.[87]

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85 Rotter, J. B., et al., Op. Cit., 1962, p. 474.

86 Idem, ibid., p. 474.

87 Idem, ibid., p. 474.

In order to incorporate the elements of skill versus chance situations, the perception of own characteristics versus the characteristics of others, and the perception of own potential to control the environment versus the influence of others in determining the occurrence of reinforcements, the general term internal versus external control of reinforcement[88] was introduced to the theory. A belief in external control is defined as the perception by the subject of a reinforcement

> "as following some action of his own but not being entirely contingent upon his action (... that is) the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him."[89]

A belief in internal control is defined as the perception of an event as

> "contingent upon his own behavior or his own relatively permanent characteristics".[90]

In general, then, internal control refers to the perception of events as being a consequence of one's own actions, thereby being under personal control, and external control refers to the perception of events as being generally unrelated to one's own actions, thereby being beyond personal control.

According to Rotter, the locus of control dimension is of major significance in understanding human behaviour in two ways:

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88 Rotter, J. B., et al., Op. Cit., 1962, p. 474.

89 Rotter, J. B., "Generalized Expectancies for Internal Versus External Control of Reinforcement", in Psychological Monographs, Vol. 80, (Whole No. 609), 1966, p. 1.

90 Idem, ibid., p. 1.

1) it affects the nature of learning processes in different kinds of situations for the same individual

and 2) consistent individual differences occur among people in the degree to which they are likely to attribute events to their own behaviours in a given situation.[91]

In general, Rotter believes that these differences are mostly attributable to the differing histories of reinforcement patterns experienced by individuals. Expectancies for behaviour-reinforcement sequences are built up as a result of experience. As a person acquires more experience he differentiates events which, for him, appear to be causally related to preceding events and those which appear to be not so related. Thus, depending on their differing histories of reinforcement, Rotter believes that individuals are likely to differ in the degree to which they attribute reinforcements to their own actions.[92] Past experiences, then, and the differing ways in which similar experiences can be interpreted by different individuals depending on their prior histories, are assumed to be responsible for the differences in feelings of personal control both within and among individuals.

Although the internal/external control variable is hypothesized to affect behaviour in learning situations, some writers believe that the implications of the construct for expectancy changes have not been fully incorporated into the formal part of the theory.[93] For example, the

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91 Rotter, J. B., Op. Cit., 1966, p. 1.

92 Idem, ibid., p. 2.

93 Cellura, A. R., "The Applications of Psychological Theory in Educational Settings: An Overview", in American Educational Research Journal, Vol. 6, 1969, p. 349-378.

assumption that the behaviour that occurs is the one with the highest potential could well be not equally valid for all positions on the internal-external dimension. As Cellura points out, if an individual believes that the source of reinforcement is an agent over which he has no control, it seems reasonable to assume that his efforts will be weakly motivated, if at all, even if the reinforcement is highly valued.[94] The individual may well behave in a random fashion, rather than make a selection among behaviours on the basis of their potentials.

Rotter theorizes that when a reinforcement is seen as not contingent on the person's own behaviour, its occurrence or non-occurrence will not increase or reduce an expectancy as much as when it is seen as contingent.[95] Learning is presumed to be behaviour change, and one determinant of behaviour change is changes in expectancies. Thus, where occurrence of reinforcements is seen as not contingent on the person's own actions, either because of the specific nature of the situation or the person's generalized belief in externality of control, or both, it is surmised that his expectancies do not change much, and that he will therefore learn less as a result of experience.[96] Several research studies, some of which will mow be reviewed, support this view.

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94 Cellura, A. R., Op. Cit., p. 366.

95 Rotter, J. B., Op. Cit., 1966, p. 2.

96 Rotter, J. B., et al., Op. Cit., 1972, p. 269.

As theory on the locus of control construct has developed, the conceptual similarity between the construct and several other psychological variables has been noted. For example, alienation, or the feeling of powerlessness on the part of an individual, was linked to externality of control by Seeman,[97] and Adler's concept of "striving for superiority" and White's concept of "competence" (referring to the individual's mastery of his environment) were thought by Lefcourt[98] to be closely related to internality of control. One of the major conceptions thought to bear some relationship to a belief in internal versus external control was that of need for achievement, with people high in need for achievement being expected to have some belief in their own ability to determine the outcome of their behaviour.[99]

On a theoretical level, individuals with a high belief in the internal control of reinforcement are described by Rotter as likely to believe in their own potential to change the world, and as likely to be ambitious, creative, innovative, or even revolutionary.[100] Individuals with a high belief in external control are expected to be relatively passive in any attempts to change the world, and to tend not to actively seek to better their position or condition or to increase the frequency and kind of reinforcements they normally receive .[101]

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97 Seeman, M., "On the Meaning of Alienation", in American Sociological Review, Vol. 24, 1959, p. 782-791.

98 Lefcourt, H. M., "Internal Versus External Control of Reinforcements: A Review", in Psychological Bulletin, Vol. 65, 1966, p. 206-229.

99 Rotter, J. B., Op. Cit., 1966, p. 3.

100 Rotter, J. B., et al., Op. Cit., 1962, p. 476.

101 Idem, ibid., p. 475.

Just as a great deal of research arising from their theory has been conducted by Super and his colleagues, Rotter and his colleagues have studied many aspects of social learning theory and locus of control. In recent years, studies on locus of control have also been carried out by many other investigators. Some of this research is summarized in the next section of the chapter. Two further studies, in which the relationship between variables closely approximating the locus of control and vocational maturity constructs has been investigated, are reviewed following the section in which links between the two theories are established.

4. Social Learning Theory and Locus of Control: Review of Selected Research.

The studies reviewed fall into three groups, according to the nature of the questions examined. The groups, which are reviewed in the order cited, consist of studies investigating the role of different kinds of situations and reinforcement schedules in learning, the relationship of locus of control to other psychological constructs such as intelligence and need for achievement, and the relationship of locus of control to information-seeking behaviour.

Rotter has reviewed several experiments carried out by himself or his colleagues which support the hypothesis that different kinds of learning situations produce different kinds of learning behaviour. In these studies, the occurrence of reinforcements in learning situations was presented to the subjects as skill determined (dependent on

their own skills) or as chance determined (for example, under the experimenter's control, or perhaps random). Typical of these experiments was one conducted by Phares, a student of Rotter's, which was reported in 1957. Using difficult colour and angle matching tasks, Phares instructed half his subjects that the tasks were so difficult that achieving success was a matter of luck. The other half were instructed that success was a matter of skill. A fixed schedule of partial reinforcement was followed, and expectancy was measured by the number of chips a subject would bet on his being correct on the next trial. As he had hypothesized, Phares found that the increments and decrements in expectancies following success and failure were significantly greater under skill conditions than under chance conditions. Expectancies were changed more often under skill conditions, but unusual changes, that is, increments after failure and decrements after success, tended to occur more often under chance conditions.[102]

In some other studies it was found that different reinforcement schedules, for example 50% versus 100% reinforcement, had differential effects on trials to extinction under skill and chance conditions. Greater generalization of expectancies from one task to another was found to occur under skill instructions than under chance instructions.[103] Rotter summarized the studies he reviewed as follows:

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102 Rotter, J. B., Op. Cit., 1966, p. 5-6.

103 Idem, ibid., p. 6-7.

> "Subjects are more likely to see a sequence of reinforcement as not being chance-controlled when the percentage of reinforcement significantly deviates from a 50-50 percentage in a right-wrong situation, when the sequence of reinforcements appears to have a pattern, when unusually long sequences of one and two alternative events occur, and when variability of performance is minimal in a task allowing for scoring along a continuum".[104]

He believed the findings from these studies to be relatively clear-cut in showing that when a subject perceives a task as outside his own control he relies on past experience less, and learns less.

Several studies exploring the nature of locus of control as a psychological construct have also been reviewed by Rotter. In support of the hypothesis that differences exist in the degree to which individuals are likely to attribute personal control to reward in the same situation, or set of situations, several attempts to measure belief in external control of reinforcements as a psychological variable have been made, beginning with the work of Phares and James in 1957. Using scales composed of items in a Likert format, these investigators found that the scales distributed individuals on a continuum from a predominant belief in externality, through mixed belief, to a predominant belief in internality. Both investigators found that subjects predominantly external in their attitudes tended to behave in ways similar to individuals placed experimentally in chance-controlled situations. The external subjects had more unusual shifts in expectancies, smaller increments and decrements following success and failure, and generalized less from one task to another.[105]

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104 Rotter, J. B., Op. Cit., 1966, p. 8.

105 Idem, ibid., p. 9.

Work with further revisions of these scales was done by Rotter and his colleagues, culminating in the publication in 1966 of Rotter's 23-item scale. The 23 items, in a forced-choice format, deal with the subjects' belief about how reinforcement is controlled in a variety of situations in the world, and the scale is thus considered to be a measure of generalized expectancy. The instrument, known as the I-E Scale, also includes six filler items, intended to make its purpose more ambiguous. This instrument, also, was found to distribute individuals on a continuum.[106]

Studies done by several researchers with the I-E Scale, and earlier measures, usually using college students as subjects (though some used prisoners, Peace-Corps volunteers, or high school seniors), generally showed low to negligible correlation with intelligence, minimal sex differences, and low relationships with such variables as adjustment and social desirability.[107] Two different studies examining the relationship between locus of control and manifest anxiety had inconsistent results.[108] Studies with college students showed no relationship between locus of control and father's occupational status.[109] However, studies with younger or non-college samples did find significant effects for social status, with internality being associated with higher social class.[110]

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106 Rotter, J. B., Op. Cit., 1966, p. 10.

107 Rotter, J. B., et al., Op. Cit., 1972, p. 283.

108 Idem, ibid., p. 282.

109 Idem, ibid., p. 283-284.

110 Idem, ibid., p. 284.

The work of McLelland et al,[111] Atkinson[112] and Crandall[113] was cited by Rotter as suggesting that people who are high in need for achievement very likely have some belief in their own ability to determine the outcome of their efforts. Findings from studies by Stack,[114] Crowne and Conn[115] and Franklin[116] supporting the hypothesis that students intending to go to college are significantly more internal than those not so intending were cited by Rotter as further evidence of a relationship between internality and need for achievement. In Franklin's study of a national stratified sample of 1,000 high school students, fifteen of seventeen hypothesized relationships between internality and reported evidences of achievement motivation were found to be significant. These

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111 McLelland, D., J. W. Atkinson, R. A. Clark and E. L. Lowell, "The Achievement Motive", Appleton-Century-Crofts, New York, 1953, cited in Psychological Monographs, Vol. 80, (Whole No.609), 1966, p. 3.

112 Atkinson, J. W., (Ed.), "Motives in Fantasy, Action and Society", Princeton, New Jersey, Van Nostrand, 1958, cited in Psychological Monographs, Vol. 80 (Whole No. 609), 1966, p. 3.

113 Crandall, V. J., "Achievement", in H. W. Stevenson et al., (Eds.), National Society for the Study of Education Yearbook: Part I: Child Psychology, Chicago, University of Chicago Press, 1963, cited in Psychological Monographs, Vol. 80, (Whole No. 609), 1966, p. 3.

114 Stack, J. J., "Individual Differences in the Reduction of Cognitive Dissonance: An Exploratory Study", unpublished doctoral dissertation, Ohio State University, 1963, cited in Psychological Monographs, Vol. 80, (Whole No. 609), 1966, p. 15.

115 Crowne, D. P. and L, K. Conn, "Personal Communication of Research Findings", cited in Psychological Monographs, Vol. 80, (Whole No. 609), 1966, p. 15.

116 Franklin, R. D., "Youth's Expectancies about Internal versus External Control of Reinforcement Related to N Variables", unpublished doctoral dissertation, Purdue University, 1963, cited in Psychological Monographs, Vol. 80, (Whole No. 609), 1966, p. 15.

included early attempts to investigate colleges, intention to go to college, and amount of time spent in studying.[117] In summarizing these studies, Rotter noted that the expected relationship between the tendency to perceive what happens to a person as dependent upon his own actions and greater motivation in achievement has generally been supported.[118]

Among the group of studies examining the relationship of locus of control to information-seeking behaviour are two early investigations of people's attempts to control their environments in important life situations which were conducted by colleagues of Rotter's. Using an earlier version of Rotter's 23-item I-E Scale, Seeman and Evans[119] studied forty-three matched pairs of white male tuberculosis patients, with each pair matched for occupational status, education and hospital experience, but differing on the I-E dimension. As hypothesized, they found that internals possessed more information about their condition, were rated by doctors and nurses (independently) as asking more questions about their illness, and were less satisfied with the amount of information they were being given by hospital personnel. In the following year, Seeman[120] then studied reformatory inmates, investigating the relationship between internality - externality and memory for various kinds of information to which they had been exposed in incidental fashion. With the effects of intelligence removed statis-

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117 Rotter, J. B., et al., Op. Cit., 1972, p. 289.

118 Idem, ibid., p. 290.

119 Seeman, M., and J. W. Evans, "Alienation and Learning in a Hospital Setting", in American Sociological Review, Vol. 27, 1962, p. 772-783.

120 Seeman, M., Social Learning Theory and the Theory of Mass Society, paper presented at American Sociological Society Annual Meeting, Los Angeles, 1963, cited in Applications of a Social Learning Theory of Personality, New York, Holt, Rinehart and Winston, 1972, p. 286.

tically, a significant correlation, favouring internals, was found between I-E scores and the amount of information retained about such issues as parole, how the reformatory was run, and long range economic factors which could be expected to have some bearing on the subjects' lives after they left the institution.

The above two studies suggest that internals and externals differ in attentiveness to and recall of information that is present in their environments. In a further study, Davis and Phares[121] found that internals and externals differed in terms of actively seeking information relevant to the task of influencing the attitude of another person concerning the war in Vietnam. In an experimental situation, success in the task was presented to subjects either as dependent on their own skills, as governed by chance conditions, or as ambiguous. Under both the skill and ambiguous conditions, internals actively sought more information than externals. However, under chance conditions, no significant difference in information seeking behaviour was found between the two groups.

In still another study, Phares[122] argued that internals, having a higher generalized expectancy that success follows as a function of their own behaviour, should make better use of information because they would see correct utilization as a pathway to achieving success. He tested his

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121 Davis, W. L., and E. J. Phares, "Internal-External Control as a Determinant of Information-seeking in a Social Influence Situation", in Journal of Personality, Vol. 35, 1967, p. 547-561.

122 Phares, E. J., "Differential Utilization of Information as a Function of Internal-External Control", in Journal of Personality, Vol. 36, 1968, p. 649-660.

hypothesis by giving a computer-simulated task, which involved matching information about individuals with job specifications, to a sample of over 200 male psychology students. With initial learning controlled, the hypothesized relationship between internality of control and utilization of information was found.

From Rotter's theoretical work and the studies reviewed here a self-consistent picture of internally-controlled compared with externally-controlled individuals emerges. With the possible exception of individuals with a very high belief in internality who, Rotter[123] contends, might tend to be highly rigid, people with an internal locus of control are envisaged to be well adjusted, to have healthy, realistic self concepts, and to be coping effectively with the demands of their environments. They are likely to be ambitious, creative and innovative. Research has substantiated that they are likely to be high in need for achievement, and to take steps to better their life conditions - for example, to be already engaged in a college education, or to have plans to engage in one. Internals have been found to make more use than externals of past learning experiences to help themselves achieve future goals. In problem-solving situations seen as skill-controlled, they have been found to seek and use more information than externals, who tend to be either passive or unsystematic, or both, in their approach to problems.

Rotter[124] summarizes his own and his colleagues' research comparing the behaviour of internals and externals in the following way:

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123 Rotter, J. B. et al., Op. Cit., 1962, p. 476.

124 Rotter, J. B. et al., Op. Cit., 1972, p. 294.

The person with a strong belief in personal control of events

(i) is more alert to those aspects of the environment which provide useful information for his future behaviour

(ii) is more likely to plan and take steps to improve his life conditions

(iii) both seeks and uses more information in problem-solving situations, and approaches these situations in a more systematic way

(iv) places more value on reinforcements following from his own skills and achievements, and makes more use of past learning experiences in achieving future goals.

Thus, the propensities of the individual with an internal rather than an external locus of control to behave in certain characteristic ways, particularly in the seeking of information, seem to be well established. It may now be asked: do these propensities also lead to the development of mature rather than immature vocational behaviours? A discussion of this question is included in the next section.

