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An examination of factors related to academic achievement in university.

Karen Angela Benzinger

University of Windsor

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AN EXAMINATION OF FACTORS RELATED TO
ACADEMIC ACHIEVEMENT IN UNIVERSITY

by
Karen Benzinger

A Thesis
Submitted to the Faculty of Graduate Studies and Research
through the Faculty of Education
in Partial Fulfilment of the Requirements for
the Degree of Master of Education at the
University of Windsor

Windsor, Ontario, Canada

1996
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- Biochemistry: 0308
- Botany: 0409
- Cell: 0379
- Ecology: 0339
- Enzymology: 0353
- Genetics: 0369
- Genomics: 0793
- Microbiology: 0410
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- Human Development: 0356
- Immunology: 0762
- Medical Genetics: 0354
- Mental Health: 0347
- Nursing: 0570
- Obstetrics and Gynecology: 0380
- Occupational Health and Safety: 0354
- Ophthalmology: 0381
- Pathology: 0371
- Pharmacology: 0419
- Physiology: 0372
- Physical Therapy: 0379
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- Radiology: 0574
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- Speech Pathology: 0460
- Zoology: 0472

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- Mining Engineering: 0551
- Nuclear Engineering: 0552
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- Systems Engineering: 0554
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- Plastics Technology: 0795
- Textile Technology: 0994
- Psychology: 0421
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- Clinical: 0422
- Developmental: 0420
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ABSTRACT

Two-hundred-and-six first-year University of Windsor students were tested to determine their locus of control, learning style, personality characteristics, OAC grades and first-semester university grades. The study was designed to test two separate questions: can locus of control, learning style and personality variables predict grades beyond high school marks; and are locus of control, learning style and personality variables related to faculty of study?

No factors were predictive of achievement in university beyond OAC marks. A significant relationship was found between locus of control and faculty of study, with Business students having a more external orientation that students in other faculties. No relationship was found between learning style and faculty of study. However, evidence was found for the hypothesis that personality variables, as measured by the Vocational Preference Inventory (VPI), are related to faculty of study.

It is suggested that future studies examine the grades of subjects once they are further along in their university careers in an attempt to overcome any impact the initial transition from secondary school to university might have on grades in the first semester of university.
TABLE OF CONTENTS

ABSTRACT ...................................................... iii

CHAPTER

I. INTRODUCTION ............................................. 1
   The Transition to University .......................... 1
   General Statement of the Problem .................... 2

II. REVIEW OF THE LITERATURE ............................. 3
   History and purpose of orientation programs ........ 3
   Locus of control ........................................ 5
   Learning style ......................................... 10
   Personality types ..................................... 16
   Summary ............................................... 21

III. METHODOLOGY ............................................ 23
   Research Questions and Hypotheses .................... 23
   Sample Selection and Subjects ......................... 23
   Instruments ............................................ 26
   Procedures ............................................. 27

IV. RESULTS .................................................. 29
   Predicting University Achievement ..................... 29
   Secondary Focus
     Locus of Control and Faculty of Study .............. 30
     Learning Style and Faculty of Study ............... 31
     Personality Variables and Faculty of Study ......... 31
   Additional Findings
     Locus of Control and Grades ......................... 42
     Scores on the VPI and Grades ....................... 42
     Gender and Grades .................................. 46
     Faculty of Study and Grades ......................... 48

V. DISCUSSION ............................................... 54
   Limitations of the present study ...................... 69
   Suggestions for further research ...................... 70

REFERENCES .................................................. 72

APPENDICIES ................................................ 81

VITA AUCTORIS .............................................. 91
# LIST OF APPENDIXES

<table>
<thead>
<tr>
<th>APPENDIX</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Head Start 1995: Today's student program</td>
<td>81</td>
</tr>
<tr>
<td>B General information sheet</td>
<td>83</td>
</tr>
<tr>
<td>C Awareness check: What is your locus of control?</td>
<td>84</td>
</tr>
<tr>
<td>D Learning Style Inventory</td>
<td>85</td>
</tr>
<tr>
<td>E Vocational Preference Inventory</td>
<td>86</td>
</tr>
<tr>
<td>F Instructions for student leaders</td>
<td>88</td>
</tr>
<tr>
<td>G Cover letter for instruments</td>
<td>89</td>
</tr>
</tbody>
</table>
CHAPTER I

Introduction

The Transition to University

Students entering university for the first time face a very difficult transition process when adjusting to their new school. They are unfamiliar with the physical set-up, rules, regulations and procedures of the institution. More importantly, they must adapt to a learning environment that is completely different from any they have previously encountered, and make decisions about the discipline in which it would be most appropriate for them to specialize. This requires them to develop new learning strategies and adjust to the particular academic requirements of their program.

In an effort to prepare students for this transition, help them make informed decisions and be successful at university, the University of Windsor offers a summer orientation program called "Head Start". It is a one-day program that runs for ten days in July and one day in September and serves approximately 2400 students.

The program includes activities that give new students the information they need to be successful at university (See Appendix A). Topics such as the structure of the University, the workload, student life and the location of support services are discussed. The underlying message is that students must take responsibility for their own
learning, behaviour and decisions at university.

**General Statement of the Problem**

This study sought to examine factors that could be related to academic achievement in university and also those that might be linked to the choice of a program of study.

Specifically, the principle focus was to determine if locus of control, learning style and personality factors predict grades beyond high school marks. The secondary focus was to examine the relationship between locus of control, learning style and personality variables and faculty of study.

It was hoped that the results would identify elements that should be included in future Head Start programs and in other follow-up services offered to students throughout their university career. Some possibilities for these follow-up services were learning and study skills workshops, academic advising and career counselling.
CHAPTER II

Review of the Literature

History and Purpose of Orientation Programs

Farnsworth and Upcraft (1984) defined orientation as "any effort on the part of an institution to help entering students make the transition from their previous environment to the collegiate environment, and to enhance their success in college" (p. 27). Initially, orientation programs in North America began very informally as a way for upper-level students and faculty members to welcome new students.

The first formal orientation program was offered in 1888 by Boston University and took the form of a course that acquainted students with college life. In 1911, Reed College began offering a similar course for academic credit. The curriculum of these courses included information on study and library skills, the institution's purpose and campus activities. The program at Reed changed in 1923 and took the form of a "Freshman Week" for new students. The goals of this program were similar to the earlier orientation course but it was held the week prior to the start of the fall term (Nadler, 1992).

The next thirty years saw the implementation of many more orientation initiatives across North America. Most of these followed the model of a Freshman Week, since faculty members were sceptical of the academic value of credit orientation courses. A natural extension of week-long
programs, late-summer clinics, also began during this period. Michigan State University was the first to offer such a clinic in 1949 (Nadler, 1992). Gardner and Hansen (1993) reported that a characteristic of these programs was that they tended to convey the impression that college would not help everyone meet their personal goals; that the unfit would be weeded out. In addition, they reinforced the sexist and racial assumptions of the times. Male and female students had separate orientation programs, and special programming for minority students was virtually unheard of.

The sixties and seventies saw efforts to orient students to university continue to develop and change. Programs expanded and took on a different role: that of promoting student success instead of predicting failure. In addition, programs no longer reflected sexist or racial views. They were based on student development principles, and tended to involve professional staff members, professors and student leaders. The participation of new students was often mandatory and large institutions began to offer specialized programming in response to the diversity of new students and the contribution of family members to student success (Gardner & Hansen, 1993).

Today, orientation programs are very complex and take many forms. There are pre-enrollment programs which take place in the summer and last between one and three days (including special summer "bridge" programs for students at
academic risk), initial enrollment programs which occur at the beginning of a semester, and credit and non-credit orientation courses (Brackin & Smith, 1993; Perigo & Upcraft, 1989; Tittley, 1985).

The most significant result of the development of orientation programming is that orientation is now recognized as being an important part of the educational process. Administrators have come to realize that orientation has a powerful impact on new students in that it promotes advising, registration, matriculation and in turn, persistence (Gardner & Hansen, 1993). As a result, a great deal of time is spent attempting to ensure that orientation programs are as effective as possible in promoting academic success.

As a part of the quest to improve the effectiveness of orientation programming and other services offered to students throughout their university career, many theorists have studied factors that are related to student success and student development. Specifically, there is a large body of research that examines possible influences on academic achievement, faculty of study, and vocational preferences. The latter, vocational preferences, have been tied to personality variables.

Locus of Control

One factor that researchers have shown to be related to academic achievement is locus of control, or where a student
places responsibility for control over his/her life. Students with an internal locus of control believe that they themselves are responsible for what happens to them. They attribute success and failure to a combination of skill and effort (Kravitz, 1974). Such students can be characterized as being self-motivated, having a positive attitude, high self-esteem and a willingness to take charge of their life (Kanar, 1991).

On the other hand, students with an external locus of control believe that other people control their lives. They require external motivators and tend to blame others when things go wrong (Kanar, 1991). They typically attribute success and failure to luck or to the level of difficulty of the task (Kravitz, 1974).

Jenkins-Friedman (1986) investigated the characteristics of honours students and found that the best students are enthusiastic, determined, self-initiating and able to immerse themselves in problems for an extended period of time. Deboer (1983) linked good feelings about achievement to effort and the ability to concentrate while studying. Other attributes of high academic achievers include self-control and a high level of responsibility (Holland, 1961; Holland & Astin, 1962). All of these characteristics certainly fit the pattern of an internal locus of control.
On the opposite side of the coin, G. E. DeBoer (cited in Saunders & Ervin, 1984) found that poor achievers were more likely than successful students to attribute poor grades to luck, not a factor that would be within their control.

Several researchers have found that students with an internal locus of control are more likely to achieve a high grade point average than those with an external locus of control (Foster & Gade, 1973; Griffore, Kallen, Popovich & Powell, 1990; Nord, Connelly & Daignault, 1974).

Students classified as having an internal locus of control in a 1978 study by Bhagat and Chassie reported higher levels of academic performance, satisfaction with their academic program and satisfaction with their personal lives. While the differences in all three categories were significant, they were strongest in terms of personal life satisfaction.

One possible explanation for the differences in the academic achievement of internals versus externals is related to learning and study strategies. Prociuk & Breen (1974) found that people who attribute reinforcements (grades) to their own ability have more effective study habits and attitudes than those who feel that reinforcements are controlled by powerful others or by chance. This, of course, leads to stronger academic achievement on the part of the former group.
An interesting facet of this particular study is that it divided those students who attribute outcomes to external factors into two groups: those who believe powerful others control outcomes and those who believe chance controls them. The former group did better academically than the latter group, perhaps because they still felt some element of personal control when outcomes were determined by a person. That is, there was a chance that they could positively influence or appeal to a professor (Prociuk & Breen, 1974).

More specifically, Gozali, Cleary, Walster and Gozali (1973) found that during tests, internals use time in a more appropriate manner than externals. That is, they tend to spend less time on easy items and more time on difficult items.

There is also some evidence to support the conclusion that achievement actually results from a match between locus of control and the type of teaching. Parent, Forward, Canter and Mohling (1975) found that "internal" students performed better under low-discipline conditions while "external" students performed better under a highly disciplined teaching style. Similarly, in situations where rewards are intrinsic, internals will reach a higher level of achievement than externals, and vice-versa (Owie, 1983).

The effects of an internal locus of control spread even beyond academic achievement. Several researchers have shown that students with an internal locus of control more easily
adjust to the college environment (Martin & Dixon, 1989; Mooney, Sherman & Lo Presto, 1991). This is probably due to the fact that students with an internal locus of control are more likely to get involved in their school both academically and socially, thereby facilitating the transition process.

Otten (1977) found that locus of control was even more accurate in predicting degree attainment. Students with an internal locus of control were more likely than those with an external locus of control to get their degree within five years.

A few researchers have studied the link between locus of control and achievement with conflicting results. Keller, Goldman and Sutterer (1978) found that locus of control was not related to final achievement, but simply to student attitudes.

Similarly, Edwards and Waters (1981) found that external students performed as well as internal students. The two groups were different only because students with an external locus of control attributed their performance to luck as opposed to ability or effort.

A recent study showed that the more positively students rated their own memory and academic ability, and the more external their locus of control, the better they tended to do (Wilhite, 1990).
Nord, Connelly and Daignault (1974) provided a partial explanation for these contrary results. They found that most of the studies which show no relationship between an internal locus of control and academic achievement involved only a single course with a single teacher. They suggested that the relationship may have been influenced by a variety of factors, including the subject matter and teaching style of the professor.

Despite these few discrepancies, the vast majority of research points to the existence of a significant, positive relationship between an internal locus of control and academic achievement. If this is true, locus may indirectly affect program choice. Students with high OAC averages will meet admission requirements for a larger number of university programs. In addition, since such students enjoy a high degree of confidence in themselves, they may be more likely to select programs perceived as difficult than other students.

Learning Style

A second area connected with student success that is often investigated is the relationship between the learning style and academic major of students. Emmanuel and Potter (1992) found differences across academic majors with regards to the amount of independence, participation and competition preferred by students in the classroom.
Biglan (1973) suggested that academic subject matter could be differentiated according to the relative amount of paradigm and practical application found in it. For example, Arts programs have very low levels of both paradigm and practical application while Business programs have low levels of paradigm and very high levels of practicality. This differentiation implies that different majors in university demand different cognitive processes.

Kolb (1981a) suggested that learning is a four-stage process that includes concrete experiences, observations and reflections, the formation of abstract concepts and the testing of concepts in new situations. In the concrete experience stage of the learning cycle, learners rely on personal relationships and their ability to be open-minded and flexible. In the reflective observation stage, people understand concepts from different points of view. They rely on patience, objectivity and careful judgment. In the abstract conceptualization stage, people rely on systematic planning and logical analysis. In the active experimentation stage, people approach learning situations actively with a focus on the practical (Kolb, 1981a).

Thus, learners need four different types of skills: concrete experience abilities, reflective observation abilities, abstract conceptualization abilities and active experimentation abilities. That is, they will be required to learn from feeling, learn by watching and listening,
learn by thinking and learn by doing (Kolb, 1981a).

Kolb (1981a) went on to identify four different learning styles based on the emphasis placed on each of the four skill areas, and associated each style with a particular discipline.

Convergers rely most heavily on abstract conceptualization and active experimentation abilities, and find their greatest strength in the practical application of ideas. They prefer tasks of a technical nature over those that deal with social and interpersonal issues. This style is characteristic of many engineers (Kolb, 1981a, 1981b).

Diversers' learning abilities are centred in concrete experience and reflective observation. Their greatest strength is their imaginative ability. They are able to view situations from many different points of view and prefer to approach situations by observing them. This style is most often associated with humanities and liberal arts students (Kolb, 1981a, 1981b).

Assimilators use primarily abstract conceptualization skills and reflective observation abilities, and have for their greatest strength the ability to create theoretical models. They are capable of synthesizing information and presenting it in a logical form. These characteristics are in keeping with students in basic sciences and math (Kolb, 1981a, 1981b).
Finally, Accommodators use concrete experience and active experimentation abilities most often. Their greatest strength is in carrying out plans and they prefer a hands-on approach. Students with these characteristics are usually found in technical or practical fields like business (Kolb, 1981a, 1981b).

Other researchers have followed up on Kolb's work with similar results. Physical education majors studied by Pettigrew and Zakrajsek (1984) matched Kolb's description of Accommodators. Green and Parker (1989) confirmed that people who could be classified as Convergers were inclined toward scientific interests, Divergers were interested in meeting the needs of other people, Assimilators had higher quantitative abilities and Accommodators were kind of in the middle of the road. These findings were certainly in keeping with Kolb's classification and association of major fields.

Biberman and Buchanen (1986) also documented differences in learning styles across academic majors. Their results matched those of Kolb with one exception. They found that students within the discipline of business could be subdivided according to major. Kolb (1981a) however, classified all business students as Accommodators.

The work of Pinto, Geiger and Boyle (1994) also confirmed Kolb's research. They found that students are likely to select particular majors because of their learning
style preference. However, they qualified that observation with the recognition that students may not be fully settled in one particular style and therefore their style may change over the course of time they are in college or university.

A different way of classifying cognitive style distinguishes among field-dependent and field-independent learners. Field-dependent learners have a social orientation, prefer to work with people, are interested in people and have greater skill in getting along with others. Field-independent learners are not socially oriented, prefer to work alone, and are interested in ideas and concepts (Witken et al., 1977).

Witkin et al. (1977) compared field dependence and independence with three groups of majors (science, education and other) at three different points (at college entry, at graduation, and upon application to graduate school). They found that science majors were favoured by relatively field-independent students, education majors were preferred more often by field-dependent students and other majors had no strong preferences.

According to Kolb (1981a), a match between a student’s learning style and their chosen discipline led to higher grades and the feeling that the workload was lighter and more manageable. This is due to the fact that their learning strengths and preferences match the demands of the workload. Witken et al. (1977) also found that students
whose major choices at the time they started college were compatible with their cognitive style were less likely to switch programs and tended to do better academically.

There has even been some research that suggests that, regardless of the choice of program, students with certain learning styles will achieve higher grades. Matthews (1991) found that, in general, students with a social/applied style do the best in college. People with this particular style prefer to have the opportunity to interact with others in activities that are similar to real-world experiences. Those with no clear area of learning preference had the worst performance.

Very few researchers have conducted studies that do not confirm the existence of different learning demands and styles across academic majors. Rowe, Waters, Thompson and Hanson (1992) found no significant differences between students in Master of Accountancy, Master of Business Administration and Master of Public Administration programs. However, these three areas are quite similar, therefore the result is not surprising. Highhouse and Doverspike (1987) attempted to link learning style with occupational preferences, but found that calculating learning styles did not improve predictions of occupation preferences.

This body of research suggests that university students in different faculties are likely to have different learning styles because of the varying nature of the programs. It
stands to reason that a match between the two would be
related to academic achievement. It is also possible that,
in general, students' with certain learning styles may fare
better in university.

**Personality Types**

The majority of first-year students at the University of
Windsor are considered to be in late adolescence, a phase of
development that occurs between the ages of 16 and 23.
These students are facing several developmental tasks -
achieving emotional independence, preparing for marriage and
family life, choosing and preparing for a career and
developing an ethical system (Chickering & Havighurst,

One of these tasks, choosing and preparing for a
career, has received a great deal of attention from
researchers. Career planning is a complicated process that
is affected by personality type, personal strengths and
weaknesses, life goals and, to a certain degree, sex-role
socialization. In terms of a university education, one key
element of career planning is the choice of a program or
major.

John Holland (1973) established a scheme to classify
major fields and vocations according to personality types.
He theorized that, when making vocational decisions, people
attempt to find a match between the work environment and
their personality. That is, they choose occupations that
are congruent with their personality type. It follows from this that similarities should exist in the personality types of people in particular occupations.

His theory was based on four assumptions. First, that people can be characterized by their resemblance to six personality types (Realistic, Investigative, Artistic, Social, Enterprising and Conventional). The more closely a person resembles a particular type, the more likely he is to exhibit the personal traits and behaviour associated with that type (Holland, 1973).

There are also six kinds of environments categorized in a similar fashion. Each environment is dominated by a given type of personality and has a physical setting with particular problems and stresses. People with similar interests gather together, creating an environment that reflects their type. People actively search for an environment that matches their personality type. They want an environment that will allow them to exercise their skills and abilities, express attitudes and take on agreeable problems (Holland, 1973).

A person's behaviour is determined by the interaction between his/her personality and the characteristics of his/her environment. If both of these elements are known, the person's choice of vocation, educational behaviour and social behaviour can be accurately forecast (Holland, 1973).