5. Relationships Between the Theories of Super and Rotter.

Rotter's Social Learning Theory of personality is a general theory which endeavours to account for complex human behaviour in a broad range of contexts. Super's vocational development theory, on the other hand, attempts to explain human behaviour in vocationally relevant situations only. Despite the difference in scope between the two theories, can they be linked conceptually? In this section of the chapter, several possible relationships are examined, including developmental, attitudinal and cognitive links between the locus of control and vocational maturity constructs, similarities in views of the learning process, and compatibility of many of the theories' basic assumptions.

In juxtaposing elements of the theories for the purposes of the present study, two assumptions are being made. The first is that the goal of choosing a suitable occupation is one which, in general, people wish to achieve - that is, the concept of being able to work in a suitable occupation has considerable reinforcement value for them. The second is that people's personality tendencies become established in early childhood, a view which would be disputed by few psychologists. This second assumption is not meant to imply that changes in an individual's behaviour tendencies, particularly in specific areas, cannot occur; rather, it suggests that his overall personality pattern becomes established during his early years. With reference to the locus of control belief, research indicates that, while this belief is to some extent developmental, most of the change from externality to internality occurs during the first few years of primary school (approximately from ages seven to eleven years).[125] It is thus reasonable to assume that, by the time he reaches high school, a student's belief in his own degree of control over events following his behaviour will be fairly well established.

Within the range of students found in non-specialized high schools, individuals are expected to be distributed on a continuum ranging from moderate levels of externality to internality. Extreme levels of externality are characteristic of very young children or of maladjusted individuals,[126] and would, therefore, not be expected among students in a typical high school. Likewise, extreme levels of internality, which have

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125 Nowicki, S. (Jr.), and B. R. Strickland, "A Locus of Control Scale for Children", in Journal of Consulting and Clinical Psychology, Vol. 40, 1973, p. 148-154.

126 Rotter, J. B. et al., Op. Cit., 1972, p. 282.

also been tentatively linked with maladjustment, are expected to occur only rarely among high school students.

Students who have developed a relatively internal locus of control would, according to theory and research, also have developed certain characteristic attitudes toward, and ways of behaving in, problem-solving situations. In general, their coping behaviour is expected to be more effective than that of students whose locus of control has remained relatively external. It has also been seen that, in association with an internal locus of control and a tendency to use more effective behaviours in problem-solving situations, a healthy self concept can be expected to develop. Thus, beginning high school students, whose personality tendencies for belief in the degree of internality of control are (by assumption) quite well established, can also be expected to have accompanying degrees of adequacy in their self concept development. Given the importance of a healthy self concept in the development of mature vocational behaviours, as discussed in the first section of the chapter, the self concept provides a theoretical link, on a general level, between locus of control and vocational maturity.

Related to the general self concept are more specific links which involve the nature of effective behaviour during adolescence. In particular, an examination of the behaviour tendencies of individuals with an internal rather than an external locus of control suggests that students classified as internal would be more likely than others to be successful in their exploratory vocational behaviour. Among the relevant attributes, the attitude of awareness to cues in the environment which characterizes the internal individual provides a theoretical link between locus of control

and Super's construct of vocational maturity, of which awareness -- of the need to choose an occupation, of factors to consider in making a choice, of available sources of useful information, of the need to engage in exploratory behaviour, and so on -- is a basic component. Links are also provided through the internal individual's tendencies to be goal-directed and to make plans to improve his life conditions, tendencies which should result in his having the goals and planful approach to exploration that are necessary for successful vocational development in adolescence.

Further links between internality of control and vocational maturity in adolescence arise from the internal individual's propensities to engage in active, systematic information-seeking in problem-solving situations, and to use past learning experiences effectively in the pursuit of future goals. The most important behavioural components in the crystallization of a vocational preference are the seeking and use of relevant information during the exploration process; further, both these components result in more effective learning, and hence greater vocational development, when knowledge from past experiences is used as a basis for new learning. It is therefore expected that internals, who have the required behaviour tendencies in their basic personality patterns, will cope more effectively than externals with their exploratory vocational activities.

In addition to the links which connect theoretical aspects of the locus of control and vocational maturity constructs, it may now be asked whether relationships on a more general level exist between the two theories. For example, are the basic assumptions of the theories generally compatible? To what extent are Super's and Rotter's explanations of human behaviour similar?

With reference to behaviour change, Super, who is primarily concerned with man's own role in the process of growth toward self-actualization, pays little attention to the concept of reinforcement as such. Yet he clearly sees new behaviour as always based on old behaviour, with results of past learning experiences playing a key role in determining what the individual learns.[127] The results of past learning experiences are seen by Rotter also as playing a significant part in determining how a person is likely to behave in the future (by influencing his expectancy or his reinforcement value or both). Thus, despite differences in emphasis, it appears that Super and Rotter hold underlying views of the learning process which are quite similar.

With reference to basic assumptions, both writers view man as a complex organism, constantly interacting with his environment. In both theories, man's behaviour is seen as purposive, directed toward the attainment of learned goals. The goals which man desires to achieve are learned partly from his perceptions of the expectations of the society in which he lives ("Society expects that I shall engage in an occupation"), and partly from the expectations he sets for himself, based on what he has learned about himself as a result of his experiences in his society ("I expect that I shall become a successful professional ping-pong player"). In his theory of vocational behaviour, the goal of achieving success in an occupation is presented by Super as a means of achieving self-actualization. The same goal is discussed by Rotter in his theory of general behaviour as one of the six main goals toward which man aims in his search for gratification of his needs.

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127 Super, D. E., et al, Op. Cit., 1957, p.45.

A further conceptual link can be provided here, arising from a statement of Super's[128] that there are several ways in which lists of vocational developmental tasks can be compiled. Among possible ways which Super considered is the one he chose to adopt, namely the construction of a chronological picture of all the tasks related to occupational choice and adjustment which face an individual during his life time. Another possible way involves the consideration of only those tasks that are directly related to work. A third way mentioned by Super includes the more inferentially related tasks, such as the development of a sense of responsibility[129] as the individual matures vocationally. Vocational psychologists working at Harvard University during the 1960's, for example Tiedeman, O'Hara and Field, began with Super's theory of vocational development as it was formulated in 1963, and followed the third method of delineating vocational developmental tasks.[130] To these theorists, the development of a sense of personal responsibility in determining one's career is a crucial dimension of vocational maturity. It would seem that Field's[131] concept of "sense of agency", defined as "an awareness of one's power to influence the relative likelihood of future situations by acting in the present" is conceptually analogous to the SLT concept of internal control over the occurrence of events.

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128 Super, D. E., et al., Op. Cit., 1957, p. 43.

129 Idem, ibid., p. 43.

130 Tiedeman, D. V., "The Organization and Intention of a Proposed Data and Educational System for Vocational Decision Making", in Harvard Studies in Career Development, Cambridge, Massachusetts, Center for Research in Careers, Harvard University, No. 42, 1965, p. 3.

131 Field, F. L., An Investigation of Decision-Making in Educational-Vocational Context with Implications for Guidance, unpublished doctoral dissertation, Harvard Graduate School of Education, 1964.

In this section of the chapter, several links between the theories of Super and Rotter were identified. On a general level, the self concept was proposed as connecting the constructs of locus of control and vocational maturity, while, on a more specific level, attitudes such as awareness and planfulness, and behaviour tendencies such as goal-directedness and information-seeking, were shown to link theoretical aspects of the two constructs. Compatibility between the theories in their general views of man and his behaviour was also demonstrated. Prior to a statement of the research hypothesis arising from these theoretical links, two recent studies in which related questions were investigated are described.

6. Studies Involving Vocational Maturity and Locus of Control.

Two studies in which measures of both vocational maturity and locus of control, or very closely related variables, were included are reviewed in this section.

In a study arising from Super's vocational development theory, Minnich and Gastright[132] investigated control of environment, acceptance of responsibility for choice, and planning orientation in relation to career information learned during a career education project. Conceptually, the variables included in Minnich's study are close to those being investigated in the present study, but the focus of Minnich's study was rather different and its instrumentation was very limited. "Control of environment", a

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132 Minnich, W. K., and J. F. Gastright, Control of Environment, Acceptance of Responsibility for Choice, and Planning Orientation in Relation to Career Information, paper presented at American Educational Research Association Annual Meeting, Chicago, 1974.

variable arising from Coleman's[133] major study of educational opportunity in the United States, was assessed by three questions only. "Acceptance of responsibility for choice" was assessed by four questions, and "Planning orientation" was assessed by ten items based loosely on the behaviours detailed in the Career Pattern Study,[134] but using attitudes toward planfulness in general rather than toward career planning as a referent. No reliability or validity evidence for any of these measures is given in the report of the study.

The focus of Minnich and Gastright's study was the prediction of career information scores from the scores on the other variables. For a sample of 122 eighth grade students in Ohio, the multiple correlation between predictors and criterion was 0.59. An incidental finding of the study was that acceptance of responsibility for choice was significantly correlated with both planning orientation ($r = 0.23$) and control of environment ($r = 0.28$). Because of the brevity of the measures used and the lack of psychometric data on the adequacy of these measures, however, the findings from Minnich and Gastright's study must be considered very tentative.

Thomas[135] investigated the relationship between locus of control in the specific situation of occupational choice and vocational maturity

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133 Coleman, J. S., E. Q. Campbell, C. J. Hobson, J. McPartland, A. M. Mood, F. D. Weinfeld, and R. L. York, Equality of Educational Opportunity, Washington, D. C., U. S. Government Printing Office, 1966.

134 Minnich, W. K. and J. F. Gastright, Op. Cit., p. 5.

135 Thomas, H. B., The Effects of Sex, Occupational Choice, and Career Development Responsibility on the Career Maturity of Ninth-grade Students, paper presented at American Educational Research Association Annual Meeting, Chicago, 1974.

as measured by the Attitude Scale of Crites' Vocational Development Inventory (VDI-AS).[136] The rationale for his study was similar in many respects to that of the present investigation, but the role of generalized expectancies for locus of control was not considered. The VDI-AS and a Career Development Responsibility (CDR) scale developed by himself were administered by Thomas to 189 ninth grade students in an Illinois school. Data on whether or not the students had decided what occupation they wished to enter were also collected. In a three way analysis of variance, with decision/indecision, level of CDR (high, medium or low) and sex as factors, and vocational maturity scores as the dependent variable, significant main effects were found for both the level of decision factor and the level of CDR factor. Post hoc tests showed that the internal and middle groups on the CDR scale had significantly higher vocational maturity scores than the external group.

The studies reviewed here provide some evidence that the theoretical connections between the constructs of locus of control and vocational maturity established in the previous section of the chapter may well be viable. However, as discussed in the review, one of the studies was very different in focus from the present study, and suffered from methodological defects particularly with respect to its instrumentation. The other study reviewed, while quite similar in its rationale to the present study, was concerned with locus of control as a specific rather than as a generalized expectancy variable. Further, the measure of vocational maturity used covers fewer aspects of adolescent vocational maturity than are assessed by Super's CDI.

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136 Crites, J. O., The Maturity of Vocational Attitudes in Adolescence, APGA Inquiry Series No. 2, Washington, D. C., American Personnel and Guidance Association, 1971, p. 78-89.

Lastly, both studies reviewed were conducted in the United States, in each case with a non-random sample of students drawn from a single high school.

The differences in aims of the above studies from that of the present study, and their methodological limitations involving instrumentation and narrowly-drawn samples, point to the need for the question of a possible relationship between generalized locus of control and vocational maturity to be investigated further. There is a need for a larger-scale study to be conducted, particularly in a country other than the United States, using reliable, adequately validated measures covering a range of aspects of adolescent vocational maturity.

7. Statement of the Research Hypothesis.

In accordance with conclusions reached through examination of Super's and Rotter's theories, and the proposed linkages between them, the research hypothesis for the present study is formulated in general terms as follows:

> High school students with a predominant belief in internality of control tend to exhibit greater vocational maturity than high school students with a predominant belief in externality of control.

The hypothesis is stated in more specific terms in the next chapter, following a description of the instruments to be used as operational definitions of the constructs under investigation.

CHAPTER II

DESIGN OF THE STUDY

In this chapter the Career Development Inventory[1] and the Nowicki-Strickland Locus of Control Scale for Children[2] are described, and details of the selection of subjects and methods of data collection are given. After a restatement in more specific terms of the research hypothesis given at the end of Chapter I, the chapter concludes with an outline of the proposed analysis procedures.

1. Instrumentation

Career Development Inventory

The Career Development Inventory (CDI), which arose from Super's theory of vocational behaviour in adolescence, was developed by researchers working with Super in the early 1970's. An account of the evolution of the instrument, which was based on several earlier questionnaires attempting

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1 Super, D. E., M. Bohn, Jr., D. J. Forrest, J. P. Jordaan, R. H. Lindeman, and A. S. Thomson, Career Development Inventory, Form I, New York, Teachers College, Columbia University, 1972.

2 Nowicki, S. Jr., and B. R. Strickland, "A Locus of Control Scale for Children", in Journal of Consulting and Clinical Psychology, Vol. 40, 1973, p. 148-154.

to assess vocational development, is given by Forrest.[3] At present, the CDI is available in an unpublished version for research use only.

The CDI is an objective, factor-based inventory designed to measure several important aspects of vocational maturity in adolescence. It contains ninety-one items in eight subscales, grouped into three scales as shown in Table III. Two of the scales, A: Planning Orientation and B: Resources for Exploration, are attitudinal, while the third scale, C: Information and Decision Making, is cognitive. Each scale measures a major dimension of vocational maturity appropriate to the first years of the Exploration stage of vocational development, as discussed in the first chapter. Scores on Scale A, a self-rating scale, represent levels of awareness of the need for planning and making choices, while scores on Scale B, also a self-rating scale, indicate the quality of resources already used or recognized to be potentially available. Scores on Scale C indicate the amount of occupational information acquired, together with a knowledge of how this may be integrated with other information in making sound educational and vocational decisions.[4]

About one third of the items in Super's version of the CDI, which was prepared for use in the United States, contain spelling, vocabulary or specific references which were considered to be inappropriate for Canadian students. With Super's permission, Lokan[5] prepared a modified

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3 Forrest, D. J., The Construction and Validation of an Objective Measure of Vocational Maturity for Adolescents, Doctoral Dissertation, Ann Arbor, Michigan, University Microfilms, 1971, p. 27.

4 Super, D. E., and D. J. Forrest, Career Development Inventory, Form I: Preliminary Manual for Research and Field Trial, New York, Teachers College, Columbia University, 1972, p. 6.

5 Lokan, J. J., Locus of Control and Indices of Vocational Maturity in Adolescence: A Validation Study, unpublished paper, Ottawa, 1976.

Table III.-

Scales, Subscales and Item Allocation in the Career Development Inventory.

Scale	Subscale	No. of items in subscale	No. of items in scale
A: Planning Orientation	Specificity of planning	14	
	Concern with choice	8	
	Definiteness of plans	1	
	Specificity of information	10	33
B: Resources for Exploration	Awareness of resources available	14	
	Actual use of resources available	14	28
C: Information and Decision-Making	Occupational information (general)	18	
	Knowledge of decision-making principles	12	30
TOTAL			91

version for use in English Canada.[6] A copy of the modified version is included in Appendix 1.

Data on the psychometric properties of the CDI, derived from a representative sample of high school students in a Michigan county, are given by Super and Forrest[7]. The psychometric properties on which Super and Forrest reported, and some additional ones, were checked by Lokan for the modified CDI in a preliminary study using a group of about 170 Canadian high school students in grades nine and eleven. A detailed discussion of results from both Super and Forrest's and Lokan's studies is given by Lokan.[8] A summary of findings from both studies concerning the reliability and validity of the CDI scales is included here.

All three scales were found to be satisfactory research instruments in terms of their estimated reliability. Test-retest reliability coefficients ranged from 0.87 for Scale A to 0.67 for Scale C,[9,10] while internal consistency reliability coefficients ranged from 0.93 for Scale A to 0.71 for Scale C.[11] Item analysis statistics were not reported by Super. Lokan[12]

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6 A French translation of the CDI, incorporating some modifications of the original items, was used in Sherbrooke, Quebec, in 1973 (personal communication from Professor Super).

7 Super, D. E., and D. J. Forrest, Op. Cit., p. 20-40.

8 Lokan, J. J., Op. Cit., p. 56-65.

9 Super, D. E., and D. J. Forrest, Op. Cit., p. 23

10 Lokan, J. J., Op. Cit., p. 86

11 Idem, ibid., p. 88.

12 Idem, ibid., p. 88.

obtained item-scale correlation estimates which were generally quite high for Scales A and B, but were insignificant or only marginally satisfactory for about a quarter of the items in Scale C. Since none of the values was negative, no further modification of Scale C was undertaken.