Holland (1985a,b) developed the Vocational Preference
Inventory as a mechanism to tie vocational preferences to personality type. Subjects indicate the vocations that are appealing to them and those that are not. A total of eleven scales are provided: Realistic, Investigative, Artistic, Social, Enterprising, Conventional, Self-Control, Masculinity-Femininity, Status, Infrequency and Acquiescence.

The first six scales are interest scales and assess personality types. The higher a subject’s score on a particular scale, the greater his/her resemblance to that type. The highest score represents the personality type while a personality pattern is obtained by ranking scale scores from highest to lowest (Holland, 1985b). Follow-up research supported his theory that there was a relationship between personality variables and occupational type as measured by academic major (DeVogue, 1975).

Realistic types prefer manipulating tools, objects and machines. They perceive their strengths as being mechanical in nature and their weaknesses to be related to human relations. They value concrete things like money, power and status. They can be described as being shy, conforming, masculine, materialistic, practical and stable. Typically, these types enter the technical and skilled trades (Holland, 1973).

Investigative personalities like to use investigative skills to solve problems. They see themselves as scholarly,
intellectually self-confident, having scientific ability and lacking in leadership ability. They value science and can be described as analytical, introspective, precise and independent. They most often enter scientific occupations (Holland, 1973).

Artistic types prefer free, unsystemized activities. They see themselves as expressive, original, intuitive and having artistic and musical ability. They value aesthetic qualities and can be described as emotional, imaginative, original and nonconforming. They typically enter artistic, musical and literary occupations (Holland, 1973).

Social personalities like to work with people to inform, train, develop or enlighten. They see themselves as enjoying helping others, having teaching ability and lacking mechanical and scientific abilities. They value social and ethical activities and can be described as cooperative, helpful, kind and understanding. They often choose teaching and helping occupations (Holland, 1973).

Enterprising types enjoy activities that involve the manipulation of others to achieve organizational goals. They see themselves as possessing good leadership and speaking ability and lacking scientific ability. They value political and economic achievement and can be described as ambitious, domineering, argumentative and self-confident. They usually lean towards supervisory and sales occupations (Holland, 1973).
Finally, Conventional personalities enjoy routine activities like manipulating data. They view themselves as having clerical and numerical ability. They value business and economic achievement and can be described as conforming, efficient, orderly and practical. They prefer clerical occupations (Holland, 1973).

A high score on the Self-Control scale indicates a personality which is very much in control. Inhibited, passive, responsible, serious and cautious are all descriptors of a person with a high score. Men and women are typically viewed differently with high-scoring males being considered responsible and persistent while their female counterparts are categorized as serious and having few interests. A low score on this scale would indicate impulsiveness and an inability to control behaviour (Holland, 1985b).

The Masculinity-Femininity scale helps determine what impact traditional sex-typing has had on an individual's vocational planning. High scores reflect the frequent choice of occupations traditionally favoured by males. Low scores indicate occupations typically preferred by women. In other words, males with a high score would aspire to traditionally male occupations while females with a high score would look beyond traditionally female roles (Holland, 1985b).
The Status scale measures interest in prestige and power as well as the level of self-confidence. High scorers are typically sociable, adventurous, expressive and want to be considered important (Holland, 1985b).

People who score high on the Infrequency scale take the popular view of the working world and feel good about their abilities, personalities and future. Low scorers, by contrast, can be described as having deviant tendencies. This scale and the Acquiescence scale help detect extreme response biases (Holland, 1985b).

High scorers on the Acquiescence scale have a wide variety of preferences and are sociable, cheerful and relatively conventional. They can usually be categorized into one of two types. They are either hyperactive and demonstrate poor judgement or they are well-integrated with lots of interests and talents (Holland, 1985b).

One can reasonably assume that students with certain personality variables will tend to enter specific faculties of study at university, and that an appropriate match between personality type and faculty of study would lead to high grades.

Summary

It would be interesting to determine which of the above factors (locus of control, learning style and personality variables) are most predictive of academic achievement in university. An additional factor that has not yet been
discussed but certainly deserves consideration is a 
student's OAC average. Holland (1960) found that the strong 
student in college was also a strong student in high school. 
The relationship of locus of control, learning style 
and personality variables to faculty of study is also worth 
examining.
CHAPTER III

Methodology

Research Questions and Hypotheses

This study is broken down into two separate components. The primary focus is an attempt to determine which factors predict achievement in university. The secondary focus examines other relationships. The research questions are:

1) Can locus of control, learning style and personality variables (as measured by the Vocational Preference Inventory) predict university grades beyond high school marks?

2) Are locus of control, learning style and personality variables related to faculty of study?

The hypotheses are as follows:

1) Locus of control, learning style and personality variables are all predictive of academic achievement in university.

2) Learning style and personality variables are related to faculty of study. Locus of control is not related.

Sample Selection and Subjects

The ideal population for this study was all newly-admitted, first-year University of Windsor students. In 1995, 2201 of the approximately 2400 new students attended Head Start, making the program an excellent opportunity to collect the data.
The large numbers prohibited the administration of the instruments to every program participant. Therefore, a smaller group of students was selected at random to take part in the study. Approximately 220 students attended Head Start each of the ten days in July. These students were broken down randomly into 10 smaller groups of roughly 22 students each. This was done by giving each student a different coloured schedule as they arrived. Then, all students with one particular coloured schedule formed a group.

One of these ten groups was selected each day that the program ran in July, leading to a potential total of 220 subjects. Only one student declined to participate in the study entirely, leaving a total sample of 219 cases. However, some subjects failed to complete one or more of the instruments or did not grant their permission for their grades to be reviewed. This resulted in a total of approximately 206 valid cases for most analyses.

With regards to the male/female ration, 47.1% of the sample was male and 52.9% was female. The faculty breakdown of the sample was quite representative of the remainder of the students who participated in Head Start - those not participating in the study and total first-year enrolment. Table One compares the three groups.

With regard to locus of control, the subjects were classified as being external, low internal, moderate
Table 1
Faculty Breakdown of First-Year Students, Sample Group and Remaining Head Start Participants

<table>
<thead>
<tr>
<th></th>
<th>Sample</th>
<th>R Group</th>
<th>First-Year Enrolment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts</td>
<td>17.8%</td>
<td>14.8%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Social Science</td>
<td>39.7%</td>
<td>41.6%</td>
<td>41.0%</td>
</tr>
<tr>
<td>Science</td>
<td>16.9%</td>
<td>19.0%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Business</td>
<td>10.2%</td>
<td>9.9%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Engineering</td>
<td>9.6%</td>
<td>9.1%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Human Kinetics</td>
<td>5.9%</td>
<td>5.6%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Actual Number</td>
<td>219</td>
<td>1775</td>
<td>2848</td>
</tr>
</tbody>
</table>

Notes:

1) % indicates the fraction of each respective group that can be categorized into each faculty.

2) R Group = Remaining Group = Head Start participants who were not selected to be subjects in this study.
internal or high internal. Of the 201 valid cases, 10 were externals (5.0%), 30 were low internals (14.9%), 82 were moderate internals (40.8) and 79 were high internals (39.3%).

With respect to final learning style, 46 of the 198 valid cases (23.2%) were Accommodators, 37 (18.7%) were Divergers, 63 (31.8%) were Convergers and 52 (26.3%) were Assimilators.

**Instruments**

A general information sheet (See Appendix B) and three separate instruments were used in this study. The General Information Sheet gathered information about the respondent including their name, ID#, faculty of study, major, OAC average and gender.

The first instrument, the "Awareness Test: What is Your Locus of Control?" (Kanar, 1991, p. 29) categorized the students' locus of control (See Appendix C).

Next, an assessment of the learning styles of students was obtained through the use of the Learning Style Inventory (LSI) (Kolb, 1981b) (See Appendix D). Sims, Veres, Watson and Buckner (1985) studied the internal consistency of the Learning Style Inventory and reported alpha for CE = .76, AE = .82, RO = .84, AC = .85. Test-retest indices ranged from .24 to .66. Merritt and Marshall (1984) tested the reliability of the LSI and found that they ranged from .29 to .59, with a mean scale reliability of .46. They also
found consistency between the learning style model proposed by Kolb and the Learning Style Inventory.

The final segment of the instrument was Holland's Vocational Preference Inventory (Holland, 1985a) (See Appendix E). Holland reports that the internal consistency of VPI scales ranges from .81 to .91 with an average of .88. Test-retest reliability ranges from .54 to .80 with a median of .71 for a sample of 115 junior college students (cited in Miller, Knippers, Burley and Tobacyk, 1993). In the Vocational Preference Inventory Manual, Holland (1985b) cites the test-retest reliability of the VPI for college freshmen as ranging from .61 to .93.

**Procedures**

Each day, the two Orientation Leaders who were responsible for the group of students selected to participate in this study administered the instruments. They explained the study and distributed the instruments using a pre-designed script so as to ensure that all subjects received standardized instructions and explanations (See Appendix F). The instruments were accompanied by a cover letter which provided further explanation (See Appendix G).

The grades of the subjects were reviewed and recorded in order to obtain some measure of their academic achievement. This was done at two points - once in August, 1995 to obtain OAC Grades, and once in January, 1996 to
review first-semester university grades.

The results from the "Awareness Test: What is Your Locus of Control?" (Kanar, 1991, p. 29) test were compared with the academic averages of the subjects to determine if there was any relationship between an internal locus of control and academic achievement.

The learning style of each respondent as indicated by the LSI (Kolb, 1981b) was compared to the faculty in which they were enrolled to determine if students who chose particular programs were more likely to have any one particular learning style.

The responses of the subjects to questions on Holland's Vocational Preference Inventory (Holland, 1995a) were compared to their vocational preferences as measured by their faculty of study.