Both the original and the modified versions of the CDI scales were judged to be valid measures of vocational maturity in adolescence on the basis of relationships found with other variables. Super and Forrest[13] established that all three scales of their version were related to Gribbons and Lohnes'[14] global Readiness for Career Planning scale, and that only the cognitive scale was related to Westbrook's[15] Cognitive Vocational Maturity Test. Likewise, only the cognitive scale was found to be related to the Attitude Scale of Crites'[16] Vocational Development Inventory , which, while nominally an attitude scale, has generally been found to be related to cognitive rather than to attitudinal measures.[17]

The relationships of the CDI scales to other variables such as intelligence, verbal aptitude, school achievement and socio-economic status,

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13 Super, D. E., and D. J. Forrest, Op. Cit., p. 37.

14 Gribbons, W. D., and P. R. Lohnes, Emerging Careers, New York, Teachers College, Columbia University, 1968.

15 Westbrook, B. W., and J. W. Cunningham, "The Development and Application of Vocational Maturity Measures", in Vocational Guidance Quarterly, Vol. 18, No. 3, 1970, p. 171-175.

16 Crites, J. O., The Maturity of Vocational Attitudes in Adolescence, APGA Inquiry No. 2, Washington, D. C., American Personnel and Guidance Association, 1971, p. 78-89.

17 Super, D. E., and D. J. Forrest, Op. Cit., p. 37.

all of which Super felt were important variables in delimiting the concept of vocational maturity,[18] were investigated by Super and Forrest for their version of the instrument and by Lokan for the modified version. In both studies, most of the correlation coefficients were found to be significantly different from zero, but relatively low in magnitude. Only Scale C, Information and Decision Making, was found in either study to be moderately related to any of the other variables examined. Correlation coefficients of the order of 0.5 were computed by Super and Forrest[19] between Scale C scores and verbal aptitude and grade-point average. Lokan[20] found the corresponding coefficients to be of the order of 0.4, and determined the coefficient between Scale C scores and general intelligence to be 0.46.

The main difference in the findings of the two studies was that level of father's occupation was found by Super and Forrest to be related to two of the CDI scales,[21] whereas in Lokan's study it was not related to any of the CDI dimensions.[22] It was felt that this discrepancy may have resulted from restriction in range of Lokan's sample, which contained students of average or above average ability only.[23] In contrast, Super and Forrest's sample was representative of the full range of the tenth grade population in a Michigan school district.[24]

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18 Super, D. E., and D. J. Forrest, Op. Cit., p. 31

19 Idem, ibid., p. 34.

20 Lokan, J. J., Op. Cit., p. 96

21 Super, D. E., and D. J. Forrest, Op. Cit., p. 34

22 Lokan, J. J., Op. Cit., p. 96

23 Idem, ibid., p. 74

24 Super, D. E., and D. J. Forrest, Op. Cit., p. 20

On the basis of the psychometric data provided by Super and Forrest for the American version of the CDI, a recent favourable evaluation by Westbrook,[25] and the results obtained for the modified version by Lokan, it was considered that the modified version would be suitable as a measure of the three dimensions of vocational maturity for the present research.

Nowicki-Strickland Locus of Control Scale for Children.

Considerable research in which the locus of control construct in college students and adults has been examined has been carried out in the last fifteen years. The Nowicki-Strickland Locus of Control Scale for Children (LC scale)[26] was developed because it seemed desirable to extend these investigations to children, and three earlier attempts by other researchers to construct measures of the locus of control variable in children[27,28,29] were considered by Nowicki and Strickland to be inadequate. Reasons given for the inadequacy of the earlier instruments included low reliability, difficulty of administration, and lack of generality of content.[30]

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25 Westbrook, B. W., "Three Measures of Vocational Maturity: A Beginning to Know About", in Measurement and Evaluation in Guidance, Vol. 6, No. 1, 1973, p. 8-16.

26 Nowicki, S. Jr., and B. R. Strickland, Op. Cit., p. 148-154.

27 Bialer, I., "Conceptualization of Success and Failure in Mentally Retarded and Normal Children", in Journal of Personality, Vol. 29, 1961, p. 303-320.

28 Battle, E. S., and J. B. Rotter, "Children's Feelings of Personal Control as Related to Social Class Ethnic Group", in Journal of Personality, Vol. 3, 1963, p. 482-490.

29 Crandall, V. J., W. Katkovsky, and V. C. Crandall, "Children's Belief in Their Own Control of Reinforcement in Intellectual-Academic Achievement Situations", in Child Development, Vol. 36, 1965, p. 91-109.

30 Nowicki, S. Jr., and B. R. Strickland, Op. Cit., p. 149.

The LC scale is an objective paper and pencil questionnaire consisting of forty items, to each of which the respondent must answer "yes" or "no". A short form, consisting of twenty-one items, is also available. The scale, which was constructed on the basis of Rotter's definition of the internal-external control of reinforcement dimension, is considered by the authors to be a measure of a generalized expectancy for the locus of control of reinforcement in children.[31] The items describe reinforcement situations in a variety of need areas, such as affiliation, achievement and dependency.

Psychometric data on the forty-item scale are provided by Nowicki and Strickland[32] for a sample of over 1,000 "mostly Caucasian elementary and high school students in four different communities" in grades three to twelve inclusive.

Internal consistency reliabilities, estimated by the split-half method and corrected by the Spearman-Brown formula, ranged from 0.63 for grades three, four and five combined to 0.81 for grade twelve. Test-retest reliabilities, after an interval of six weeks, ranged from 0.63 to 0.71, the higher values again being obtained at the higher grade levels. Scores on the LC scale at each grade level were found to be unrelated to social desirability as measured by an abbreviated form of the Children's Social Desirability Scale.[33]

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31 Nowicki, S. Jr., and B. R. Strickland, Op. Cit., p. 149

32 Idem, ibid, p. 151-154.

33 Crandall, V. C., V. J. Crandall, and W. Katkovsky, "A Children's Social Desirability Questionnaire", in Journal of Consulting Psychology, Vol. 29, 1965, p. 27-36.

Nowicki and Strickland hypothesized that, for their scale to be an appropriate assessment of locus of control, scores on the scale would have to meet several criteria. In particular, scores would have to become more internal with increasing age, to be related to achievement with internals achieving more than externals, and to be unrelated to intelligence.[34] The validity of the scale in terms of some of these criteria was demonstrated.

In general, scores for both males and females became more internal with increasing grade level, though differences in scores between adjacent grades from six to twelve were mostly very slight. Intelligence test scores were collected, but no statistics relating these to LC scores were reported. Correlations with achievement scores were significant at the .05 level or better at only four of seven grade levels for males, and at no grade level for females. Significant correlations at the .10 level were reported at two further grade levels for males and at two for females. The authors do not state what data were used as achievement scores. The relationship between socio-economic status, assessed by a rating of father's occupational level, and LC scores was determined for males and females separately at eight grade levels. The variables were correlated significantly, at the .05 level or better, at only two of the eight grade levels for males, and at only one for females.[35]

The low level of most of the correlations found, with only four of fourteen for achievement and three of sixteen for socio-economic status

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34 Nowicki, S. Jr., and B. R. Strickland, Op. Cit., p. 149

35 Idem, ibid., p. 152.

reaching significance at the .05 level, seems to indicate that only weak inferences concerning the hypothesized relationships can be made. However, the authors state that

> "it is tentatively concluded that internality is related significantly to higher occupational level, especially for males (...) [and] a clear relationship between locus of control and achievement scores emerges".[36]

From these conclusions, it appears that the authors have over-interpreted their findings.

To assess the construct validity of the LC scale further, its relationships with other measures of locus of control were investigated. Significant correlations were found with scores on the I+ scale of Crandall's[37] Intellectual Achievement Responsibility instrument, which measures locus of control in academic situations, and with the Bialer-Cromwell[38] scale. A version of the LC scale adapted for college students was found to be related to Rotter's I-E Scale in two separate studies.[39]

Despite the rather weak support for most of the hypothesized relationships between the LC scale and other variables, a favourable evaluation was given recently in a publication of the University of Michigan's Institute of Social Research.[40] It was considered that the

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36 Nowicki, S. Jr., and B. R. Strickland, Op. Cit., p. 152.

37 Crandall, V. J., W. Katkovsky and V. C. Crandall, Op. Cit., p. 91-109.

38 Bialer, I., Op. Cit., p. 303-320.

39 Nowicki, S. Jr., and B. R. Strickland, Op. Cit., p. 153.

40 MacDonald, A. P., Jr., "Measures of Internal-External Control", in Measures of Social Psychological Attitudes, Robinson, J. P, and P. R. Shaver, (Eds.), University of Michigan, Institute for Social Research, 1973, p. 159-184.

information on the scale's internal consistency and test-retest reliabilities, and "convergent and discriminant validity" indicated it to be the best measure of locus of control as a generalized expectancy presently available for use with children.

Further investigation of the psychometric properties of the LC scale was carried out in a preliminary study by Lokan. This investigation was done primarily because time constraints necessitated the use of the short form of the instrument, for which Nowicki and Strickland did not report psychometric data. Despite the use of the short form, reliability estimates of the same order as those determined by Nowicki and Strickland for the full scale were obtained. A test-retest reliability coefficient of 0.83 for the short form was found after an interval of about two and a half weeks.[41] In comparison, Nowicki and Strickland obtained a value of 0.71 after an interval of six weeks.[42] The internal consistency reliability coefficient of 0.72 (Cronbach's alpha) obtained for the short form[43] is comparable with the value of 0.74 (estimated by the split-half method and corrected by the Spearman-Brown formula) reported by Nowicki and Strickland for the full scale used in grades nine, ten and eleven.[44]

Findings concerning the construct validity of the short form of the LC scale, assessed through relationships with level of father's occupation, general intelligence, verbal aptitude and school achievement, also tended to

41 Lokan, J. J., Op. Cit., p. 86

42 Nowicki, S. Jr., and B. R. Strickland, Op. Cit., p. 152

43 Lokan, J. J., Op. Cit., p. 88

44 Nowicki, S. Jr., and B. R. Strickland, Op. Cit., p. 152

to replicate Nowicki and Strickland's findings for the full scale. Degree of internality of control was correlated with level of father's occupation and with average school marks. Contrary to Nowicki and Strickland's expectations, however, general intelligence and verbal aptitude were found to be related, both at the .001 level of significance, to degree of internality of control.[45]

On the basis of MacDonald's favourable review[46] of the full LC scale as a measure of generalized locus of control in children, and the satisfactory replication of most of Nowicki and Strickland's findings obtained by Lokan for the short form of the scale, it was considered that the short form would be a suitable measure of locus of control in the present study. A copy of the short form of the instrument is included in Appendix 1.

A further aspect of the locus of control construct was also investigated by Lokan. Given the theoretical importance of both generalized and specific expectancies in the prediction of behaviour, as discussed in the first chapter, it was felt that locus of control in situations specific to occupational choice should also be measured. Of concern was the incidence of students holding the belief that reinforcement in occupational choice situations is externally controlled who also believe that reinforcement in general is internally controlled. Research has shown that, for individuals with such a combination of beliefs, the generalized expectancy variable tends not to contribute to the prediction of behaviour.[47] Lokan found that the

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45 Lokan, J. J., Op. Cit., p. 99

46 MacDonald, A. P. Jr., Op. Cit., p. 176

47 Davis, W. L., and E. J. Phares, "Internal-External Control as a Determinant of Information-Seeking in a Social Influence Situation", in Journal of Personality, Vol. 35, 1967, p. 547-561.

proportion of students classified by a specially constructed scale as external in situations specific to occupational choice but internal in general was negligible.[48] It was decided, therefore, that the specific expectancy variable need not be considered further.

2. Selection of Subjects.

Subjects for the study were chosen from the thirteen English-language high schools administered by the Ottawa Board of Education (OBE). Of these schools, two offer academic programmes only, while eleven offer composite programmes (academic together with some business and technical courses). In order that the study population would be as widely based as possible, it was decided to select students from at least one academic and four composite schools. Random sampling of schools was not feasible. Requests were made to the Principals of seven schools; from these requests, students in one academic and five composite schools were obtained. The schools were situated in locations providing coverage of most areas of the city.

Given the hypothesized developmental nature of vocational maturity, it was regarded as particularly important in this study to obtain some degree of control over student age. It was decided, therefore, to include students from only one grade level. In selecting the grade level to be used, Super's statements concerning the different rates and stages of development of the various aspects of vocational maturity were considered. With

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48 Lokan, J. J., Op. Cit., p. 103.

reference to the aspects measured by the three scales of the CDI, Super[49] contends that:

i) planning orientation (Scale A) is most appropriately fostered in the middle or junior high school, but can be expected to be lacking in many students when they enter high school (grade nine)

ii) awareness and use of resources for exploration (Scale B) normally can be expected to develop in ninth and tenth grades, following the development of an appropriate planning orientation, but that in many students this stage can be expected to continue throughout and even beyond high school

iii) possession of occupational information and knowledge of decision-making principles (Scale C), which is related to general ability and is, therefore, not necessarily an index of vocational maturity, may occur at any stage of adolescence.

On the basis of Super's contentions, and the fact that testing was to be done towards the end of the school year, it was decided that first year (grade nine) students should be used as subjects for the study. By the end of grade nine, according to Super, most students could be expected to have developed on the Planning Orientation dimension and to have developed to some extent on the Resources for Exploration dimension. Further, a full range of scores on the Information and Decision Making dimension could probably be expected at this stage. High scores on this dimension would tend to indicate vocational maturity if they occurred along with high scores on the other two dimensions, or general ability if they occurred along with low scores on the other dimensions.

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49 Super, D. E., and D. J. Forrest, Op. Cit., p. 18

Within each grade level, most of the high schools which participated in the study offer courses at up to three levels - general, advanced and enriched, indicated by the letters G, A and E, respectively. G-level courses are provided for students who do not wish to pursue their studies beyond high school, or who do not require an advanced level of training or knowledge in the particular subjects taken at G-level. A-level courses are intended for students who wish to continue studying at tertiary level, or who desire to graduate from high school with a five-year rather than a four-year diploma. E-level courses are provided in some subjects for small groups of students who enter high school with especially advanced levels of knowledge. Academic schools differ from composite schools in that fewer courses are available at G-level, and those G-level courses which are offered tend to contain smaller proportions of the schools' enrolments. Most school staffs have a policy of encouraging students of average or above average ability to take A-level courses regardless of the students' intentions concerning higher education.

Operationally, the grade level from which subjects for the present study were selected was defined as consisting of all 1A English classes - that is, all first year classes taking English at advanced level - in the six participating schools. English was chosen because, during 1975-76, it was the only subject which all students were required to take for at least four years in high school, and was thus expected to contain the most complete cross-section of students. Classes at A-level were chosen following an earlier study[50] in which the CDI was found to be too difficult for first year students in G-level classes.

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50 Lokan, J. J., Op. Cit., p. 76.

In order to implement the proposed study design in which school was initially to be considered as a factor, it was decided that three classes of students from each school should be tested. Again random sampling was not possible. Classes were selected by the Heads of the Guidance and the English Departments at each school, largely on the basis of teachers' willingness to have their students participate. However, when the request to the schools was made, it was stated that the selected classes should be as representative as possible of all the 1A English classes in the school. The total number of students tested was 410.

3. Data Collection.

Students were tested in late March or early April of 1976. As far as possible, uniform arrangements for the test sessions were made at all the schools. The students were tested one class at a time, with all test sessions being conducted by the investigator and an assistant. The CDI and the LC scale together require about fifty minutes' administration time, which meant that testing had to be scheduled on two occasions in the five schools which were operating with a forty-minute class period. Staff members from the sixth school, in which the class period length was fifty minutes, were also asked to conform to the two-occasion testing procedure, but were not willing to do so.

In the sixth school, then, both instruments were administered to each class during the same extended testing session, the LC scale always being given before the CDI. In all other classes the LC scale was given on one day, and the CDI was given on the following day. Where necessary, return

visits were made to the schools so that students who did not finish the CDI in one class period could complete it, and so that the few students who omitted items in the LC scale could be asked to answer these items. Altogether, about thirty students were involved in this make-up testing.

The administration of the LC scale, called the "Personal Reaction Survey" for testing purposes, was carried out according to instructions provided by its authors. The students wrote their responses on the actual test booklets. Specially designed separate answer sheets, a sample of which is included in Appendix 1, were used for the CDI. In the preliminary study, Lokan[51] found that many students at first year level had difficulty in understanding the "How to Answer" instructions provided with the CDI. The instructions for use in the present study, therefore, were modified and read aloud, and examples of how to respond were shown on the blackboard. With these administration procedures, it was found that few students experienced difficulty in understanding the required answering modes.