There were some ethical concerns related to this study. The first three were procedural issues: the instruments had to be approved by the Faculty of Education Ethics Committee. In addition, the permission of the Dean of Student Affairs was required. The subjects themselves also had to consent to participate and sign a waiver granting the researcher permission to review their OAC and fall semester grades. Finally, all participants were assured that their responses will be kept completely confidential. The completed questionnaires were therefore kept under lock and key and destroyed upon completion of the analysis.
CHAPTER IV
Results

Primary Focus - Predicting University Achievement

A step-wise multiple regression analysis was used to determine the predictive ability of locus of control, learning style and personality variables on academic achievement at university.

An initial analysis was completed with locus of control, learning style, sex, major and all VPI scales as the independent variables. The results indicated that none of these variables were predictive.

A second analysis added final OAC marks to the list of independent variables. This time, final marks were predictive ($R^2 = .43$). Final OAC marks therefore accounted for 43% of the variance. No other variable added to this.

Finally, a separate analysis was completed using these same variables for each faculty, with various results. Unfortunately, some of these results may be suspect due to small cell sizes. None of the independent variables were predictive in the Faculty of Arts. In the faculty of Social Science, English OAC marks were predictive ($R^2 = .42; N=10$) and VPI-Enterprising added to it ($R^2 = .67; N=10$). OAC grades in mathematics were predictive in the Faculty of Science ($R^2 = .45; N=22$). English OAC marks were significant in the Faculty of Business ($R^2 = .36, N=13$).

The Faculties of Engineering and Human Kinetics

29
differed in that a variety of independent variables were predictive. In the first step, final OAC marks were predictive in the Faculty of Engineering ($R^2 = .72$, $N=13$). In the second step, the Investigative scale on the VPI added to it ($R^2 = .83$). On the third step, sex added to it ($R^2 = .90$). Finally, on the fourth step, the Artistic scale of the VPI added to it ($R^2 = .94$).

The Faculty of Human Kinetics showed predictive value for the Status scale of the VPI on the first step ($R^2 = .75$, $N=5$). On the second step, the Social scale of the VPI added to it ($R^2 = .94$). On the third step, English OAC marks added to it ($R^2 = .998$). On the fourth step, the Infrequency scale of the VPI added to it ($R^2 = 1.0$).

**Secondary Focus**

The relationship of all three areas of concern (locus of control, learning style and personality variables) to faculty of study was examined using cross-tabulations.

**Locus of Control and Faculty of Study**

The analysis showed that there was a significant difference in the distribution of categories of locus of control among students in the six faculties, chi squared (15) = 27.04, $p < .05$. Locus of control was classified as external, low internal, moderate internal or high internal. Most faculties were heavily weighted towards moderate internal and high internal. Only the Faculty of Business
varied from this pattern, with the various loci of control being balanced (see Table 2). The Faculty of Human Kinetics appeared more heavily weighted to high internal.

**Learning Style and Faculty of Study**

With regard to the relationship between learning style and faculty of study, the analysis showed that there was no significant difference in the distribution of learning styles across faculties, chi squared(15) = 16.04, p > .1. Therefore, learning style is not related to faculty of study (see Table 3).

**Personality Variables and Faculty of Study**

Evidence was found for the hypothesis that personality variables, as measured by the Vocational Preference Inventory (VPI), are related to faculty of study. Subjects were classified as scoring high or low on each of the first six scales of the VPI. These scales represent personality types. A high score on any particular scale would indicate that the subject possesses characteristics that are typical of that specific personality type. This information was then compared with faculty of study using cross-tabulations. Significant results were obtained for each scale.
Table 2
Cross-Tabs Table for Faculty by Locus of Control

<table>
<thead>
<tr>
<th></th>
<th>External</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Internal</td>
<td>Internal</td>
<td>Internal</td>
<td>Internal</td>
</tr>
<tr>
<td>Arts</td>
<td>15.4%</td>
<td>38.5%</td>
<td>46.2%</td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>2.8%</td>
<td>7.1%</td>
<td>8.5%</td>
<td></td>
</tr>
<tr>
<td>Total %</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soc. Science</td>
<td>5.9%</td>
<td>12.9%</td>
<td>44.7%</td>
<td>36.5%</td>
</tr>
<tr>
<td>Row %</td>
<td>2.4%</td>
<td>5.2%</td>
<td>17.9%</td>
<td>14.6%</td>
</tr>
<tr>
<td>Total %</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science</td>
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<td>32.4%</td>
</tr>
<tr>
<td>Row %</td>
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<td>2.4%</td>
<td>8.0%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Total %</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>25.0%</td>
<td>20.0%</td>
<td>30.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Row %</td>
<td>2.4%</td>
<td>1.9%</td>
<td>2.8%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Total %</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
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<td>40.9%</td>
<td></td>
</tr>
<tr>
<td>Row %</td>
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<td>4.2%</td>
<td></td>
</tr>
<tr>
<td>Total %</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hum.Kin.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>8.3%</td>
<td>25.0%</td>
<td>66.7%</td>
<td></td>
</tr>
<tr>
<td>Total %</td>
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<td>1.4%</td>
<td>3.8%</td>
<td></td>
</tr>
</tbody>
</table>
Table 3
Cross-Tabs Table for Faculty by Learning Style

<table>
<thead>
<tr>
<th></th>
<th>Accommodator</th>
<th>Diverger</th>
<th>Converger</th>
<th>Assimilator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Arts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>27.0%</td>
<td>27.0%</td>
<td>21.6%</td>
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</tr>
<tr>
<td>Total %</td>
<td>4.7%</td>
<td>4.7%</td>
<td>3.8%</td>
<td>4.3%</td>
</tr>
<tr>
<td><strong>Soc. Science</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>26.2%</td>
<td>17.9%</td>
<td>26.2%</td>
<td>29.8%</td>
</tr>
<tr>
<td>Total %</td>
<td>10.4%</td>
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<td>10.4%</td>
<td>11.8%</td>
</tr>
<tr>
<td><strong>Science</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
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<td>17.1%</td>
<td>31.4%</td>
<td>31.4%</td>
</tr>
<tr>
<td>Total %</td>
<td>3.3%</td>
<td>2.8%</td>
<td>5.2%</td>
<td>5.2%</td>
</tr>
<tr>
<td><strong>Business</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Row %</td>
<td>25.0%</td>
<td>2.4%</td>
<td>30.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Total %</td>
<td>2.4%</td>
<td>1.9%</td>
<td>2.8%</td>
<td>2.4%</td>
</tr>
<tr>
<td><strong>Engineering</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>9.1%</td>
<td>4.5%</td>
<td>50.0%</td>
<td>36.4%</td>
</tr>
<tr>
<td>Total %</td>
<td>0.9%</td>
<td>0.5%</td>
<td>5.2%</td>
<td>3.8%</td>
</tr>
<tr>
<td><strong>Hum.Kin.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>23.1%</td>
<td>15.4%</td>
<td>53.8%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Total %</td>
<td>1.4%</td>
<td>0.9%</td>
<td>3.3%</td>
<td>0.5%</td>
</tr>
</tbody>
</table>
Realistic Scale

The analysis showed a significant difference in the distribution of scores on the VPI-Realistic scale among students in different faculties, chi squared(5)=16.16, p<.01. There is therefore a relationship between faculty of study and the degree to which students exhibit personality traits associated with the VPI-Realistic type (see Table 4). The Faculty of Engineering stood out as being different from the other faculties with the majority of students scoring high on this scale.

Investigative Scale

The analysis showed a significant difference in the distribution of scores on the VPI-Investigative scale among students in different faculties, chi squared(5)=36.41, p<.01 (see Table 5). The majority of Science students scored high on this scale, Engineering and Human Kinetics students were balanced, and the majority of students in the remaining faculties scored low.

Artistic Scale

The analysis also showed a significant difference in the distribution of scores on the VPI-Artistic scale among students in different faculties, chi squared(5)=24.70, p<.01 (see Table 6). The majority of Arts and Social Science students scored high on this scale, especially Arts. This differed from the remaining faculties.
Table 4
Cross-Tabs Table for Faculty by the VPI-Realistic Scale

<table>
<thead>
<tr>
<th></th>
<th>Low Score</th>
<th>High Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Arts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
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<td>17.1%</td>
</tr>
<tr>
<td>Total %</td>
<td>14.2%</td>
<td>2.9%</td>
</tr>
<tr>
<td><strong>Social Science</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>75.3%</td>
<td>24.7%</td>
</tr>
<tr>
<td>Total %</td>
<td>29.9%</td>
<td>9.8%</td>
</tr>
<tr>
<td><strong>Science</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>70.6%</td>
<td>29.4%</td>
</tr>
<tr>
<td>Total %</td>
<td>11.8%</td>
<td>4.9%</td>
</tr>
<tr>
<td><strong>Business</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
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</tr>
<tr>
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</tr>
<tr>
<td><strong>Engineering</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
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<td>65.0%</td>
</tr>
<tr>
<td>Total %</td>
<td>3.4%</td>
<td>6.4%</td>
</tr>
<tr>
<td><strong>Human Kinetics</strong></td>
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<td></td>
</tr>
<tr>
<td>Row %</td>
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</tr>
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<td>Total %</td>
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</tr>
</tbody>
</table>
Table 5
Cross-Tabs Table for Faculty by the VPI-Investigative Scale

<table>
<thead>
<tr>
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<th>High Score</th>
</tr>
</thead>
<tbody>
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<td></td>
</tr>
<tr>
<td>Row %</td>
<td>85.7%</td>
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</tr>
<tr>
<td>Total %</td>
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<tr>
<td><strong>Social Science</strong></td>
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<td></td>
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<tr>
<td>Row %</td>
<td>70.4%</td>
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</tr>
<tr>
<td>Total %</td>
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<td>11.8%</td>
</tr>
<tr>
<td><strong>Science</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>29.4%</td>
<td>70.6%</td>
</tr>
<tr>
<td>Total %</td>
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<td>11.8%</td>
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<tr>
<td><strong>Business</strong></td>
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<td>Row %</td>
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</tr>
<tr>
<td>Total %</td>
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<td>50.0%</td>
</tr>
<tr>
<td>Total %</td>
<td>4.9%</td>
<td>4.9%</td>
</tr>
<tr>
<td><strong>Human Kinetics</strong></td>
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<td></td>
</tr>
<tr>
<td>Row %</td>
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<td>53.8%</td>
</tr>
<tr>
<td>Total %</td>
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</table>
Table 6
Cross-Tabs Table for Faculty by the VPI-Artistic Scale