Of the 410 students tested, two did not have complete responses on the LC scale and a further eleven did not have complete responses on the CDI after one return visit had been made to each of the schools concerned; these students were dropped from the study. The final sample, therefore, consisted of the 397 students with complete data on the locus of control and vocational maturity measures. The distribution of these students by school and sex is shown in a later table (Table IV).

On the basis of earlier results showing that the CDI Scale C scores were moderately correlated with both verbal aptitude ($r = 0.41$, $N = 109$)

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51 Lokan, J. J., Op. Cit., p. 76

and general intelligence ($r = 0.46$, $N = 116$),[52] it was decided that the design of the present study should incorporate one of these variables as a covariate for the analyses involving Scale C, provided that data for a sufficient number of students were available from school records. With an estimated level of relationship between the covariate and the dependent variable of about 0.45, the adjustments made in a covariance analysis would be expected to reduce the error variance by about 20% of its value in an analysis of variance.[53]

Students entering first year (grade nine) in Ottawa Board of Education high schools are given either the verbal and numerical subtests of the Differential Aptitude Tests (D.A.T.) or the Henmon Nelson Test of Mentall Ability, or both, as part of the Board's city-wide testing programme. It was found that the Henmon Nelson test had been administered in all six schools in the fall of 1975, but the D.A.T. had been administered in only five. It was decided, therefore, to use the Henmon Nelson test as the source of data for the covariate in the analysis involving Scale C, provided that the number of subjects who missed taking the test was relatively small. Scores on the Henmon Nelson test were located for 92% (364 of 397) of the students in the final sample.

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52 Lokan, J. J., Op. Cit., p. 96

53 Elashoff, J. D., "Analysis of Covariance: A Delicate Instrument", in American Educational Research Journal, Vol. 6, No. 3, 1969, p. 386.

4. Restatement of the Research Hypothesis.

Following the discussion of the measuring instruments, the research hypothesis given in the first chapter can be restated in more specific terms as two hypotheses. The first involves the attitude dimensions of the CDI, the second the cognitive dimension:

Hypothesis 1: First year high school students classified as internal on the LC scale tend to score higher on Planning Orientation and on Resources for Exploration, as measured by Scales A and B of the CDI, than students classified as external on the LC scale

Hypothesis 2: First year high school students classified as internal on the LC scale tend to score higher on Information and Decision Making, as measured by Scale C of the CDI, than students classified as external on the LC scale.

While it seems clear from Super's theory that development along the attitude dimensions will have occurred by the end of first year (grade nine), and will be indicative of vocational maturity, the situation regarding development along the cognitive dimension is less clear. Scores on the cognitive scale have been shown to be moderately correlated with measures of scholastic aptitude, as discussed earlier in the chapter, suggesting that high scores on this scale do not necessarily indicate vocational maturity. Super contends that high scores on Scale C indicate high degrees of vocational maturity only if they accompany high scores on the other two scales. Hypothesis 2, therefore, is more exploratory in nature than Hypothesis 1.

5. Classification of Subjects as Internal or External.

Studies involving the locus of control construct, including those carried out by Rotter and his colleagues, have most commonly classified subjects as internal or external by dividing the distribution of obtained locus of control scores at the median. When the number of subjects involved in a study is relatively small, this procedure is often necessary to ensure the maximum number of degrees of freedom for the analyses. However, to the extent that the instrument used to measure locus of control is unreliable, the procedure results in varying amounts of misclassification of subjects whose scores lie at or close to the median.

When sufficient subjects are tested, it is possible to reduce the effects of incorrect classification of subjects scoring near the median by taking into account the standard error of measurement (SEM) of the instrument used to classify them. In the present study, a "buffer zone" extending approximately one SEM on each side of the median was defined, with data for subjects whose LC scores fell within this zone being excluded from further analyses. The choice of the median as the midpoint of the zone, and of two SEM's as the width, was arbitrary in both instances. The median rather than the mean was selected as the midpoint to be consistent with the many other studies which have used the median as the dividing score between internal and external groups. The criterion for establishing the boundaries of the zone was that the zone should be wide enough to remove a substantial amount of the risk of including incorrectly classified subjects, while at the same time not being so wide that the hypothesis tests would be based on extreme cases only.

The median of the distribution of LC scores obtained by the 397 students in the final sample was 15.03, and the standard deviation was 3.22. In selecting the value of the reliability (r) of the LC scale to be used in calculating the SEM, results from an earlier study in which the short form of the scale was given were considered to be the most appropriate. The relevant internal consistency and test-retest reliability coefficients were 0.72 and 0.83.[54] Given the relatively short interval (about two weeks) over which the test-retest reliability was measured, it was felt that the obtained value of 0.83 was probably an over-estimate of the scale's reliability. It was decided to use a value of 0.75 as a reasonable estimate of r, which resulted in a value of 1.61 for the SEM.

The range encompassed by the median ± one SEM, then, was found to be 13.42 to 16.64. According to the criterion specified, the lowest score for which a subject would be classified as internal would therefore be the nearest whole number to 16.64, or 17. Similarly, the highest score for which a subject would be classified as external would be 13. The numbers of students assigned by this procedure to the internal, middle and external locus of control groups are shown by school and sex in Table IV.

6. Statistical Procedures.

Given that the correlation between the attitude scales (A and B) of the CDI is usually estimated to be about 0.5,[55] it was proposed that

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54 Lokan, J. J., Op. Cit., p. 87.

55 Super, D. E., and D. J. Forrest, Op. Cit., p. 27.

Table IV.-

Distribution of Subjects by Locus of Control Group, School and Sex

	Locus of Control Group						
	Internal		Middle		External		
School	Male	Female	Male	Female	Male	Female	Total
1	10	10	7	12	15	7	61
2	7	10	9	10	14	10	60
3	11	9	14	10	12	12	68
4	8	9	15	5	12	3	52
5	8	18	12	7	10	7	62
6	14	14	19	15	14	18	94
Total	58	70	76	59	77	57	397

Hypothesis 1 would be tested by means of a multivariate analysis of variance, with Scales A and B as dependent variables and generalized locus of control as the independent variable. It was also proposed to include two blocking factors. Since several researchers in other countries[56] have found sex differences in scores on various of the CDI scales, it was felt that Super and Forrest's[57] finding of no sex differences might not be replicated in Canada. In addition, since guidance programmes in Ottawa high schools and intermediate schools are known to vary considerably, it was felt that differences in vocational maturity scores could conceivably arise from school to school as a reflection of these programme differences. Thus, it was proposed that both sex and school should be incorporated in the design as blocking factors. Given that the attitude measured by Scale A is postulated by Super to develop before the attitude measured by Scale B, it was proposed that step-down analysis would be used as a post hoc procedure.

The correlation between the third CDI scale, the cognitive Scale C, and the attitude scales is usually estimated to be at the relatively low level of about 0.2.[58] Given this fact, and the desirability of using a measure of scholastic aptitude as a covariate in analyses involving this scale, it was proposed that Hypothesis 2 would be tested in a univariate analysis of covariance, with generalized locus of control as the independent variable and sex and school as blocking factors. General intelligence, as

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56 Jordaan, J. P., A Perspective on Cross-National Adaptations of Measures of Occupational Maturity, paper presented at the International Association of Applied Psychology Conference, Montreal, 1974.

57 Super, D. E., and D. J. Forrest, Op. Cit., p. 24.

58 Idem, ibid., p. 27.

measured by the Henmon Nelson Test of Mental Ability, was selected as the covariate. The estimated correlation between this variable and Scale C of the CDI, based on results from an earlier study,[59] is about 0.5. It was specified that all hypotheses would be tested at the .05 level of significance.

In this chapter the instruments chosen for the research were described, and details of procedures used in the selection of subjects for the study were given. Following a description of the data collection methods, the research hypothesis given at the end of Chapter I was restated, in terms of the selected measure of locus of control and the specific aspects of vocational maturity assessed by the CDI, as two hypotheses. Finally the proposed analysis procedures, which are described more fully in the next chapter together with the results, were delineated.

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59 Lokan, J. J., Op. Cit., p. 96.

CHAPTER III

PRESENTATION AND DISCUSSION OF RESULTS.

In this chapter, the results of the data analyses are presented and discussed. Descriptive statistics for the various analysis groups are given, and the hypothesis tests are described. Separate sections of the chapter are devoted to the presentation and discussion of the results pertaining to each hypothesis.

1. Descriptive Results.

The means and standard deviations obtained on the CDI scales are shown by locus of control group, sex and school in Tables V and VI. Results for Scale A: Planning Orientation and Scale B: Resources for Exploration are given together in Table V to conform with the grouping of the scales for the hypothesis tests. The results for Scale C: Information and Decision Making are given separately in Table VI. Table VII contains the means on all three scales for the groups combined across each of the three factors in the design. The results of the formal tests of the hypotheses concerning group differences in vocational maturity as assessed by the scales of the CDI are given in the next two sections.

Table V.-

Means ($\bar{X}$) and Standard Deviations on Scales A and B of the Career Development Inventory, by Locus of Control Group, School and Sex.

Locus of Control Group	School	N* M	N* F	Scale A Males $\bar{X}$	Scale A Males s.d.	Scale A Females $\bar{X}$	Scale A Females s.d.	Scale B Males $\bar{X}$	Scale B Males s.d.	Scale B Females $\bar{X}$	Scale B Females s.d.
Internal	1	10	10	113.9	17.9	96.4	22.1	254.1	32.2	238.6	52.4
	2	7	10	101.9	12.3	108.4	18.0	250.9	23.2	262.9	18.6
	3	11	9	115.1	17.8	109.1	26.7	268.7	49.7	247.2	34.4
	4	8	9	97.4	21.4	87.9	25.6	245.0	56.9	222.8	42.3
	5	7	18	104.7	14.0	96.6	20.7	225.6	31.7	244.2	42.5
	6	14	14	109.7	16.3	87.3	24.5	243.7	28.6	231.5	61.4
External	1	14	7	102.6	20.3	72.4	7.9	214.4	36.7	203.0	28.3
	2	14	10	97.6	21.5	92.0	24.6	232.0	47.1	224.0	44.0
	3	12	12	93.5	16.2	94.8	16.8	216.8	48.0	227.3	29.2
	4	12	3	99.2	22.7	92.3	23.1	235.2	42.8	206.3	36.8
	5	10	6	90.8	19.4	89.2	12.5	239.4	39.8	220.2	32.3
	6	14	18	89.2	20.9	94.3	17.3	194.4	31.2	226.4	37.8

* Data on both scales for three students with extreme Scale B scores are not included in these results

Table VI.-

Mean ($\bar{X}$) and Standard Deviation on Scale C of the Career Development Inventory, by Locus of Control Group, School and Sex.

LC Group	School	N* M	N* F	Males $\bar{X}$	Males s.d.	Females $\bar{X}$	Females s.d.
Internal	1	8	8	15.4	2.6	15.9	2.6
	2	6	9	17.7	3.3	15.8	3.2
	3	10	9	17.0	4.3	18.1	3.6
	4	8	8	17.1	3.5	17.8	4.6
	5	5	17	15.2	3.9	17.2	2.9
	6	14	14	17.0	4.5	17.4	3.4
External	1	12	6	15.9	2.6	14.7	3.1
	2	10	10	16.8	3.8	15.7	3.6
	3	12	12	15.3	3.7	16.5	2.3
	4	12	3	17.6	4.4	19.0	3.0
	5	8	5	15.5	1.9	13.2	3.0
	6	13	7	15.2	3.3	16.1	4.1

* Data for students with no Henmon Nelson IQ scores and data for three students with extreme Scale B scores are not included in these results.

Table VII.-

Means ($\overline{X}$) on the Career Development Inventory Scales for Combined Locus of Control, Sex and School Groups.

Group	N	Scale A $\overline{X}$	Scale B $\overline{X}$	N	Scale C $\overline{X}$
Total Internal	127	101.9	244.8	116	16.9
Total External	132	93.5	221.1	120	16.0
Total Male	133	101.0	233.0	118	16.3
Total Female	126	94.1	232.4	117	16.5
Total School 1	41	98.7	228.0	34	15.6
Total School 2	42	99.6	240.8	35	16.4
Total School 3	44	102.4	238.8	43	16.6
Total School 4	32	94.8	231.4	31	17.7
Total School 5	41	95.5	236.3	35	15.9
Total School 6	60	95.1	224.1	58	16.4

2. Hypothesis 1: Presentation and Discussion of Results.

Test of the Hypothesis

It was hypothesized that internals tend to achieve higher mean scores on Scales A and B of the CDI (Planning Orientation and Resources for Exploration) than externals. The hypothesis was tested in its null form by means of a multivariate analysis of variance, using Finn's[1] MULTIVARIANCE computer programme, with Scales A and B as dependent variables and locus of control group, sex and school as independent variables.

Prior to the hypothesis test, the variance-covariance matrices for the sets of Scale A and B scores were tested for homogeneity, using Box's test as discussed by Kirk.[2] The obtained value of χ^2 (96.4, with 69 degrees of freedom) was significant at the .05 level, indicating that the requirement for multivariate analysis of variance of homogeneity of the variance-covariance matrices was not met by the data. On further examination of the sets of scores, it was found that three students achieved anomalously high scores on Scale B, more than three standard deviations beyond the overall mean. This suggested either that the scores were not valid indicators of the students' true scores, or that the students did not really belong in the study population. It was decided to exclude these students from the study.

With the scores of these students omitted, the obtained value of χ^2 (76.7, with 69 degrees of freedom) was not significant. Thus the assumption

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1 Finn, J. D., MULTIVARIANCE: Univariate and Multivariate Analysis of Variance, Covariance and Regression, Ann Arbor, Michigan, National Educational Resources Inc., 1972.

2 Box, G. E. P., "Problems in the Analysis of Growth and Wear Curves", in Biometrics, Vol. 6, 1950, p. 362-389, cited in Kirk, R. E., Experimental Design, Belmont, California, Brooks/Cole, 1969, p. 258-261.

of homogeneity of variance-covariance matrices was satisfied by the scores of the remaining 259 students. The summary statistics from the multivariate analysis of variance are presented in Table VIII. As shown in the table, the main effect of locus of control group was found to be significant. The null hypothesis was, therefore, rejected. Since higher mean scores were earned by internals than by externals on both Scales A and B, as shown in Table VII, Hypothesis 1 was supported by the results. As indicated in Table VIII, the main effect of sex was also significant. The means by sex (Table VII) show that males scored higher than females on Scale A, while the two groups scored at about the same level on Scale B. Neither the main effect of school nor any of the interaction effects in this analysis was significant.

The results reported above show that the locus of control groups differed on both Scales A and B, while the sex groups differed only on Scale A. Super's theory proposes that Scales A and B, both attitude scales, measure aspects of vocational maturity that are developmental in the sense that an orientation toward planning is presumed to be a precondition for the effective use of resources for exploration. More specifically, Super states his expectation that by the beginning of grade nine development in Planning Orientation (the dimension measured by Scale A) will be generally well in progress, and many students will also be beginning to develop in Resources for Exploration (the dimension measured by Scale B). It was felt, therefore, that it would be appropriate to use step-down F-ratios in post hoc analyses to determine the extent to which each of the two vocational maturity dimensions contributed to the differences indicated by the multivariate F tests.

Table VIII.-

Multivariate Analysis of Variance for Locus of Control Group (LC), Sex and School as Independent Variables and the Attitude Scales of the Career Development Inventory (Scales A and B) as Dependent Variables.

Source of variation	Number of degrees of freedom	F	p
LC	2,234	11.53*	.0001
Sex	2,234	4.62*	.01
School	10,468	1.02	.43
LC x Sex	2,234	0.19	.83
LC x School	10,468	0.99	.45
Sex x School	10,468	1.47	.15
LC x Sex x School	10,468	1.48	.14

* Significant at the level specified ($\alpha = .05$)

The relevant step-down F-ratios are presented together with their significance levels in Table IX. For the independent variable of locus of control group, the univariate F-ratio for Scale A and the step-down F-ratio for Scale B eliminating the effects of differences in Scale A were both found to be significant. It is clear from these results that differences in the dependent variables associated with locus of control group involve both Scales A and B. For the blocking variable of sex, the univariate F-ratio for Scale A was found to be significant, but the step-down F-ratio for Scale B eliminating the effects of differences in Scale A was not significant. These results show that any differences in the two dependent variables associated with sex are differences which are not unique to Scale B.