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<tr>
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<th>High Score</th>
</tr>
</thead>
<tbody>
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<td></td>
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<tr>
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<tr>
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<td>Total %</td>
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<td>4.9%</td>
</tr>
<tr>
<td><strong>Business</strong></td>
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<td></td>
</tr>
<tr>
<td>Row %</td>
<td>85.7%</td>
<td>14.3%</td>
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<td>Total %</td>
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<tr>
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<tr>
<td>Row %</td>
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<td>35.0%</td>
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<tr>
<td>Total %</td>
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</tr>
<tr>
<td><strong>Human Kinetics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>76.9%</td>
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</tr>
<tr>
<td>Total %</td>
<td>4.9%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>
Social Scale

The analysis showed a significant difference in the distribution of scores on the VPI-Social scale among students in different faculties, chi squared$(5)=34.33$, $p<.01$ (see Table 7). While the majority of students in most faculties scored low on this scale, Social Science students tended to score high.

Enterprising Scale

The analysis showed a significant difference in the distribution of scores on the VPI-Enterprising scale among students in different faculties, chi squared$(5)=27.83$, $p<.01$ (see Table 8). The majority of Business students scored high while the majority of students in the remaining faculties scored low.

Conventional

The analysis showed a significant difference in the distribution of scores on the VPI-Conventional scale among students in different faculties, chi squared$(5)=46.35$, $p<.01$ (see Table 9). Once again, Business was the faculty that stood out, with the majority of students scoring high on this scale.

These results certainly provide some support for the hypothesis that students in different faculties have different personality characteristics. This implies that vocational preferences are indeed related to personality characteristics.
Table 7
Cross-Tabs Table for Faculty by the VPI-Social Scale

<table>
<thead>
<tr>
<th>Subject</th>
<th>Low Score</th>
<th>High Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Arts</strong></td>
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<td></td>
</tr>
<tr>
<td>Row %</td>
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<td>28.6%</td>
</tr>
<tr>
<td>Total %</td>
<td>12.2%</td>
<td>4.9%</td>
</tr>
<tr>
<td><strong>Social Science</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>37.8%</td>
<td>62.2%</td>
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<tr>
<td>Total %</td>
<td>15.1%</td>
<td>24.9%</td>
</tr>
<tr>
<td><strong>Science</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>79.4%</td>
<td>20.6%</td>
</tr>
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<td>13.2%</td>
<td>3.4%</td>
</tr>
<tr>
<td><strong>Business</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>61.9%</td>
<td>38.1%</td>
</tr>
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<td>Total %</td>
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<td>3.9%</td>
</tr>
<tr>
<td><strong>Engineering</strong></td>
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<td></td>
</tr>
<tr>
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<td>5.0%</td>
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<td>Total %</td>
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<td>0.5%</td>
</tr>
<tr>
<td><strong>Human Kinetics</strong></td>
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<td></td>
</tr>
<tr>
<td>Row %</td>
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Table 8
Cross-Tabs Table for Faculty by the VPI-Enterprising Scale

<table>
<thead>
<tr>
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<th>Low Score</th>
<th>High Score</th>
</tr>
</thead>
<tbody>
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<td><strong>Arts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
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<td>28.6%</td>
</tr>
<tr>
<td>Total %</td>
<td>12.2%</td>
<td>4.9%</td>
</tr>
<tr>
<td><strong>Social Science</strong></td>
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<td></td>
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<tr>
<td>Row %</td>
<td>57.3%</td>
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<td>Total %</td>
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<td>17.1%</td>
</tr>
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<td><strong>Science</strong></td>
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</tr>
<tr>
<td>Row %</td>
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</tr>
<tr>
<td><strong>Business</strong></td>
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<td></td>
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<tr>
<td>Row %</td>
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<td>85.7%</td>
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<tr>
<td>Total %</td>
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<td>8.8%</td>
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<tr>
<td><strong>Engineering</strong></td>
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<tr>
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<td>35.0%</td>
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<td>Total %</td>
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</tr>
<tr>
<td><strong>Human Kinetics</strong></td>
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</tr>
<tr>
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</tr>
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<td>Total %</td>
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</table>
Table 9
Cross-Tabs Table for Faculty by the VPI-Convention Scale

<table>
<thead>
<tr>
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<th>Low Score</th>
<th>High Score</th>
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</thead>
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<td>11.7%</td>
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<td>Row %</td>
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<td>90.5%</td>
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<td>Total %</td>
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<td>9.3%</td>
</tr>
<tr>
<td>Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>65.0%</td>
<td>35.0%</td>
</tr>
<tr>
<td>Total %</td>
<td>6.3%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Human Kinetics</td>
<td></td>
<td></td>
</tr>
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<td>Row %</td>
<td>84.6%</td>
<td>15.4%</td>
</tr>
<tr>
<td>Total %</td>
<td>5.4%</td>
<td>1.0%</td>
</tr>
</tbody>
</table>
Additional Findings

While examining the results from the previous section, several trends and other interesting results were evident.

Locus of Control and Grades

While locus of control was not determined to be predictive in the primary focus of the study, it was worth some additional investigation. Using a one-way ANOVA, a main effect was found for locus of control and final OAC grades, $F(3,174)=3.14$, $p<.05$. In addition, there was linear trend, $F(1,174)=6.53$, $p<.01$, due to the fact that OAC grades increased as internal locus of control increased.

A similar analysis was done using the semester grades from the University of Windsor. These semester grades were converted from a 13 point scale to a percentage-based scale to match the secondary school grades. The analysis showed no main effect, $F(3,180)=.88$, $p>.1$ and there was no linear trend, $F(1,180)=1.17$, $p>.1$.

As can be seen in Table 10, the pattern of grades increasing as the level of internal locus of control increases is clearly evident in the high school grades but is not so apparent in the university grades. However, Figures 1 and 2 illustrate the regression lines for both OAC and University grades.

Scores on the VPI and Grades

For each VPI scale, subjects were grouped into high
Table 10
Descriptive Statistics for OAC and Semester Grades by Locus of Control

<table>
<thead>
<tr>
<th>LOCFINAL</th>
<th>OAC</th>
<th>U OF W</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>70.63</td>
<td>65.00</td>
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<tr>
<td></td>
<td>3.16</td>
<td>8.12</td>
</tr>
<tr>
<td>2.00</td>
<td>75.74</td>
<td>66.80</td>
</tr>
<tr>
<td></td>
<td>7.31</td>
<td>8.14</td>
</tr>
<tr>
<td>3.00</td>
<td>75.25</td>
<td>66.53</td>
</tr>
<tr>
<td></td>
<td>7.93</td>
<td>9.00</td>
</tr>
<tr>
<td>4.00</td>
<td>77.78</td>
<td>68.47</td>
</tr>
<tr>
<td></td>
<td>6.51</td>
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Grade Patterns
Locus of Control

<table>
<thead>
<tr>
<th>Grades</th>
<th>QAC</th>
<th>UW</th>
</tr>
</thead>
</table>

Grade Averages

External - Low Internal - Moderate Internal - High Internal

Locus of Control
versus low categories. These two groupings were compared in terms of OAC and University of Windsor grades using one-way ANOVAS. Only the Investigative scale was found to be significantly related to academic achievement, so it is the only one reported. The analysis showed there was a significant difference in final OAC grades among students who scored low versus high on the VPI-Investigative scale, $F(1,171)=11.56, p<.01$. Those who scored higher on the Investigative scale had higher OAC averages.

No significant difference was found in university semester grades among students who scored low versus high on the VPI-Investigative scale, $F(1,176)=1.72, p>.1$. This pattern is evident in Table 11, which outlines the means for each group.

**Gender and Grades**

Possible gender differences in academic achievement in both secondary school and university were analyzed using a one-way MANOVA. The analysis showed, $F(2)=.04, p<.05$ there was a significant difference in the grades of males and females.

The subsequent univariate analyses revealed that there was a significant difference in the OAC final grades of males and females, $F(1,182)=4.50, p<.05$. Female students achieved higher averages than males. Although one can still see this pattern in the university grades, the difference
<table>
<thead>
<tr>
<th>SCORING GROUP</th>
<th>OAC</th>
<th>U OF W</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>MEAN</td>
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</tr>
<tr>
<td>STANDARD DEV.</td>
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<tr>
<td>High Scorers</td>
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<td></td>
</tr>
<tr>
<td>MEAN</td>
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<td>68.66</td>
</tr>
<tr>
<td>STANDARD DEV.</td>
<td>7.74</td>
<td>9.42</td>
</tr>
</tbody>
</table>
was not found to be significant in university, $F(1,188)=.32$, $p>.1$ (see Table 12).

The grades of both male and female students drop between OAC and first-semester at university. However, the drop is much more pronounced for females.

The relationship between gender and achievement in the faculty of engineering was worth additional consideration because, for this faculty, gender added to the predictive value of OAC marks in the primary focus of this study. One-way ANOVAS were therefore conducted to determine if a relationship existed between the gender of engineering students and their OAC and University of Windsor averages.

The analysis showed, $F(1,10)=.25$, $p>.05$ there was no significant difference in the OAC grades of males and females studying engineering. Similarly, the analysis showed, $F(1,10)=.67$, $p>.05$ there was no significant difference in their University of Windsor grades either.

Faculty of Study and Grades

The relationship between faculty of study and grades was examined using a 6 by 2 (two-way) ANOVA. There was a main effect for Faculty, $F(5,171)=3.93$, $p<.01$, and a main effect for Marks, $F(1,171)=160.44$, $p<.01$. However, these main effects must be qualified by a two-way interaction (Faculty by Marks), $F(5,171)=2.26$, $p<.05$.

To explain this interaction effect, simple effects tests were computed and revealed that the means of the OAC
Table 12
Means and Standard Deviations - Gender and Grades

<table>
<thead>
<tr>
<th></th>
<th>OAC</th>
<th>U OF W</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEX</td>
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<td></td>
</tr>
<tr>
<td>Males</td>
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<td></td>
</tr>
<tr>
<td>MEAN</td>
<td>74.93</td>
<td>66.99</td>
</tr>
<tr>
<td>STD</td>
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<td>8.34</td>
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<tr>
<td>Females</td>
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<td></td>
</tr>
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<td>MEAN</td>
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<td>67.70</td>
</tr>
<tr>
<td>STD</td>
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<td>8.97</td>
</tr>
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</table>
grades for students in the Faculties of Social Science and Business Administration were significantly lower than those of other faculties. With regard to university grades, students in the Faculty of Social Science still had grades that were lower than all of the other faculties. This difference was most evident in comparison with the Faculties of Arts, Science and Human Kinetics (see Table 13). However, the differential was not as evident as it was with the OAC grades.

There appeared to be some difference between students in Social Science and Business, in that the grades of Business students rebounded during first semester but those of Social Science students did not. Since the university grades of males on the whole do not drop as much as those of females, more males in Business might explain this phenomenon. A gender breakdown of students in each faculty was completed to see if there were proportionally more males in Business than in Social Science.

Approximately 57% of the Business subjects were male and 43% were female. In Social Science, this pattern was reversed, with 43% of students being male and 57% female.

The study also revealed that OAC marks for students within the faculty of Business were not as predictive as they were for students in other faculties. That fact combined with the gender breakdown described above prompted an additional analysis of the relationship between gender
<table>
<thead>
<tr>
<th>FACULTY</th>
<th>OAC</th>
<th>U OF W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts</td>
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<td></td>
</tr>
<tr>
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<td>65.23</td>
</tr>
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</tr>
<tr>
<td>Science</td>
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<td></td>
</tr>
<tr>
<td>MEAN</td>
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<td>69.57</td>
</tr>
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<td>9.19</td>
</tr>
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<td>67.47</td>
</tr>
<tr>
<td>STANDARD DEV.</td>
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<td>6.02</td>
</tr>
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<tr>
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<td>70.75</td>
</tr>
<tr>
<td>STANDARD DEV.</td>
<td>7.11</td>
<td>10.07</td>
</tr>
</tbody>
</table>
and achievement within the faculty of Business.

One-way ANOVAs were therefore completed for gender and both OAC and University of Windsor grades for students within Business. The analysis showed, $F(1,14)=4.67$, $p<.05$, a significant difference in the OAC grades of male and female business students (see Table 14). The analysis showed, $F(1,15)=.07$, $p>.05$, no significant difference in their University of Windsor grades. This was therefore no different than the pattern for the subjects as a whole.
Table 14
Means and Standard Deviations - Gender and OAC Grades for Business Students

<table>
<thead>
<tr>
<th></th>
<th>MALES</th>
<th>FEMALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN</td>
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<td>77.29</td>
</tr>
<tr>
<td>STANDARD DEV.</td>
<td>4.06</td>
<td>5.12</td>
</tr>
</tbody>
</table>
CHAPTER V

Discussion

Primary Focus: Predicting University Achievement

This study revealed that, in general, the strongest predictor of academic achievement during the first semester at university is OAC grades. This is not surprising and has been well documented by other researchers (Astin, 1993; Holland & Astin, 1962; Quilter, 1995).

The fact that OAC grades in English also seem tied to achievement in university is indicative of the fact that writing is important in university and should not be overlooked, even with the predominant use of objective testing methods. The implication is that objective tests not only measure students' knowledge but also their language abilities. This is an interesting finding which might explain why many participants in the Learning and Study Strategies program at the University of Windsor find multiple choice exams more difficult than any other format.

What is somewhat surprising is the fact that no factors other than OAC grades were predictive. Richardson and Sullivan (1994) found that, at least for academically underprepared students, high school grades accounted for only 15% of the variance in first-semester university grades. This implies that other factors were certainly at play.

So, it is possible that some of the additional
variables examined in this study actually might predict university achievement despite the current results. For some reason, they are simply not identifiable or evident yet.

One explanation for this possible dormancy may lie within the transition from secondary school to university. The first semester grades of students may not accurately reflect their abilities. Students in their first semester are struggling to deal with larger class sizes, a new learning environment, comparatively less contact with instructors and a stronger emphasis on objective testing methods.

Professionals working in the field of Student Affairs are quite familiar with the idea that students' grades typically drop during their first semester at university, but often rebound later when students are more familiar with the challenges of post-secondary education.

Astin (1993) found that nearly one-half of all students achieve a lower grade point average in their first semester at university than they did in secondary school. However, he also found that grade point average is partially correlated to self-reported growth during college. Four years later, these same students reported strong learning and growth, which was reflected in higher grades.

Further evidence of the possibility that grade predictors other than secondary school average may not be
evident early in students' university career can be found in the work of Levin and Wyckoff (1995). They discovered that the variables that predict persistence and success changed over time as students progressed through the first two years of study. While their research was limited to engineering students, it appears to be a rational explanation that could apply to other faculties as well. So, it may very well be that factors such as locus of control are predictive of academic achievement, but that this relationship is not evident until students have completed at least their first year of study.

In any case, given the solid support this study finds for the predictive value of OAC grades on achievement in the first semester of university, the staff of the Academic Advisory Centre should consider designing special support programs for those students with weaker OAC averages. Such students would benefit from an ongoing orientation program which emphasizes learning and study skills. The ideal situation would be a for-credit orientation course offered during the fall semester.

Such an endeavour would likely only gain in value as the number of applicants to post-secondary education in Ontario declines. The University of Windsor may resort to lowering its admission average and accepting more academically at-risk students in order to maintain its student population. In that scenario, increasing emphasis
would be placed on retaining those students who are admitted. This, in turn, would generate more support for the concept of an orientation course than has been evident in the past.

Secondary Focus: Personal Characteristics and Faculty of Study

Locus of Control and Faculty of Study

This study found that students in the faculty of Human Kinetics have a locus of control that is more internal than that of students in other faculties. Proportionally speaking, there are a significantly higher number of students classified as having a highly internal locus of control.

On the opposite end of the spectrum, this study also revealed that students in the faculty of Business are divided evenly among the four locus of control categories (external, low internal, moderate internal and high internal). The remaining faculties are heavily oriented towards a moderate or high internal locus of control. The faculty of Business Administration therefore seems to attract students who, on the whole, have a more external locus of control than the students in other faculties.

The faculty of Human Kinetics typically has a higher admission average than other faculties, which might explain the findings if locus of control is predictive of achievement even slightly. However, the admission average
for the faculty of Business Administration in 1995 was not significantly lower than that of the other faculties, so no explanation for this phenomenon is evident there. That is, the faculty of Business is not attracting students who are less academically competent than other students.

In general, students with an external locus of control are more heavily influenced by others than students with an internal locus of control. It could be that Business students differ from their counterparts in other faculties because they have selected their program based largely on parental pressure as opposed to their own preferences. Indeed, Barney, Fredericks and Fredericks (1984) found that the majority of business students come from homes where the father was engaged in white collar work, primarily professional and managerial occupations.

Friedrich (1988) found that externality in students was associated with lower occupational aspirations and a greater discrepancy between these ideal aspirations and what students believe they can realistically obtain. Therefore, it could possibly be that some students who enter the faculty of Business are choosing that path as opposed to tackling programs they perceive as more challenging.

The personal experience of academic advisors at the University of Windsor is that Business students quite often aren't sure about why they chose to enter that faculty. The perception is that programs in Arts and Social Science will
not lead to job prospects and Science, Engineering and Human Kinetics are too difficult. Perhaps this indecision is also related to externality.

In summary, Business students could be less interested in their program, less committed to it and less motivated by academic challenges than students in other faculties. These characteristics may be reflected in their greater likelihood to be classified as having an external locus of control.

This explanation is tentative at best and further studies should be undertaken to determine why students in the Faculty of Business are different from students in other programs. This must be completed before the implications for the Academic Advisory Centre at the University of Windsor can be fully understood.

Learning Styles and Faculty of Study

It is very surprising that this study provides absolutely no support for the hypothesis that students in different faculties of study employ different learning styles. However, some interesting patterns that are in keeping with the research did emerge.

Students in the faculty of Engineering were heavily oriented to the Converger and Assimilator styles. The faculty of Human Kinetics also showed a very large proportion of students classified as Convergers. This makes sense, given the emphasis these faculties place on the practical application of theories.
The fact that no significant evidence was found to link learning style with faculty of study may be attributed to a lack of university experience on the part of the subjects. They made a final decision about their faculty of study in June, one month prior to Head Start and over two months before classes start.

It is possible that, at that point, their decision was affected primarily by the opinions of others (friends, parents, secondary school teachers). Perhaps once students get into university, and gain a better understanding of academic disciplines and about their own preferences, they may select a faculty whose demands match their own learning style. It is certainly not unusual for students to change majors and, in fact, the university system is structured so as to make that switch relatively easy.

Another rationale for testing this hypothesis among students further along in their university career is found in the work of Pinto, Geiger and Boyle (1994). They suggest that learning styles may change over time in college, so first-year students may not be fully settled in one particular style.

**Personality Variables and Faculty of Study**

The results of this study strongly support the hypothesis that students with different vocational preferences as measured by faculty of study have different personality characteristics (meaning, in this case, that...
they scored high or low on six different personality scales).