Discussion of Results

The rationale for the hypotheses arose from links between several aspects of the theories of Rotter and Super, and related research. With respect to Hypothesis 1, the rationale can be stated briefly as follows:

Individuals with a predominantly internal locus of control (internals) tend, according to Rotter, to behave more effectively in problem-solving situations in general and, in particular, to make more plans for their future and to be more aware of useful cues in their environment, than externals. Therefore, high school students classified as internal would be expected to have developed more adequate coping behaviours than externals in the vocational situations relevant to early and mid-adolescence. Since some of the most crucial vocational behaviours appropriate to adolescence, as identified by Super, reflect the particular aspects of planfulness and

Table IX.-

Results of Step-down Analyses for Locus of Control Group (LC) and Sex as Independent Variables with the Attitude Scales of the Career Development Inventory (Scales A and B) as Dependent Variables.

Source of variation	Scale A		Scale B	
	Univariate F	p	Step-down F	p
LC	14.10*	.0003	8.51*	.004
Sex	8.88*	.003	0.37	.54

* Significant at the level specified (α = .05)

awareness of cues in the environment mentioned by Rotter, it follows that students classified as internal would be expected to attain more adequate levels of these crucial behaviours than externals. The degree to which the particular vocational behaviours are attained is measured by the Planning Orientation (A) and Resources for Exploration (B) scales of Super's Career Development Inventory (CDI). It was, therefore, hypothesized that students classified as internal tend to attain higher scores on these two CDI scales than students classified as external.

The test of the hypothesis supports the validity of the links made between the two theories. The multivariate F test indicates significant differences in the scores obtained on the two CDI scales by the two locus of control groups, and the mean scores themselves show that the differences were in the direction predicted by the hypothesis. In the absence of significant interaction effects it can, therefore, be concluded that a relationship exists between degree of internality of control and level of maturity in the vocational attitudes appropriate to adolescence, as assessed by the attitude scales of the CDI. It appears clear that, as hypothesized, internals do tend to exhibit more mature vocational behaviour than externals.

The post hoc procedures relating to Hypothesis 1 indicate that differences in the dependent variables that are associated with locus of control group involve both Scales A and B. The univariate F-ratio for Planning Orientation (Scale A) was significant at the .001 level, while the step-down F-ratio for Resources for Exploration (Scale B) using Scale A scores as a covariate was significant at the .01 level. These results

are in agreement with Super's[3] contentions that some development along both the Planning Orientation and Resources for Exploration dimensions can be expected to occur during the grade nine year.

Although no hypothesis was formulated concerning the relationship of sex to adolescent vocational maturity, the finding of a significant difference in Planning Orientation (Scale A) scores in favour of males, as indicated by the step-down analysis procedures, is not surprising in view of both evidence from other research and logical considerations. Super and Forrest[4] reported no significant sex difference on any of the CDI scales for their Michigan samples, but results showing sex differences on one or more of the scales for students at various grade levels were reported by researchers from several countries at a recent international symposium. Sex differences on Scale B were found for level four French Canadian students in Quebec,[5] for grades eight and eleven students in Japan,[6] and for seventh grade students in Brazil.[7] Differences by sex on Scale A were found for eighth and ninth grade students combined in

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3 Super, D. E., and D. J. Forrest, Career Development Inventory, Form I: Preliminary Manual for Research and Field Trial, New York, Teachers College Columbia University, 1972, p. 18.

4 Idem, ibid., p. 25.

5 Dupont, P., Adaptation du CDI au Canada français et utilisation pour l'information scolaire et professionnelle, paper presented at the International Association of Applied Psychology Conference, Montreal, 1974.

6 Fujimoto, G. K., Adapting the Career Development Inventory to Research in Japan: Problems and Results, paper presented at the International Association of Applied Psychology Conference, Montreal, 1974.

7 Monteiro, L., and R. Scheeffer, Research and Development with the Career Development Inventory in Brazil, paper presented at the International Association of Applied Psychology Conference, Montreal, 1974.

Switzerland,[8] and for seventh and eighth grades separately in Brazil.[9] Differences on Scale C were also reported for the eighth grade Brazilian sample.

While none of the above studies examined the question of different rates of vocational development between the sexes, the number of occasions on which sex differences in CDI scale scores have been found indicates that it would not be valid to assume rates of development independent of sex. On the contrary, it seems likely that differences in rates of development will continue to occur in societies where the two sex groups tend to hold different expectations concerning the role of careers in their adult lives. In Canada, females have traditionally been subject to cultural beliefs that it is less important for them to prepare themselves for careers than it is for males. Hence it is not surprising to find that grade nine females are less advanced in terms of preparing themselves for vocational exploration than males at the same grade level.

The step-down analysis procedures relating to the blocking factor of sex show that only Scale A contributed significantly to the differences associated with sex. Since both scales were found to contribute to the differences associated with locus of control group, it appears that the patterns of development on the two dimensions between the locus of control groups and between the sex groups may be somewhat different. While males scored higher than females on Scale A, when these differences were controlled statistically the two sex groups scored similarly on Scale B. In contrast,

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8 Dupont, J. B., Etude d'une adaptation Suisse Romande de l'inventaire de développement professionnel, paper presented at the International Association of Applied Psychology Conference, Montreal, 1974.

9 Monteiro, L., and R. Scheeffer, Op. Cit.

internals scored higher than externals on Scale A and also scored higher on Scale B even after statistical control of differences on Scale A had been exercised. This finding suggests that locus of control is a more important variable than sex in the overall vocational development of students at the grade nine level.

3. Hypothesis 2: Presentation and Discussion of Results.

Test of the Hypothesis

It was hypothesized that internals tend to achieve a higher mean score on Scale C of the CDI (Information and Decision Making) than externals. It was proposed that, since Scale C has been found in several studies to be moderately correlated with measures of verbal ability or of intelligence, the hypothesis would be tested by means of an analysis of covariance, using Henmon Nelson Mental Ability scores as the covariate. In this way initial differences in ability between the internal and external groups would be controlled statistically.

Given the estimated level of correlation of about 0.5 between the dependent variable and the covariate, however, only a relatively small increase in precision could be expected to result from using analysis of covariance rather than analysis of variance procedures. It was decided, therefore, to examine the locus of control groups for differences in intelligence prior to conducting the actual hypothesis test analysis. Henmon Nelson test scores were available for 236 of the 259 students

remaining in the sample who had been assigned either to the internal or to the external group. The mean and standard deviation on the Henmon Nelson test are shown by locus of control group in Table X. It can be seen that the internal group scored slightly higher than the external group in absolute terms. A test of the difference between the group means, however, yielded a non-significant result ($t = 1.56$, $p > .05$).

In the absence of differences in intelligence between the locus of control groups, and the expectation of only a small increase in precision to be achieved by considering the covariate, it was decided to test the null form of Hypothesis 2 using analysis of variance rather than analysis of covariance. Since it was not known whether the 236 students with Henmon Nelson scores differed systematically from those for whom no Henmon Nelson scores were available, the analysis of variance involved the Scale C scores of these 236 students only.

The assumption of homogeneity of variances of the Scale C scores was checked prior to performing the hypothesis test. Cochran's statistic (C), as recommended by Kirk,[10] was used to test the assumption. The value of C was computed to be 0.07, which did not exceed the relevant critical value (approximately 0.1) for $\alpha = .05$. The assumption of homogeneity of variances was therefore considered to be satisfied by the data, indicating that analysis of variance was an appropriate technique for testing the hypothesis.

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10 Cochran, W. G., "The Distribution of the Largest of a Set of Estimated Variances as a Fraction of Their Total", in Annals of Eugenics, Vol. 11, 1941, p. 47-52, cited in Kirk, R. E., Op. Cit., p. 62.

Table X.-

Mean ($\overline{X}$) and Standard Deviation on the Henmon Nelson Test of Mental Ability by Locus of Control Group.

Locus of control group	N	$\overline{X}$	s.d.
Internal	116	57.2	10.8
External	120	55.0	11.1

A univariate analysis of variance with CDI Scale C scores as the dependent variable and locus of control group, sex and school as factors, was conducted, again using Finn's[11] MULTIVARIANCE programme. The results of this analysis are summarized in Table XI. As can be seen from the table, none of the main or interaction effects reached significance at the .05 level. The null hypothesis of no difference in Scale C mean scores associated with locus of control group could, therefore, not be rejected.

Discussion of Results

Like Hypothesis 1, Hypothesis 2 also arose from links between the theories of Rotter and Super, and related research. The rationale for Hypothesis 2, beyond the general aspects concerning effective behaviour in problem-solving situations, involved particular links concerning the established tendencies of internals to engage in systematic information-seeking behaviour and to make use of the acquired information.[12] These tendencies were linked to the importance of systematic information-seeking in adolescent vocational exploration, as described by Jordaan.[13] The possession of information relevant to occupational choice and the knowledge of how to use this information in making suitable decisions is assessed by the Information and Decision Making scale, Scale C, of Super's

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11 Finn, J. D., Op. Cit.

12 Davis, W. L., and E. J. Phares, "Internal-External Control as a Determinant of Information-seeking in a Social Influence Situation", in Journal of Personality, Vol. 35, 1967, p. 547-561.

13 Jordaan, J. P., "Exploratory Behavior: The Formation of Self and Occupational Concepts", in Career Development: Self Concept Theory, Princeton, N. J., College Entrance Examination Board, 1963, p. 77.

Table XI.-

Univariate Analysis of Variance for Locus of Control Group (LC), Sex and School as Independent Variables and the Cognitive Scale of the Career Development Inventory (Scale A) as Dependent Variable.

Source of variation	No. of degrees of freedom	Mean square	F	p
LC	1	34.72	2.81	.09
Sex	1	0.81	0.06	.80
School	55	23.80	1.93	.09
LC x Sex	1	5.10	0.41	.52
LC x School	5	8.06	0.65	.66
Sex x School	5	8.80	0.71	.61
LC x Sex x School	5	7.59	0.62	.69
Error (within cells)	212	12.34		
Total	235			

Career Development Inventory (CDI). It was, therefore, hypothesized that students classified as internal tend to obtain higher Scale C scores than students classified as external.

As mentioned in the second chapter, however, Hypothesis 2 was proposed as being exploratory in nature. The reason for this consideration arose from uncertainty concerning when development on the cognitive dimension measured by Scale C occurs, and the fact that development on this dimension, which is moderately correlated with intelligence, does not necessarily indicate vocational maturity. Thus it was felt that the argument linking degree of internality of control to level of vocational maturity might not hold for the Information and Decision Making dimension at the grade nine level. It appears from the results of the test of Hypothesis 2 that this was the case for the students in this study, though the level of probability associated with the obtained F-ratio indicates the possibility of a trend for internals to possess more occupational information and to know better how to use it than externals. As Super contends, however, it seems likely that, at the grade nine level, development in the two attitudinal dimensions of vocational maturity is still proceeding, and probably has not reached the stage in many students of being followed or accompanied by development in the cognitive dimension.

The table of F-ratios for the test of Hypothesis 2 (Table XI) also indicates a possible trend toward significant differences among schools on the cognitive CDI dimension. Since the F-ratio did not reach significance at the .05 level, the possible differences were not pursued. School was initially included in the design as a blocking factor because

it was felt that differences in guidance programmes among schools might lead to school differences in vocational maturity scores. The results reported here suggest the possibility of differences in emphasis on the importance of occupational information in the guidance programmes offered either in the feeder intermediate schools or in the high schools themselves, or in both.

In this chapter the results of the tests of the two hypotheses, one proposed as a research hypothesis and the other more as an exploratory hypothesis, have been presented and discussed. In summary, the findings provided support for the hypothesis that internals tend to exhibit greater vocational maturity than externals on the two attitude dimensions examined, but failed to support the hypothesis that internals tend to be more mature vocationally than externals on the cognitive dimension. Conclusions which can be drawn from these findings in the context of the study as a whole are presented in the next section of the report.

SUMMARY AND CONCLUSIONS.

The problem investigated in the study was whether high school students with a predominantly internal belief in the locus of control of reinforcement tend to exhibit greater vocational maturity than students with a predominantly external belief. Three important dimensions of adolescent vocational maturity arising from Super's theory and research were examined. These dimensions were:

1) Planning Orientation

2) Resources for Exploration

and 3) Information and Decision Making,

as measured by Scales A, B and C of Super's Career Development Inventory (CDI). The first two dimensions are attitudinal, the third cognitive.

Subjects for the research consisted of three classes of first year students taking advanced level English in each of six English-language high schools in Ottawa. One of these high schools offered an academic programme only; the other five offered composite programmes. Altogether, over 400 students participated in the study.

The Nowicki-Strickland Locus of Control Scale for Children (LC scale), designed to measure the construct of internality-externality of control arising from Rotter's Social Learning Theory of Personality, and a modified version of the CDI were administered to the students on successive days early in the third term of their grade nine year. The students were tested one class at a time in the rooms in which their English classes were normally held. Henmon Nelson Test of Mental Ability scores on entry to high school, to be used as a covariate, were collected also.

Two hypotheses arising from the research problem were studied. The first postulated a relationship between degree of internality of control and level of vocational maturity on the attitudinal dimensions assessed by Scales A and B of the CDI. The second hypothesis, considered to be more exploratory in nature, postulated a relationship between degree of internality of control and cognitive vocational maturity as measured by Scale C of the CDI. The first hypothesis was tested by means of a multivariate analysis of variance with Scales A and B as dependent variables, since Scales A and B are themselves moderately correlated. After it was established that the locus of control groups did not differ in intelligence, the variable proposed for use as a covariate, the second hypothesis was tested by means of a univariate analysis of variance. Both analyses incorporated sex and school as blocking factors.

In the establishment of the locus of control groups, students scoring more than one standard error of measurement (SEM) unit above and below the median of the distribution of scores on the LC scale were classified as internal and external, respectively. Students scoring within one SEM unit of the median were not included because of the relatively high probability of misclassification due to unreliability in the LC scale.

The results of the analyses may be summarized as follows:

1) The hypothesis that internals, in contrast with externals, tend to have a greater orientation toward career planning and to be more aware of resources available to help them in their planning, as assessed by Scales A and B of the CDI, was supported. In addition, males were found to score significantly higher than females on Scales A and B considered jointly as dependent variables. Step-down analyses showed that the differences in the dependent variables

associated with sex were differences in Planning Orientation (Scale A), but that Resources for Exploration (Scale B) contributed uniquely beyond Scale A to the differences associated with locus of control group.

2) The hypothesis that internals, in contrast with externals, tend to possess more occupational information and to know better how to use such information in making vocational decisions, as assessed by Scale C of the CDI, was not supported.

It is considered that the results of the study extend Super's theory in that they provide a possible explanation of why some individuals develop vocationally mature behaviours more readily than other individuals. Briefly, it was argued that students with a predominantly internal locus of control, through their ability to cope more effectively with problem situations and their tendencies to be planful, to be aware of useful cues in their environment and to seek and use information systematically, would tend to exhibit more mature vocational behaviours in adolescence than students with a predominantly external locus of control. The main rationale for this argument was that adolescent vocational maturity, as described by Super, involves the possession of a positive orientation toward career planning, an awareness and use of resources available to help in the planning process, and both the possession of and ability to use relevant educational and occupational information.

It is also considered that the results provide reasonably strong support for Super's theory, particularly for the aspect involving the different stages of development of the three dimensions under investigation. It is felt that the failure to support the second hypothesis is, in fact,

consistent with Super's contention that high scores on Scale C, which is moderately highly correlated with intelligence, do not necessarily indicate vocational maturity. The results indicate that, at the grade nine level, development in the two attitudinal dimensions is still in progress, and may not have reached the stage where it will be followed or accompanied by development in the cognitive dimension. Had the study been conducted with grade ten or grade eleven students, the second hypothesis may well have been upheld.

The main limitation of the study which needs to be considered when the findings are being assessed involves the methods used in the selection of subjects. It was not possible to select schools, classes or individual students at random. However, care was taken to reflect in the schools and classes chosen the balance of types of schools in Ottawa and of the achievement levels of classes taking English at advanced level within the schools. It is hoped that, as a result of these efforts, the study's findings may be more likely to be replicated in other similar school systems.

The restriction of the study population to students in advanced level English classes at a single grade level, however, leads to the expectation that the findings would not necessarily generalize to lower ability students in general level courses or to students at other grade levels. Indeed, an implication of the discussion concerning the different grade levels during which the three vocational maturity dimensions are presumed to develop is that the pattern of findings at a higher grade level, for example grade eleven or twelve, would be expected to be different from the pattern of findings at grade nine. Future research could well be directed to this question.

BIBLIOGRAPHY

Battle, E. S., and J. B. Rotter, "Children's Feelings of Personal Control as Related to Social Class Ethnic Group", in Journal of Personality, Vol. 3, 1963, p. 482-490.