The differences in the distribution of high and low scores among students in the various faculties on each of the scales was as expected. The majority of Engineering students scored high on the Realistic scale, while the majority of the other faculties scored low. Holland (1985b) categorized Realistic types as being mechanical in nature, weak in interpersonal relations and typically entering technical professions. This description certainly fits the profile of an engineering student.

In terms of the Investigative scale, the majority of Arts, Social Science and especially Business students scored low while Science and Human Kinetics students scored high. Engineering students were split equally. Holland (1985b) suggested that high scorers on this scale would typically enter scientific occupations. It makes sense, then, that high scorers in this study be primarily in Science and Human Kinetics.

Students in the faculties of Arts and Social Science were the high scorers on the Artistic scale, with the majority of the other faculties scoring low. This too is not surprising given Holland's (1985b) profile. He theorized that those who scored high on this scale are likely to enter artistic, musical and literary occupations.

The majority of Social Science students scored high on
the Social scale and the majority of students in the other faculties scored low, particularly those in Science and Engineering. Social personalities, according to Holland (1985b) like to work with people, are cooperative, helpful and kind, and often choose teaching and helping occupations. With programs such as Psychology, Social Work, Criminology, Sociology and Family and Social Relations housed in the faculty of Social Science, these results make sense.

The results on the Conventional scale also yielded no surprises. The majority of Business students scored high while the majority of the other faculties scored low, especially Arts and Human Kinetics. Holland (1973) profiled Conventional personalities as valuing business and economic achievement, having numerical abilities and enjoying routine activities. Again, this profile fits that of the typical business student and is borne out in this study.

Finally, the same results were found for the Enterprising scale as were found for the Conventional scale - business students were the high scorers. According to Holland (1985b), high scorers on this scale lean towards supervisory and sales occupations. Since Business is the most natural selection of a program for these careers, one would have expected business students would score high.

It is an interesting aside to note that, although fewer in number, there were some students in other faculties who were classified as high scorers on the Conventional Scale.
This can be explained by the fact that Business is not the only faculty that can prepare students for a career in management. Psychology, for example, would also be relevant. Indeed, almost any degree program will provide students with skills that can be transferred to a supervisory career (time management, stress management, communication skills, problem-solving skills, etc.).

These findings certainly add credence to the notion that academic advisors should spend some time investigating the personality characteristics of those students who are seeking assistance with selecting or changing their major. The Academic Advisory Centre should investigate the possibility of including personality-based tests in its programming.

Further, since students in each of the faculties have distinct personality characteristics, the Academic Advisory Centre should investigate the possibility that separate Head Start programs for the faculties might enhance their effectiveness. That is, students in each faculty might respond better to certain activities and philosophies. It would not be difficult to arrange for students from each faculty to participate in Head Start on different days. An added benefit to such a strategy is that the new students would be interacting only with their potential classmates, probably enhancing their level of comfort.
Additional Findings

Locus of Control and Grades

While locus of control was not found to be predictive of academic achievement in the first semester of university, weak support was found for the hypothesis that locus of control is related to OAC academic achievement. The means of both OAC and university grades tended to increase as the level of internal control increased. However, only the OAC differences were found to have a significant linear trend.

It seems then, that on an overall basis, an internal locus of control has a slight positive impact on achievement in secondary school. This result is certainly puzzling. One would have expected the relationship to be stronger at the post-secondary level, given the strong emphasis on independent learning in university.

As discussed in the section pertaining to the prediction of academic achievement, it could very well be that the effects of locus of control on academic achievement in university simply cannot be seen yet. The new learning environment at university may be so overwhelming for students during their first semester that it diminishes the positive impact of an internal locus of control. Perhaps the relationship will become more pronounced as students progress and feel more comfortable with university.

If that were found to be true, the Academic Advisory Centre could incorporate testing for locus of control into
its study skills programming. It could even develop workshops that would reinforce to students the fact that they can control their academic outcomes and help them develop more active study habits.

**VPI and Grades**

Students who scored high on the Investigative scale of the Vocational Preference Inventory achieved significantly higher OAC grades than low-scorers. However, while this difference was still evident in the university grades, it was not significant.

Generally speaking, high-scorers enjoy using investigative skills to solve problems and are very inquisitive (Holland, 1973). It stands to reason that when in OAC, these students will ask many questions and have a great deal of contact with their teachers. The teachers may enjoy this contact and unconsciously inflate their grades. At university, much of the potential for that bias is eliminated due to large class sizes and the use of objective tests.

Another possibility is that, once again, the effect of an Investigative personality on achievement is moderated by the enormous transition to university. Analysis of students' grades later in their university careers may reveal a stronger relationship between a high score on the Investigative scale of the VPI and high grades.

Nevertheless, this information should certainly be
incorporated into the Head Start program so that students are better prepared for the drop in their grades that is likely to occur. In fact, advisors would do well to keep this in mind when dealing with clients who are concerned about their grades.

**Gender and Grades**

This study revealed that females achieve higher averages in QAC than males do, but that the differential evens out during their first semester at university.

One possible explanation for this might be a bias on the part of secondary school teachers. They may be grading female students too leniently or male students too harshly. Once students reach university, this bias is removed and the differential disappears.

However, another explanation might be found in the general characteristics of female students. Females are generally considered to be more social in nature and may therefore focus more on the social adjustment to university as opposed to the academic adjustment. Kaufman and Creamer (1991) found that female college students have a higher tendency to place importance on social goals and are more likely to expend a great deal of effort in their relations with peers than male students. Similarly, Paludi and Frankell-Hauser (1986) found that, in general, younger women are more concerned with interpersonal relations and less concerned with competitive achievement than older women.
The women in this study may therefore have spent more time during their first semester developing friendships, joining clubs and trying to 'fit in' than their male counterparts. This social focus would have certainly affected their academic achievement.

It is also possible that males and females achieve at approximately the same level in university because they have sorted themselves into programs that are appropriate for them. That is, males and females who choose to enter particular programs tend to do equally well in them. For example, a student who had particular difficulty with science and math courses in secondary school would likely choose to enter a university program that does not include courses from that area. His or her grades would then change accordingly.

In any case, female students should be prepared for the fact that their grades are likely to drop more severely than those of male students. Implications for the Academic Advisory Centre arise from the possibility that female students may focus on the social adjustment to university at the expense of academic achievement.

The Centre administers a mentoring program which matches new students with an upper-level, experienced student who can act as a friend and a resource person. It appears that female students may benefit from participation in this program more than males. Being pre-matched with an
upper-level student would ease the anxiety felt by females about meeting people, and the more experienced student would be able to encourage the new student to continue to place high priority on academic achievement. The Academic Advisory Centre should therefore market this program more actively to new students who are female.

Faculty and Grades

Significant differences were found in the OAC and University of Windsor grades of students in the six different faculties. In terms of the OAC grades, students in Social Science and Business seemed to lag behind. The differential narrowed in university, but the grades of Social Science students were still significantly lower than the grades of students in the other faculties.

The differences in university performance of Social Science and Business students may be explained by the fact that the latter faculty has proportionally more male students. Since, their grades do not drop as much as female students' do, the university grades of Business students end up more in line with those of students in other faculties. No such adjustment takes place within the faculty of Social Science.

Nevertheless, it appears once again that students who enter Business are different than their counterparts in other faculties. This is the same conclusion that was reached regarding locus of control. It appears that not
only are they more external in nature, but their OAC marks are not as predictive of achievement in university.

Future examination of this issue is certainly warranted and could lead to additional support for the strategy of developing separate orientation programs for each faculty.

Summary

As shown above, the results of this study have quite a few implications for the Academic Advisory Centre in its search to develop the most effective support programming possible for students. Perhaps the strongest implication is that the Centre should begin to actively investigate the characteristics of our students through various research projects. The results would be interesting and enable staff to develop services based on students at the University of Windsor as opposed to relying on instinct, our own experience or the findings of outside studies.

Limitations of the Present Study

The major limitation of this study is that it simply does not go far enough. Some of the expected relationships did not materialize, perhaps due to the fact that first-semester grades are not a strong enough indicator of academic achievement in university. The transition from secondary school to university may be so overwhelming that students are still adjusting to their new environment. A better measure of achievement would be their grades at the
end of first year or even half-way through their second year.

Another limitation is that the sample was not quite large enough to draw reliable conclusions about the predictors of academic achievement for students in various faculties. The cell sizes were simply too small.

Suggestions for Further Research

The most important suggestion for future research stems from the primary limitation discussed above. A further examination of the grades of students at the end of their first-year at university or even into their second year would probably shed additional light on the entire study. The grades of the subjects would be more reliable at that time, and the subjects may have made some additional decisions about their program of study. Decisions made at that point are more likely to be based upon the opinions and personalities of the students themselves as well as accurate knowledge about the university.

The addition of second or third semester grades into the equation might, for example, reveal that factors such as locus of control are indeed predictive of academic achievement or that a significant relationship exists between learning style and faculty of study. It might also clarify other issues such as the differential in OAC grades between males and females. If the differential does not reappear, it might indicate that a bias is indeed occurring in
the grading of students in secondary school. If it did re-appear, it might confirm that females do achieve consistently higher grades than males, with the exception of the adjustment period associated with the first semester of university.

Future studies should also explore the characteristics of students within the faculty of Business Administration and seek to identify why they are more external in terms of locus of control and why their OAC grades are not as predictive as those of students in most other faculties.
REFERENCES


Psychology, 36(2), 183-188.


APPENDIX A

Head Start 1995: Today's Student Program

8:30 - 9:00  WELCOME

Join us in Ambassador Auditorium in the C.A.W. Student Centre for a chance to hear what current University of Windsor students learned during their first year, welcoming remarks by the Dean of Student Affairs, and instructions for the day.

9:15 - 12:00  STUDENT SESSIONS

You will participate in a variety of sessions led by returning student volunteers.