Bialer, I., "Conceptualization of Success and Failure in Mentally Retarded and Normal Children", in Journal of Personality, Vol. 29, 1961, p. 303-320.

Cellura, A. R., "The Application of Psychological Theory in Educational Settings: An Overview", in American Educational Research Journal, Vol. 6, 1969, p. 349-378.

Coleman, J. S., E. Q. Campbell, C. J. Hobson, J. McPartland, A. M. Mood, F. D. Weinfeld and R. L. York, Equality of Educational Opportunity, Washington, D. C., U. S. Government Printing Office, 1966, vi-737 p.

Crandall, V. C., V. J. Crandall and W. Katkovsky, "A Children's Social Desirability Questionnaire", in Journal of Consulting Psychology, Vol. 29, 1965, p. 27-36.

Crandall, V. J., W. Katkovsky and V. C. Crandall, "Children's Belief in Their Own Control of Reinforcement in Intellectual-Academic Achievement Situations", in Child Development, Vol. 26, 1965, p. 91-109.

Crites, J. O., The Maturity of Vocational Attitudes in Adolescence, APGA Inquiry Series No. 2, Washington, D. C., American Personnel and Guidance Association, 1971, 110 p.

Davis, W. L. and E. J. Phares, "Internal-external Control as a Determinant of Information-seeking in a Social Influence Situation", in Journal of Personality, Vol. 35, 1967, p. 547-561.

Dupont, J. B., Etude d'une adaptation Suisse-Romande de l'inventaire de développement professionnel, paper presented at the International Association of Applied Psychology Conference, Montreal, 1974.

Dupont, P., Adaptation du CDI au Canada français et utilisation pour l'information scolaire et professionnelle, paper presented at the International Association of Applied Psychology Conference, Montreal, 1974.

Elashoff, J. D., "Analysis of Covariance: A Delicate Instrument", in American Educational Research Journal, Vol. 6, No. 3, 1969, p. 383-401.

Field, F. L., An Investigation of Decision-Making in Educational-Vocational Context with Implications for Guidance, unpublished doctoral dissertation, Harvard Graduate School of Education, 1964, 58 p.

Finn, J. D., MULTIVARIANCE: Univariate and Multivariate Analysis of Variance, Covariance and Regression, Ann Arbor, Michigan, National Educational Resources Inc., 1972.

Forrest, D. J., The Construction and Validation of an Objective Measure of Vocational Maturity for Adolescents, doctoral dissertation, Ann Arbor, Michigan, University Microfilms, 1971, 124 p.

Fujimoto, G. K., Adapting the Career Development Inventory to Research in Japan: Problems and Results, paper presented at the International Association of Applied Psychology Conference, Montreal, 1974.

Ginzberg, E., S. W. Ginsburg, S. Axelrad, and J. L. Herma, Occupational Choice, New York, Columbia University Press, 1951, viii-271 p.

Gribbons, W. D. and P. R. Lohnes, Emerging Careers, New York, Teachers College, Columbia University, 1968, v-202 p.

Jordaan, J. P., "Exploratory Behavior: The Formation of Self and Occupational Concepts", in Career Development: Self Concept Theory, Princeton, New Jersey, College Entrance Examination Board, 1963, p. 42-78.

--------, A Perspective on Cross-National Adaptations of Measures of Occupational Maturity, paper presented at the International Association of Applied Psychology Conference, Montreal, 1974.

Kirk, R. E., Experimental Design: Procedures for the Behavioral Sciences, Belmont, California, Brooks/Cole (Wadsworth), 1969, xii-577 p.

Lefcourt, H. M., "Internal versus External Control of Reinforcement: A Review", in Psychological Bulletin, Vol. 65, 1966, p. 206-220.

Lokan, J. J., Locus of Control and Indices of Vocational Maturity in Adolescence: A Validation Study, unpublished paper, Ottawa, 1976.

MacDonald, A. P. (Jr.), "Measures of Internal-External Control", in Robinson, J. P. and P. R. Shaver (Eds.), Measures of Social Psychological Attitudes, University of Michigan, Institute for Social Research, Chapter IV, 1973, p. 159-184.

Minnich, W. K. and J. F. Gastright, Control of Environment, Acceptance of Responsibility for Choice, and Planning Orientation in Relation to Career Information, paper presented at the American Educational Research Association Annual Meeting, Chicago, 1974, 11 p.

Monteiro, L. and R. Scheeffer, Research and Development with the Career Development Inventory in Brazil, paper presented at the International Association of Applied Psychology Conference, Montreal, 1974.

Nowicki, S. (Jr.) and B. R. Strickland, "A Locus of Control Scale for Children", in Journal of Consulting and Clinical Psychology, Vol. 40, 1973, p. 148-154.

Phares, E. J., "Differential Utilization of Information as a Function of Internal-External Control", in Journal of Personality, Vol. 36, 1968, p. 649-660.

Rotter, J. B., Social Learning and Clinical Psychology, New York, Prentice-Hall, 1954, 466 p.

--------, "Generalized Expectancies for Internal versus External Control of Reinforcement", in Psychological Monographs, Vol. 80, (Whole No. 609), 1966, p. 1-28.

Rotter, J. B., M. Seeman and S. Liverant, "Internal Versus External Control of Reinforcements: A Major Variable in Behavior Theory", in Washburne, N. F. (Ed.), Decisions, Values and Groups, Vol. II, London, Pergamon Press, 1962, 521 p.

Rotter, J. B., J. E. Chance and E. J. Phares, Applications of a Social Learning Theory of Personality, New York, Holt, Rinehart and Winston, 1972, xiii-624 p.

Seeman, M., "On the Meaning of Alienation", in American Sociological Review, Vol. 24, 1959, p. 782-791.

Seeman, M. and J. W. Evans, "Alienation and Learning in a Hospital Setting", in American Sociological Review, Vol. 27, 1962, p. 772-783.

Super, D. E., The Dynamics of Vocational Adjustment, New York, Harper, 1942.

--------, "A Theory of Vocational Development", in American Psychologist, Vol. 8, 1953, p. 185-190.

--------, "Dimensions and Measurement of Vocational Maturity", in Teachers College Record, Vol. 57, 1955, p. 151-165.

--------, The Psychology of Careers, New York, Harper, 1957, x-362 p.

--------, "Self Concepts in Vocational Development", in Career Development: Self Concept Theory, Princeton, New Jersey, College Entrance Examination Board, 1963, p. 1-16.

Super, D. E., "Vocational Development in Adolescence and Early Adulthood: Tasks and Behaviors", in Career Development: Self Concept Theory, Princeton, New Jersey, College Entrance Examination Board, 1963, p. 79-95.

--------, "Vocational Development Theory: Persons, Positions and Processes", in The Counseling Psychologist, Vol. 1, 1969, p. 2-9.

--------, "Vocational Maturity Theory", in Measuring Vocational Maturity for Counseling and Evaluation, Washington, D. C., National Vocational Guidance Association Monograph, 1974, p. 9-21.

Super, D. E., J. O. Crites, R. C. Hummel, H. P. Moser, P. L. Overstreet and C. F. Warnath, Vocational Development: A Framework for Research, New York, Teachers College, Columbia University, 1957, xiv-142 p.

Super, D. E. and P. L. Overstreet, The Vocational Maturity of Ninth Grade Boys, New York, Teachers College, Columbia University, 1960, xii-212 p.

Super, D. E., M. Bohn (Jr.), D. J. Forrest, J. P. Jordaan, R. H. Lindeman and A. S. Thompson, Career Development Inventory, Form I, New York, Teachers College, Columbia University, 1971.

Super, D. E. and D. J. Forrest, Career Development Inventory, Form I: Preliminary Manual for Research and Field Trial, New York, Teachers College, Columbia University, 1972, 52 p.

Thomas, H. B., The Effects of Sex, Occupational Choice, and Career Development Responsibility on the Career Maturity of Ninth-grade Students, paper presented at the American Educational Research Association Annual Meeting, Chicago, 1974, 9 p.

Tiedeman, D. V., "The Organization and Intention of a Proposed Data and Educational System for Vocational Decision Making", Harvard Studies in Career Development, No. 42, Cambridge, Mass., Center for Research in Careers, Harvard University, 1965, 14 p.

Westbrook, B. W., "Three Measures of Vocational Maturity: A Beginning to Know About", in Measurement and Evaluation in Guidance, Vol. 6, 1973, p. 8-16.

Westbrook, B. W. and J. W. Cunningham, "The Development and Application of Vocational Maturity Measures", in Vocational Guidance Quarterly, Vol. 18, 1970, p. 171-175.

APPENDIX 1

Copies of Instruments

1 5

PERSONAL REACTION SURVEY.

On the following pages you will find some questions which ask for your reactions to many things that you're bound to have thought about or experienced at some time or other. The only right answers to these questions are the ones that are right for you.

Each question should be answered either Yes or No. Mark your answer directly on the test paper, by placing a check mark in the appropriate box alongside each question. If you're not sure of an answer, mark whichever answer comes closest to being right for you. PLEASE DO NOT OMIT ANY QUESTIONS.

There is no time limit, but work as rapidly as you can; the first answer that comes to you is often the best one.

PLEASE FILL IN THE INFORMATION ASKED FOR BELOW (USE BLOCK LETTERS), THEN WAIT UNTIL YOU ARE TOLD TO BEGIN.

YOUR NAME: 8 _____ 18 _____

Last name First name

SCHOOL: _____ HOME FORM: _____

PERSONAL REACTION SURVEY

Answer each question by checking the appropriate box.

1. Do you believe that most problems will solve themselves if you just don't fool with them? ☐ 1 Yes ☐ 2 No 35

2. Are you often blamed for things that just aren't your fault? ☐ 1 Yes ☐ 2 No

3. Do you feel that most of the time it doesn't pay to try hard because things never turn out right anyway? ☐ 1 Yes ☐ 2 No

4. Do you feel that most of the time parents listen to what their children have to say? ☐ 1 Yes ☐ 2 No

5. When you get punished, does it usually seem it's for no good reason at all? ☐ 1 Yes ☐ 2 No

6. Most of the time, do you find it hard to change a friend's opinion? ☐ 1 Yes ☐ 2 No 40

7. Do you feel that it's nearly impossible to change your parent's mind about anything? ☐ 1 Yes ☐ 2 No

8. Do you feel that when you do something wrong there's very little you can do to make it right? ☐ 1 Yes ☐ 2 No

9. Do you believe that most kids are just born good at sports? ☐ 1 Yes ☐ 2 No

10. Do you feel that one of the best ways to handle most problems is just not to think about them? ☐ 1 Yes ☐ 2 No

11. Do you feel that when someone your age decides to hit you, there's little you can do to stop him or her? ☐ 1 Yes ☐ 2 No 45

12. Have you felt that when people were mean to you it was usually for no reason at all? ☐ 1 Yes ☐ 2 No

Please go on to the next page .....

13. Most of the time, do you feel that you can change what might happen tomorrow by what you do today? ☐ 1 Yes ☐ 2 No 47

14. Do you believe that, when bad things are going to happen, they just are going to happen no matter what you try to do to stop them? ☐ 1 Yes ☐ 2 No

15. Most of the time do you find it useless to try to get your own way at home? ☐ 1 Yes ☐ 2 No

16. Do you feel that when somebody your age wants to be your enemy there's little you can do to change matters? ☐ 1 Yes ☐ 2 No 50

17. Do you usually feel that you have little to say about what you get to eat at home? ☐ 1 Yes ☐ 2 No

18. Do you feel that when someone doesn't like you there's little you can do about it? ☐ 1 Yes ☐ 2 No

19. Do you usually feel that it's almost useless to try in school because most other students are just plain smarter than you are? ☐ 1 Yes ☐ 2 No

20. Are you the kind of person who believes that planning ahead makes things turn out better? ☐ 1 Yes ☐ 2 No

21. Most of the time, do you feel that you have little to say about what your family decides to do? ☐ 1 Yes ☐ 2 No 55

End of questionnaire 60 ☐ 1 ☐ 2

THANK YOU

CAREER DEVELOPMENT INVENTORY

Form 1

Donald E. Super
Martin J. Bohn, Jr.
David J. Forrest
Jean Pierre Jordaan
Richard H. Lindeman
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Teachers College, Columbia University
New York, New York

* * * * * * * * * * * * * * * *

INTRODUCTION

The questions you are about to read ask you about school, work, your future career, and some of the plans you may have made. The only right answers are the ones which are right for you. Later, some questions ask about career facts; others ask you to judge students' plans. Give the best answers you can.

Answers to questions like these can help teachers and counsellors offer the kind of help which high school students want and need in planning and preparing for a job after graduation, for vocational and technical school training, or for going to college or university.

THE FIRST STEP

Check your booklet to make sure it has 13 pages, all in the right order.

Now look at the green and yellow sheets you have been given. Please fill in your name, school and home form at the top of each of these sheets.

You may then fill in the rest of the information asked for on the green sheet.

PLEASE DO NOT WRITE ON THIS BOOKLET.

DO NOT OPEN IT UNTIL YOU ARE TOLD TO BEGIN.

HOW TO ANSWER

1. All your answers go on the yellow Answer Sheet.

2. The questions in the Inventory are arranged in sections. In each of Sections I through V, you are given a set of statements at the beginning of the section to show the possible answers for the questions in that section. The sets of statements are not the same for all the sections, so PLEASE READ THEM CAREFULLY.

   For most of the remainder of the Inventory, each question has its own set of answers. However, please note that the questions in Section VII have a set of answers at the beginning of the section, and that the questions in Section VIII are set out differently from those in all the other sections. Again, PLEASE READ THE INSTRUCTIONS CAREFULLY.

3. After you choose an answer to a question, find the number of the question on the Answer Sheet and circle the appropriate letter opposite that number. If you make a mistake, cross out the wrong answer clearly and circle the right one.

4. Answer all questions. If you are not sure about an answer, make the best guess you can. There is no time limit, but work as rapidly as you can; the first answer that comes to you is often the best one.

The questions begin on the next page.

SECTION I

Students differ considerably in the amounts of thinking and planning they do about their future careers.

Here are five statements showing different amounts of thinking and planning:

(A) I have not given any thought to this.

(B) I have given some thought to this, but haven't made any plans yet.

(C) I have some plans, but am still not sure of them.

(D) I have made definite plans, but don't know how to carry them out.

(E) I have made definite plans, and know what to do to carry them out.

For EACH QUESTION (questions 1 through 14) in this first section, choose the statement which is closest to showing the amount of thinking and planning you have done. * * * * * * * * * * * * * *

I. HOW MUCH THINKING AND PLANNING HAVE YOU DONE IN THE FOLLOWING AREAS?

1. Finding out about educational and occupational possibilities by going to the library, sending away for information, or talking to somebody who knows about the possibilities.

2. Talking about career decisions with an adult who knows something about me.

3. Taking high school courses which will help me decide what line of work to go into when I leave school, community college or university.

4. Taking high school courses which will help me later in university, in job training, or on the job.

5. Taking part in school or out-of-school activities which will help me in university, in training, or on the job.

6. Taking part in school or after school activities (for example, science club, school newspaper, Sunday School teaching, volunteer nurse's aide) which will help me decide what kind of work to do when I leave school.

7. Getting a part-time or summer job which will help me decide what kind of work I might go into.

8. Getting a part-time or summer job which will help me get the kind of job or training I want.

Here are five statements showing different amounts of thinking and planning:

(A) I have not given any thought to this.

(B) I have given some thought to this, but haven't made any plans yet.

(C) I have some plans, but am still not sure of them.

(D) I have made definite plans, but don't know how to carry them out.

(E) I have made definite plans, and know what to do to carry them out.

9. Getting money for university, college or training.

10. Dealing with things which might make it hard for me to get the kind of training or the kind of work I would like.

11. Getting the kind of training, education or experience which I will need to get into the kind of work I want.

12. Getting a job once I've finished my education and training.

13. Doing the things one needs to do to become a valued employee who doesn't have to be afraid of losing his job or being laid off when times are hard.

14. Getting ahead (more money, promotions, etc.) in the kind of work I choose.

SECTION II

High school students differ greatly in the amount of time and thought they give to making choices. Use the statement below to compare yourself to the typical students of your sex in your grade on each of the following kinds of choices (questions 15-21).

Compared to my classmates I am .....

(A) much below average, not as good as most
(B) a little below average
(C) average
(D) a little above average
(E) much above average, better than most

..... in the amount of time and thought I give to:

15. Choosing high school courses.

16. Choosing high school activities.

17. Choosing out-of-school activities.

18. Choosing between university, community college, business college, work, military service, marriage, homemaking, etc.

19. Choosing a university, community college, branch of Military service, husband or wife, etc.

20. Choosing an occupation for after high school, university, college or job training.

21. Choosing a career in general.

22. How would you rate your plans for after high school?

(A) Not at all clear or sure.
(B) Not very clear
(C) Some not clear, some clear.
(D) Fairly clear.
(E) Very clear, all decided.

III. Below are five possible answers to use in answering questions 23 through 33, questions about how much you know about the occupation you said you like best on the green sheet. Mark the number of your choice on the Answer Sheet.

I know .....

(A) hardly anything
(B) a little
(C) an average amount
(D) a good deal
(E) a great deal

..... about:

23. What people really do on the job.

24. Specialities in the occupations.

25. Different places where people might work in this occupation.

26. The abilities and traits needed in the occupation.

27. The physical working conditions.

28. The education or training needed to get into the occupation.

29. The courses offered in high school that are the best for the occupation.

30. The need for new people in the occupation.

31. Different ways of entering the occupation.

32. The starting pay in the occupation.

33. The chances for getting ahead in the occupation.

IV. Here are five answers which can be used for questions 34 through 47. Use these answers to show whether or not you would go to the sources of information listed below for help in making your job, university, or other training plans.

I would .....

(A) definitely not
(B) probably not
(C) not be sure whether to
(D) probably
(E) definitely

..... go to:

34. Father or male guardian.

35. Mother or female guardian.

36. Brothers, sisters, or other relatives.

37. Friends.

38. Team coaches or Physical Education teachers.

39. Other teachers.

40. Minister, priest, or rabbi.

41. School counsellors.

42. Private counsellors, outside of school.

43. Books with the information I needed.

44. Audio or visual aids like tape recordings, movies, or computers.

45. University or community college calendars.

46. Persons in the occupation or at the university or college I am considering.

47. TV shows, movies, or magazines.

V. Here again are five answers which are to be used with the following items. This time use the statements to show which of the sources of information below have already given you information which has been helpful to you in making your job, university or other training plans.

I have obtained .....

(A) no useful information
(B) very little useful information
(C) some useful information
(D) a good deal of useful information
(E) a great deal of useful information

..... from:

48. Father or male guardian.

49. Mother or female guardian.

50. Brothers, sisters, or other relatives.

51. Friends.

52. Team coaches or Physical Education teachers.

53. Other teachers.

54. Minister, priest, or rabbi.

55. School counsellors.

56. Private counsellors, outside of school.

57. Books with the information I needed.

58. Audio or visual aids like tape recordings, movies, or computers.

59. University or community college calendars.

60. Persons in the occupation or at the university or college I am considering.

61. TV shows, movies, or magazines.

SECTION VI.

Here, each question (Nos. 62-66) has its own set of possible answers.

62. Which of the following is the best source of information about job duties and opportunities?

(A) The Encyclopedia Britannica
(B) World Almanac
(C) Scholastic Magazine
(D) Occupational Monographs
(E) The Occupational Index

63. Which one of the following would be most useful for detailed information about getting into university or college?

(A) The World Book Encyclopedia
(B) Webster's Collegiate Dictionary
(C) Horizons
(D) Reader's Digest
(E) The Education Index

64. Which one of the following pairs of occupations involves the same level of training and responsibility?

(A) Tailor, Sales Clerk
(B) Engineer, Accountant
(C) Tailor, Engineer
(D) Accountant, Sales Clerk

65. The occupational fields expected to grow most rapidly during the next ten years are:

(A) Professional and service.
(B) Sales and crafts.
(C) Crafts and clerical.
(D) Labour and sales.

66. Between 1910 and 1970, the industry employing the greatest number of workers changed from:

(A) Agriculture to wholesale and retail trade.
(B) Manufacturing to agriculture.
(C) Wholesale and retail trade to manufacturing.
(D) Agriculture to manufacturing.

SECTION VII.

Occupations are different in the amount of education required for employment. Five different amounts of education are listed below. For each of the following occupations (questions 67-74), mark on your Answer Sheet the amount of education usually required.

Amount of Education:

(A) High School Graduation Diploma
(B) Apprenticeship Training
(C) Technical School or Community College (2 years)
(D) University Degree (3 or 4 years)
(E) Professional training beyond a 3 or 4 year University Degree

Occupation:

67. Stenographer.

68. Dental Technician.

69. Family Doctor (Physician).

70. Mail Carrier.

71. Plumber.

72. Computer Operator.

73. Bank Clerk.

74. Social Worker.

SECTION VIII.

Many occupations use special tools. Below is a list of special tools or equipment and a list of occupations. Match the occupation in Column A with its equipment (Column B).

COLUMN A		COLUMN B	
Occupation :		Equipment :	
75.	Electrician	(A)	Tracing Wheel
76.	Bookkeeper	(B)	Ammeter
77.	Bricklayer	(C)	Centrifuge
78.	Dressmaker	(D)	Trowel
79.	Medical Technician	(E)	Ledger

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SECTION IX.

Here again, each question has its own set of answers.

80. In the ninth and tenth grades, plans about jobs and occupations should:

(A) be clear
(B) not rule out any possibilities
(C) keep open the best possibilities
(D) not be something to think about.

81. Decisions about high school courses can have an effect on:

(A) the diploma one receives
(B) the kind of training or education one can get after high school
(C) later occupational choices
(D) how much one likes school
(E) all of these.

82. Decisions about jobs should take into account:

(A) strengths, or what one is good at learning and doing
(B) what one likes to do
(C) the kind of person one is
(D) the chances for getting ahead in that kind of job
(E) all of these.

83. One of the things that great artists, musicians and professional athletes have in common is the desire to:

(A) make money
(B) have large audiences
(C) be the best there is at what they do
(D) teach others to do what they do.

84. J. D. might like to become a computer programmer, but knows little about computer programming and is going to the library to find out more about it. The most important thing for J. D. to know about this occupation is:

(A) the nature of the work involved
(B) the rate of pay
(C) the hours of work
(D) the place (or places) where one can get the right training.

85. M. S. likes high school biology and general science courses best, and likes to do schoolwork alone in order to be able to concentrate. Such a person, beginning to think about a future occupation, should consider:

(A) Accountant
(B) High School Science Teacher
(C) Medical Laboratory Technician
(D) Nurse.

86. P. T. is the best speaker on the school debating team, described in the school yearbook as "our golden-tongued orator -- a real nice person who can listen as well as talk -- could sell refrigerators to the Eskimos". P. T. will probably graduate in the bottom half of the class, although test scores show superior ability. P. T.'s only good grades (mostly B's) are in business subjects, poorest grades (mostly D's) are in English and social studies.

P. T. desires to become a trial lawyer. Which of the following reasons shows best why this desire is not very realistic?

(A) With grades like these, it is difficult to get into a university.
(B) P. T.'s poorest grades are in the subjects that are most important for law.
(C) There is much more to being a lawyer than being good at public speaking.
(D) All of the above are good reasons for thinking that this student will have a hard time becoming a trial lawyer.

87. The facts about P. T. suggest that he or she should think about becoming:

(A) an accountant
(B) a sales representative
(C) an actor or actress
(D) a school counsellor
(E) a lawyer.

88. A. M. is very good with skilled handwork and there isn't anybody in the class who has more mechanical aptitude or is better at art. A. M. also does very well in math. A. M. likes all of these things.

What should this student do?

(A) Look for an occupation which will use as many of these interests and abilities as possible?
(B) Pick an occupation which uses math since there is a better future in that than in art or in working with one's hands?
(C) Decide now on one of these activities because of ability or interest, and then pick an occupation which uses that kind of asset?
(D) Put off deciding about the future and wait until interest in some of these activities declines?

89. E. R. took some tests and got scores which show promise in clerical work. The student says, "I just can't see myself sitting behind a desk for the rest of my life. I'm the kind of person who likes variety. I think a travelling job would suit me fine". E. R. should:

(A) disregard the tests and do what he or she wants to do.
(B) do what the tests say, since they know best.
(C) look for a job which will use the clerical abilities but not keep him or her pinned to a desk.
(D) ask to be tested with another test, since the results of the first ones are probably wrong.

90. B. R. gets very good science grades but doesn't care too much about these subjects. The subject liked best is art, even though grades in it are only average. This student is most likely to do well in an occupation if he or she:

(A) forgets about interest in art since he or she is so much better in science.
(B) doesn't worry about grades in art, because if you like something you can become good at it.
(C) looks for an occupation which uses both art and science, but more science than art.
(D) looks for an occupation which involves both science and art, but more art than science.

91. L. F. professes not to care much about what kind of work is available to him or her on leaving school as long as it involves working with people. If this is all this student cares about he or she is likely to make a bad choice because:

(A) this kind of work usually requires a university degree.
(B) employers usually want people with definite interests and objectives.
(C) jobs involving work with people are looked down on, since they usually don't pay as well as scientific work.
(D) occupations in which one works with people can be very different from each other in the abilities and interests which are needed.

THANK YOU.

YOUR FUTURE OCCUPATION

YOUR NAME: _____ _____
Last name First name

_____ _____
School Home form

1. In your present thoughts and plans, what kind of work would you like to do when you finish all of your education and training? What kind of occupation do you plan to enter? For example, bookkeeper, machinist, lawyer, registered nurse, small store owner, waitress, engineer, shop foreman, elementary teacher, truck driver, etc. Write the name(s) of the occupation(s) you have thought about on the lines below:

_____

_____

_____

_____

If you have given more than one occupation, put an "X" in front of your first choice, the one you prefer more than the others.

KEEP THIS SHEET HANDY, AS YOU WILL NEED TO REFER TO IT DURING THE QUESTIONNAIRE.

APPENDIX 1

ANSWER SHEET.

YOUR NAME: 8 _____ Last name 18 _____ First name

1 5 _____

SCHOOL: _____ Home Form: _____

INSTRUCTIONS: There are four or five possible answers for each question. After you choose an answer to a question, find the number of the question on the Answer Sheet and CIRCLE the letter that corresponds to your answer. If you make a mistake, cross out the wrong answer and circle the right one.

SECTION I (c 31-44)

1.	A	B	C	D	E
2.	A	B	C	D	E
3.	A	B	C	D	E
4.	A	B	C	D	E
5.	A	B	C	D	E
6.	A	B	C	D	E
7.	A	B	C	D	E
8.	A	B	C	D	E
9.	A	B	C	D	E
10.	A	B	C	D	E
11.	A	B	C	D	E
12.	A	B	C	D	E
13.	A	B	C	D	E
14.	A	B	C	D	E

SECTION II (c 45-52)

15.	A	B	C	D	E
16.	A	B	C	D	E
17.	A	B	C	D	E
18.	A	B	C	D	E
19.	A	B	C	D	E
20.	A	B	C	D	E
21.	A	B	C	D	E
22.	A	B	C	D	E

SECTION III (c 53-63)

23.	A	B	C	D	E
24.	A	B	C	D	E

SECTION III (cont'd)

25.	A	B	C	D	E
26.	A	B	C	D	E
27.	A	B	C	D	E
28.	A	B	C	D	E
29.	A	B	C	D	E
30.	A	B	C	D	E
31.	A	B	C	D	E
32.	A	B	C	D	E
33.	A	B	C	D	E

c 80: 1

Repeat c 1-12

SECTION IV (c 14-27)

34.	A	B	C	D	E
35.	A	B	C	D	E
36.	A	B	C	D	E
37.	A	B	C	D	E
38.	A	B	C	D	E
39.	A	B	C	D	E
40.	A	B	C	D	E
41.	A	B	C	D	E
42.	A	B	C	D	E
43.	A	B	C	D	E
44.	A	B	C	D	E
45.	A	B	C	D	E
46.	A	B	C	D	E
47.	A	B	C	D	E

Continued over page...

ANSWER SHEET (cont'd)

SECTION V (c 28-41)

48.	A	B	C	D	E
49.	A	B	C	D	E
50.	A	B	C	D	E
51.	A	B	C	D	E
52.	A	B	C	D	E
53.	A	B	C	D	E
54.	A	B	C	D	E
55.	A	B	C	D	E
56.	A	B	C	D	E
57.	A	B	C	D	E
58.	A	B	C	D	E
59.	A	B	C	D	E
60.	A	B	C	D	E
61.	A	B	C	D	E

SECTION VI (c 42-46)

62.	A	B	C	D	E
63.	A	B	C	D	E
64.	A	B	C	D	
65.	A	B	C	D	
66.	A	B	C	D	

SECTION VII (c 47-54)

67.	A	B	C	D	E
68.	A	B	C	D	E
69.	A	B	C	D	E
70.	A	B	C	D	E
71.	A	B	C	D	E
72.	A	B	C	D	E
73.	A	B	C	D	E
74.	A	B	C	D	E

SECTION VIII (c 55-59)

75.	A	B	C	D	E
76.	A	B	C	D	E
77.	A	B	C	D	E
78.	A	B	C	D	E
79.	A	B	C	D	E

SECTION IX (c 60-71)

80.	A	B	C	D	
81.	A	B	C	D	E
82.	A	B	C	D	E
83.	A	B	C	D	
84.	A	B	C	D	
85.	A	B	C	D	
86.	A	B	C	D	
87.	A	B	C	D	E
88.	A	B	C	D	
89.	A	B	C	D	
90.	A	B	C	D	
91.	A	B	C	D	

c 80: 2

End of questionnaire.

THANK YOU.

APPENDIX 2

Scores of 397 Students in Final Sample

SCORES OBTAINED BY 397 STUDENTS IN FINAL SAMPLE

SCHOOL	STDT ID	SEX	HN IQ (RAW)	LC	CDI A	CDI B	CDI C
SECTION I. STUDENTS RETAINED FOR HYPOTHESIS TESTS							
1	4	1	49	19	133	254	14
1	8	1	0	20	100	276	18
1	12	1	40	18	114	268	14
1	31	1	59	18	121	204	16
1	32	1	50	18	79	227	14
1	38	1	74	17	131	277	19
1	41	1	0	17	134	272	15
1	51	1	47	19	121	309	17
1	66	1	49	17	109	234	18
1	80	1	56	18	97	220	11
2	7	1	71	19	107	283	23
2	11	1	65	17	85	247	17
2	45	1	56	17	90	224	19
2	63	1	61	17	96	229	17
2	68	1	0	18	102	280	13
2	77	1	56	18	117	240	13
2	80	1	46	19	116	253	17
3	1	1	45	18	145	282	19
3	14	1	73	17	99	216	22
3	20	1	58	17	125	330	14
3	35	1	58	17	123	260	19
3	40	1	57	17	128	321	24
3	41	1	64	17	107	301	17
3	42	1	59	18	109	217	16
3	55	1	68	19	115	258	17
3	67	1	38	17	94	255	11
3	69	1	0	20	87	184	14
3	72	1	37	17	134	332	11
4	14	1	57	20	130	166	16
4	15	1	56	17	91	288	17
4	37	1	37	18	84	264	10
4	38	1	69	18	98	272	21
4	44	1	61	17	63	175	20
4	61	1	54	17	89	228	16
4	62	1	61	17	123	335	17
4	69	1	60	18	101	232	20
*5	6	1	58	17	151	413	10
5	9	1	44	17	94	261	10
5	12	1	54	19	104	228	21
5	13	1	50	17	102	203	15
5	37	1	65	17	90	183	15
5	66	1	0	17	95	197	18
5	76	1	50	19	124	260	15
5	89	1	0	21	124	247	16
6	19	1	46	19	95	226	10
6	24	1	64	17	115	309	19
6	30	1	34	17	108	203	10
6	31	1	66	17	111	233	19

* Subject excluded because of extreme score on Scale B.

SCORES OBTAINED BY 397 STUDENTS IN FINAL SAMPLE (CONT)

SCHOOL	STDT ID	SEX	HN IQ (RAW)	LC	CDI A	CDI B	CDI C
6	46	1	71	18	138	254	19
6	47	1	62	17	90	231	13
6	60	1	51	20	128	269	15
6	64	1	55	18	116	243	20
6	67	1	43	20	87	200	13
6	77	1	84	19	90	227	24
6	84	1	60	19	106	268	17
6	87	1	61	21	130	232	21
6	90	1	70	17	123	254	23
6	96	1	59	17	99	263	15
1	3	2	57	17	71	208	18
1	16	2	53	17	66	165	14
1	43	2	52	20	121	330	17
1	46	2	59	21	73	177	19
1	49	2	52	17	80	213	15
1	52	2	59	17	109	213	11
1	63	2	0	17	96	247	21
1	65	2	55	20	123	290	18
1	75	2	0	19	112	274	15
1	77	2	62	17	113	269	15
2	3	2	43	20	116	277	16
2	12	2	41	17	97	234	12
2	19	2	77	21	132	263	19
2	22	2	63	18	102	278	22
2	34	2	69	17	94	271	13
2	69	2	31	17	88	243	15
2	71	2	57	20	143	288	15
2	74	2	77	19	116	262	17
2	75	2	0	18	103	238	13
2	81	2	41	20	93	275	13
3	9	2	36	17	100	249	12
3	11	2	66	17	128	249	23
3	21	2	66	17	158	246	15
3	46	2	70	17	117	244	22
3	51	2	61	17	127	275	19
3	57	2	66	20	73	230	18
3	58	2	49	17	83	198	15
3	65	2	66	18	109	318	21
3	79	2	48	18	87	216	18
4	1	2	79	18	81	210	21
4	5	2	0	18	122	279	24
4	9	2	61	19	52	174	14
4	11	2	78	20	133	254	22
4	33	2	62	18	89	284	24
4	49	2	56	18	78	196	16
4	65	2	61	18	79	185	10
4	72	2	65	18	90	239	19
4	74	2	57	18	65	184	16
5	8	2	65	18	74	214	18
5	14	2	58	18	115	241	16
5	31	2	62	18	90	212	16
5	32	2	0	20	118	253	18

SCORES OBTAINED BY 397 STUDENTS IN FINAL SAMPLE (CONT)

SCHOOL	STDT ID	SEX	HN IG (RAW)	LC	CDI A	CDI B	CDI C
5	34	2	38	17	115	329	11
5	42	2	53	17	92	251	18
5	43	2	49	18	105	268	18
5	44	2	69	20	108	267	23
5	63	2	47	17	72	183	15
5	64	2	60	19	62	172	19
5	67	2	60	18	87	268	16
5	69	2	59	18	138	307	18
5	75	2	44	17	104	218	20
5	80	2	57	18	109	296	17
5	83	2	57	18	60	188	20
5	85	2	23	18	98	235	12
5	87	2	62	18	107	259	19
5	90	2	49	17	94	234	16
6	3	2	60	18	91	175	18
6	7	2	67	17	54	251	21
6	39	2	52	18	58	187	13
6	43	2	62	17	120	368	18
6	45	2	65	17	104	191	21
6	48	2	60	20	127	345	11
6	51	2	57	19	110	265	21
6	65	2	76	18	89	206	20
6	66	2	67	17	72	258	20
6	69	2	48	18	88	199	16
6	72	2	52	17	53	164	14
6	74	2	60	17	75	236	18
6	94	2	59	18	91	200	13
6	97	2	65	18	109	196	19
1	15	1	58	12	86	176	15
1	20	1	56	12	113	222	19
1	22	1	50	13	105	224	16
*1	25	1	45	13	144	390	17
1	33	1	50	8	109	187	16
1	36	1	51	9	143	254	13
1	39	1	0	10	141	156	18
1	42	1	48	8	87	240	17
1	44	1	50	13	74	217	15
1	47	1	56	10	79	202	18
1	48	1	67	13	94	199	12
1	50	1	63	9	104	290	21
1	62	1	64	10	106	258	16
1	71	1	39	12	103	181	13
1	76	1	0	13	93	195	16
2	2	1	52	12	132	299	18
2	5	1	43	13	86	212	14
2	16	1	64	10	122	249	16
2	20	1	59	11	103	235	20
2	33	1	51	12	87	232	16
2	36	1	70	12	107	269	19
2	37	1	0	6	72	139	15
2	47	1	49	10	66	194	13
2	50	1	0	11	112	239	15

* Subject excluded because of extreme score on Scale B.

SCORES OBTAINED BY 397 STUDENTS IN FINAL SAMPLE (CONT)

SCHOOL	STD ID	SEX	HN IQ (RAW)	LC	CDI A	CDI B	CDI C
2	61	1	0	10	77	199	12
2	66	1	44	11	73	183	14
2	70	1	0	8	124	322	11
2	76	1	71	12	93	222	25
2	85	1	78	10	113	254	13
3	12	1	60	12	115	287	18
3	15	1	69	12	79	210	19
3	17	1	53	12	74	171	8
3	32	1	72	13	103	209	21
3	34	1	51	13	90	262	15
3	47	1	60	13	113	256	19
3	50	1	65	12	119	297	13
3	62	1	69	11	74	186	17
3	75	1	66	13	84	178	15
3	76	1	49	10	94	147	11
3	80	1	45	13	79	188	14
3	81	1	37	12	98	210	13
4	3	1	58	13	85	222	23
4	4	1	61	11	107	182	17
4	8	1	43	7	90	298	22
4	10	1	63	12	139	259	17
4	34	1	75	12	89	241	20
4	36	1	40	12	94	312	11
4	39	1	77	11	141	207	22
4	64	1	47	11	69	206	11
4	70	1	49	13	116	222	13
4	73	1	58	11	95	279	18
4	75	1	83	12	90	198	22
4	76	1	58	10	75	196	15
5	1	1	68	7	67	235	16
5	2	1	0	9	128	224	19
5	33	1	67	13	96	213	18
5	38	1	52	13	104	276	13
5	45	1	71	10	81	247	15
5	65	1	68	13	93	229	16
5	68	1	53	8	93	285	18
5	70	1	58	7	99	213	14
5	71	1	48	11	58	169	14
5	77	1	0	13	89	303	13
6	4	1	56	11	57	179	20
6	12	1	63	8	126	220	14
6	17	1	44	13	90	178	12
6	18	1	46	12	103	205	13
6	20	1	42	12	98	201	12
6	23	1	49	10	68	168	17
6	36	1	0	9	85	212	6
6	37	1	35	13	59	118	10
6	40	1	48	13	81	202	16
6	61	1	55	12	101	259	19
6	73	1	49	12	91	185	12
6	76	1	29	9	94	189	17
6	91	1	41	12	73	199	16

SCORES OBTAINED BY 397 STUDENTS IN FINAL SAMPLE (CONT.)

SCHOOL	STDT ID	SEX	HN IQ (RAW)	LC	CDI A	CDI B	CDI C
6	99	1	54	11	123	206	20
1	1	2	58	7	77	233	11
1	7	2	39	8	71	170	13
1	9	2	51	13	86	233	14
1	11	2	60	12	60	212	18
1	14	2	48	13	72	185	13
1	17	2	0	9	69	168	12
1	19	2	58	13	72	220	19
2	8	2	46	10	102	267	16
2	10	2	64	9	98	252	18
2	17	2	63	12	136	248	17
2	42	2	77	12	113	273	18
2	43	2	55	5	71	201	17
2	46	2	49	12	72	192	7
2	52	2	76	13	113	258	20
2	65	2	48	11	85	232	13
2	72	2	49	6	73	174	16
2	79	2	44	13	57	143	15
3	3	2	32	13	75	230	17
3	5	2	51	9	121	218	12
3	8	2	47	9	71	257	16
3	38	2	59	13	72	181	15
3	44	2	66	13	115	285	19
3	52	2	44	8	86	210	15
3	54	2	56	10	94	218	18
3	63	2	59	12	110	230	16
3	66	2	41	12	104	233	14
3	68	2	68	8	89	182	20
3	77	2	46	12	95	245	18
3	78	2	63	12	105	238	18
4	40	2	42	12	119	238	19
4	48	2	52	13	78	166	16
4	50	2	44	8	80	215	22
5	7	2	53	10	85	171	11
5	10	2	0	13	101	247	17
* 5	11	2	60	13	79	376	15
5	40	2	49	9	75	191	9
5	46	2	69	10	101	252	16
5	72	2	44	13	98	228	15
5	88	2	68	10	75	232	15
6	5	2	46	8	75	226	12
6	14	2	72	12	140	253	20
6	21	2	71	8	120	176	22
6	25	2	51	11	85	168	6
6	26	2	0	13	90	251	18
6	27	2	56	11	85	210	13
6	28	2	46	6	103	224	13
6	33	2	39	10	89	208	17
6	42	2	67	12	101	217	18
6	52	2	75	13	115	234	16
6	53	2	70	12	106	263	19
6	55	2	44	12	87	193	13

* Subject excluded because of extreme score on Scale B.

SCORES OBTAINED BY 397 STUDENTS IN FINAL SAMPLE (CONT)

SCHOOL	STDT ID	SEX	HN IQ (RAW)	LC	CDI A	CDI B	CDI C
6	56	2	57	13	80	199	19
6	58	2	44	12	86	200	17
6	63	2	58	12	77	196	18
6	78	2	38	10	98	265	12
6	79	2	44	9	77	315	16
6	80	2	52	11	84	275	22
SECTION II. STUDENTS NOT RETAINED FOR HYPOTHESIS TESTS							
1	2	1	0	16	136	252	12
1	18	1	53	14	61	287	17
1	23	1	49	16	93	258	13
1	34	1	36	15	79	201	14
1	35	1	65	15	83	197	18
1	67	1	52	15	149	299	25
1	69	1	66	15	158	228	19
2	1	1	47	16	74	312	13
2	9	1	81	16	107	258	21
2	18	1	0	15	113	267	17
2	35	1	44	15	82	197	18
2	38	1	52	14	94	251	18
2	39	1	48	16	79	220	20
2	40	1	47	16	105	281	10
2	48	1	51	15	112	249	16
2	62	1	53	16	111	238	19
3	2	1	54	14	138	174	16
3	4	1	52	15	90	190	13
3	6	1	56	15	117	233	19
3	10	1	41	15	60	210	14
3	13	1	0	16	89	211	22
3	19	1	50	15	102	239	15
3	33	1	56	14	113	324	16
3	43	1	57	16	102	250	16
3	56	1	60	14	80	244	17
3	61	1	62	15	120	211	17
3	64	1	64	14	70	179	14
3	71	1	51	16	77	204	13
3	73	1	57	16	110	257	20
3	74	1	49	14	128	213	10
4	2	1	67	16	102	185	15
4	6	1	66	15	84	234	20
4	7	1	71	16	66	170	20
4	12	1	63	16	94	187	14
4	13	1	48	15	103	215	20
4	31	1	70	14	95	194	12
4	35	1	0	16	91	341	16
4	41	1	66	16	81	232	20
4	43	1	54	15	133	344	21
4	45	1	33	15	112	236	14

SCORES OBTAINED BY 397 STUDENTS IN FINAL SAMPLE (CONT)

SCHOOL	STDT ID	SEX	HN IQ (RAW)	LC	CDI A	CDI B	CDI C
4	46	1	71	15	65	267	11
4	63	1	52	14	137	247	18
4	66	1	63	15	119	324	15
4	68	1	51	14	72	227	20
4	71	1	46	15	83	211	13
5	4	1	65	15	115	260	17
5	15	1	66	16	67	168	20
5	39	1	67	15	106	269	20
5	41	1	70	16	67	221	20
5	47	1	62	14	66	169	18
5	61	1	51	16	114	237	17
5	62	1	51	15	119	153	13
5	74	1	0	15	123	169	14
5	78	1	44	16	116	269	11
5	79	1	63	16	103	243	17
5	82	1	53	16	104	216	20
5	86	1	42	15	113	176	8
6	8	1	0	15	140	287	18
6	9	1	73	16	106	266	18
6	13	1	36	15	121	225	17
6	29	1	64	15	128	272	22
6	35	1	42	15	89	212	16
6	38	1	64	16	76	180	19
6	41	1	54	15	102	164	13
6	49	1	56	16	113	272	13
6	50	1	56	15	124	205	19
6	54	1	56	15	103	222	17
6	57	1	72	16	119	252	15
6	62	1	54	15	106	270	15
6	82	1	57	15	97	253	13
6	83	1	64	14	114	221	20
6	88	1	67	16	98	286	16
6	89	1	69	16	102	214	21
6	92	1	49	14	95	192	6
6	93	1	56	15	117	248	18
6	95	1	47	16	112	248	20
1	5	2	53	15	127	243	19
1	6	2	62	14	75	238	18
1	10	2	47	16	118	270	16
1	13	2	36	14	112	181	11
1	40	2	54	16	95	230	8
1	53	2	58	15	113	213	14
1	64	2	62	15	91	204	15
1	68	2	0	15	116	226	20
1	72	2	58	15	101	237	15
1	73	2	36	14	105	189	13
1	78	2	49	15	102	242	9
1	79	2	52	14	79	176	8
2	6	2	71	14	132	236	21
2	14	2	71	16	112	331	17
2	15	2	29	15	82	224	12
2	31	2	61	16	92	202	20

SCORES OBTAINED BY 397 STUDENTS IN FINAL SAMPLE (CONT)

SCHOOL	STDT ID	SEX	HN IQ (RAW)	LC	CDI A	CDI B	CDI C
2	44	2	54	15	110	335	16
2	51	2	51	16	61	173	15
2	67	2	49	16	98	255	9
2	78	2	48	14	99	224	20
2	83	2	59	14	94	185	17
2	84	2	62	16	105	198	14
3	7	2	50	16	60	233	14
3	16	2	49	14	87	188	10
3	18	2	56	14	78	212	16
3	31	2	62	15	92	254	16
3	36	2	60	14	90	173	18
3	39	2	46	14	60	215	6
3	45	2	0	15	88	185	15
3	49	2	52	15	76	221	15
3	53	2	61	16	120	286	15
3	70	2	0	15	72	183	8
4	16	2	64	14	107	332	16
4	32	2	61	14	73	244	16
4	42	2	65	14	87	204	20
4	47	2	50	16	61	277	14
4	67	2	41	15	115	366	14
5	3	2	58	14	91	276	18
5	5	2	0	14	98	245	17
5	35	2	65	14	110	258	20
5	36	2	52	16	90	236	15
5	73	2	43	16	76	177	14
5	84	2	73	14	119	209	20
5	91	2	43	16	57	224	21
6	1	2	61	15	87	217	16
6	2	2	68	16	94	213	19
6	6	2	53	16	74	153	15
6	11	2	54	14	92	189	14
6	15	2	45	15	103	269	6
6	16	2	62	15	99	195	20
6	22	2	56	14	101	190	16
6	32	2	64	14	148	288	16
6	44	2	56	16	115	229	19
6	68	2	60	14	85	223	10
6	70	2	48	16	81	192	18
6	71	2	59	16	76	170	19
6	75	2	61	16	87	203	19
6	81	2	43	15	82	220	14
6	98	2	42	14	64	142	14

APPENDIX 3

Abstract of

Locus of Control in Relation to Super's Theory of Vocational Maturity During Adolescence.

APPENDIX 3

ABSTRACT OF

Locus of Control in Relation to Super's Theory of Vocational Maturity During Adolescence.[1]

Professor D. E. Super's vocational development theory provides a detailed description of the nature of mature vocational behaviours during adolescence, and the "Exploration" process through which these behaviours are thought to develop. While the existence of individual differences in the attainment of adolescent vocational maturity is acknowledged in the theory, relatively little is known about factors which lead some individuals to develop the appropriate behaviours more readily than other individuals.

In the present study, it was hypothesized that the personality variable locus of control, arising from Rotter's Social Learning Theory, is related to degree of success in attaining the vocational attitudes and behaviours appropriate to adolescence. It was argued that students with a predominantly internal locus of control, through their ability to cope more effectively with problem situations and their tendencies to be planful, to be aware of useful cues in their environment and to seek and use information systematically, would tend to exhibit more mature vocational behaviours during adolescence than students with a predominantly external locus of control. The main rationale for this argument was that adolescent vocational

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1 Lokan, J. J., Thesis submitted to the Faculty of Education, University of Ottawa, 1977.

maturity, as described by Super, involves the possession of a positive orientation toward career planning, an awareness of and use of resources available to help in the planning process, and both the possession of and the ability to use relevant educational and occupational information.

The study was carried out with approximately 400 male and female students from six English-language high schools. Subjects were administered the Nowicki-Strickland Locus of Control Scale for Children and Super's Career Development Inventory (CDI) early in the third term of their grade nine year.

The hypothesis that internals, in contrast with externals, tend to have a greater orientation toward career planning and to be more aware of resources available to help them in their planning, as assessed by the predominantly attitudinal Scales A and B of the CDI, was supported. A similar hypothesis relating internality-externality to the possession of occupational information and knowledge of how to use such information in making vocational decisions, as assessed by the predominantly cognitive Scale C of the CDI, was not upheld.

The results of the study are considered to extend Super's theory in that they provide a possible explanation of why some individuals develop vocationally mature behaviours more readily than other individuals. The results also support the aspect of Super's theory which postulates that the three dimensions of vocational maturity investigated develop at different stages of adolescence. As suggested by the findings, development in the two predominantly attitudinal dimensions is still proceeding in many students at the grade nine level, and probably has not, in general, reached the stage of being followed or accompanied by development in the predominantly cognitive dimension.