The Road to Success

What types of support services are there for students on campus? Where are they located? How can they help you? Who can tell you more? Come with us on a mini-tour of campus to find the answers to these questions.

Winding Road Ahead

As a university student, you will be adapting to new regulations and procedures, and facing many new and different situations. A series of scenarios will familiarize you with some of the issues you may encounter and will offer advice on how to handle them successfully. Materials that will assist with timetabling and registration will be distributed and discussed.
12:00 - 12:45 LUNCH

12:45 - 2:15 ACADEMIC ADVISING

Orientation leaders will take you to meet with advisors to discuss academic programs and course selection. Parents are welcome, too.

2:00 INFO SESSION FOR STUDENTS WITH SPECIAL NEEDS

This presentation, held in Erie Hall, will outline the services that are available on campus for students with special needs. Early contact with the Special Needs Office is necessary to ensure that all accommodations will be in place by the time classes begin.

2:00 - 4:00 ACCESS CODE/ALL-CAMPUS CARD PICK-UP

Stop by the lobby of the C.A.W. Student Centre during these times to pick up your access code for telephone registration and your All-Campus card.

2:15 RESIDENCE/FOOD SERVICES PRESENTATION

If you would like to have more information on residence and food services drop by to view this presentation. It will be held in Ambassador Auditorium (C.A.W. Student Centre).
APPENDIX B

General Information Sheet

Thank-you for taking the time to participate in this study. Please fill in the following information and complete each of the three attached instruments carefully.

1. Name: ________________________________

2. ID#: ________________________________

3. Faculty of Study:
   ____ Arts  ____ Business
   ____ Social Science  ____ Engineering
   ____ Science  ____ Human Kinetics

4. If you have a major within your faculty of study (example: English), please write it on the line below. If you do not have a major, please write "undecided".

   ______________________________________

5. You are:
   ____ Male  ____ Female

   ______________________________

Please sign below to grant your permission for us to review your OAC and first semester grades.

   ______________________________
APPENDIX C

Awareness Check: What is Your Locus of Control?

What Is Your Locus of Control?
Check yes if you agree with a statement; check no if you do not agree.

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1. If I can do the work, I can get a good grade in any course no matter how good or bad the instructor is.

2. If the teacher isn't a good speaker or doesn't keep me interested, I probably won't do well in the class.

3. I believe that I have the power to control what happens to me.

4. I believe that I have very little control over what happens to me.

5. When I make a mistake, it's usually my fault.

6. When I make a mistake, it's usually because someone didn't make clear to me what I was supposed to do.

7. My grades are the result of how much studying I do.

8. My grades don't seem to be affected by the amount of studying I do.

9. I can adapt easily to a change in plans or events.

10. Adapting to change has always been difficult for me. I like things to be as predictable and orderly as possible.

11. When I fail a test, it's either because I didn't study or I didn't understand the material.

12. When I fail a test, it's either because the test was unfair or the instructor didn't cover the material.

13. I usually don't need anyone to push me or make me study.

14. I can't seem to make myself study.

15. I am a self-motivated person.

16. I need someone to motivate me.


APPENDIX D

Learning Style Inventory

1. When I learn:  
   ____ I like to deal with my feelings.  
   ____ I like to watch and listen.  
   ____ I like to think about ideas.  
   ____ I like to be doing things.

2. I learn best when:  
   ____ I trust my hunches and feelings.  
   ____ I listen and learn.  
   ____ I rely on logical thinking.  
   ____ I work hard to get things done.

3. When I am learning:  
   ____ I have strong feelings and reactions.  
   ____ I am quiet and reserved.  
   ____ I tend to reason things out.  
   ____ I am responsible about things.

4. I learn by:  
   ____ feeling  
   ____ watching  
   ____ thinking  
   ____ doing.

5. When I learn:  
   ____ I am open to new experiences.  
   ____ I look at all sides of issues.  
   ____ I like to analyze things, break them down into their parts.  
   ____ I like to try things out.

6. When I am learning:  
   ____ I am an intuitive person.  
   ____ I am a person.  
   ____ I am an active person.  
   ____ I am responsible.

7. I learn best from:  
   ____ personal relationships.  
   ____ observation.  
   ____ rational theories.  
   ____ a chance to try out and practice.

8. When I learn:  
   ____ I feel personally involved in things.  
   ____ I am interested in understanding ideas and results from my work.

9. I learn best when:  
   ____ I rely on my feelings.  
   ____ I rely on my observations.  
   ____ I rely on my ideas.  
   ____ I can try things out for myself.

10. When I am learning:  
   ____ I am an accepting person.  
   ____ I am an open-minded person.

11. When I learn:  
   ____ I get involved.  
   ____ I like to observe.  
   ____ I evaluate things.  
   ____ I like to be active.

12. I learn best when:  
   ____ I am receptive and open-minded.  
   ____ I am careful to analyze ideas.  
   ____ I am practical.

This is an inventory of your feelings and attitudes about many kinds of work. Fill out your answer sheet by following the directions given below:

- Show on your answer sheet the occupations which Interest or appeal to you by blackening (O) for “Yes.”
- Show the occupations which you dislike or find uninteresting by blackening (X) for “No.”
- Make no marks when you are undecided about an occupation.

1. Criminologist
2. Private Investigator
3. Restaurant Worker
4. Detective
5. Photograver
6. Truck Gardener
7. Physical Education Teacher
8. Humorist
9. Photographer
10. Diplomat
11. Airplane Mechanic
12. Heresiologist
13. Poet
14. Sociologist
15. Speculator
16. Bookkeeper
17. Deep Sea Diver
18. Stock Clerk
19. Dramatic Coach
20. Lawyer
21. Fish and Wildlife Specialist
22. Ichthyologist
23. Symphony Conductor
24. High School Teacher
25. Buyer
26. Business Teacher
27. Wrecker (Building)
28. Veterinarian
29. Elementary School Teacher
30. Physician
31. Auto Mechanic
32. Astronomer
33. Huskian
34. Juvenile Delinquency Expert
35. Advertising Executive
36. Budget Reviewer
37. Firefighter
38. Post Office Clerk
39. Experimental Laboratory Engineer
40. Bartender
41. Carpenter
42. Medical Laboratory Technician
43. Author
44. Speech Therapist
45. Manufacturer's Representative
46. Certified Public Accountant
47. Firefighter
48. Airline Ticket Agent
49. Entertainer
50. Novelist
51. Hunting or Fishing Guide
52. Anthropologist
53. Commercial Artist
54. Marriage Counselor
55. Television Producer
56. Credit Investigator
57. Wild Animal Trainer
58. Administrative Assistant
59. Physical Therapist
60. Cashier
61. Surveyor
62. Zoologist
63. Free-lance Writer
64. School Principal
65. Hotel Manager
66. Court Stenographer
67. Stunt Man/Stunt Woman (Movies)
68. Route Salesperson
69. Professional Athlete
70. Flight Attendant
71. Construction Inspector
72. Chemist
73. Musical Arranger
74. Playground Director
75. Business Executive
76. Bank Teller
77. Jockey
78. Interior Decorator
79. Airplane Pilot
80. Banker
81. Radio Operator
82. Independent Research Scientist
83. Journalist
84. Clinical Psychologist
85. Restaurant Manager
86. Tax Exempt
87. Motorcycle Driver
88. Sport's Promoter
89. Referee (Sporting Events)
90. Mule Carrier
91. Electronic Technician
92. Writer of Scientific Articles
93. Portrait Artist
94. Social Science Teacher
95. Master of Ceremonies
96. Inventory Controller
97. Blaster (Dynamiter)
98. Police Officer
99. English Teacher
100. UN Official

101. Tree Surgeon
102. Editor of a Scientific Journal
103. Concert Singer
104. Director of Welfare Agency
105. Salesperson
106. NIH Equipment Operator
107. F.I.I. Agent
108. Probation Agent
109. Astronaut
110. College Professor

111. Bus Driver
112. Geologist
113. Composer
114. Youth Camp Director
115. Real Estate Salesperson
116. Financial Analyst
117. Mountain Climber
118. Cook/Chef
119. Stage Director
120. Ticket Agent

121. Locomotive Engineer
122. Botanist
123. Sculptor/Sculptress
124. Personal Counselor
125. Publicity Director
126. Cost Estimator
127. Explorer
128. Nursery School Teacher
129. Quality Control Expert
130. Judge

131. Machinist
132. Scientific Research Worker
133. Playwright
134. Psychiatric Case Worker
135. Department Store Manager
136. Payroll Clerk
137. Test Pilot
138. Computer Programmer
139. Clothing Designer
140. Truck Driver

141. Electrician
142. Physicist
143. Cartoonist
144. Vocational Counselor
145. Sales Manager
146. Bank Examiner
147. Racing Car Driver
148. Forester
149. Social Worker
150. Sales Clerk

151. Funeral Director
152. Mind Reader
153. Architect
154. Shipping & Receiving Clerk
155. Criminal Psychologist
156. Insurance Clerk
157. Barber
158. Bill Collector
159. Ward Attendant
160. Harriet/Harriett
APPENDIX F

Instructions for Student Leaders

• Please distribute the instruments to each member of your group.

• Explain the exercise by running through the following points:

  • the Academic Advisory Centre (AAC) is interested in obtaining information about students' attitude toward studying, the way that they study and the way that they make career related decisions
    - the study includes a review of your OAC grades and the grades you obtain in your first semester at the U of W
    - BUT
    - this information will be kept completely confidential and used in an aggregate form ONLY

  • this information will allow the AAC to identify topics that should be addressed in future Head Start programs and other student support services

• we would therefore appreciate it if they would complete each instrument
  - complete the general information page (including the signature which gives us permission to review your grades
  - fill out all heading information (name, age, etc.)
  - answer every question on all of the instruments
  - be honest

• all responses will be kept completely confidential

• participation in this study is completely voluntary

• Collect the instruments after everyone is finished and thank participants for their time
APPENDIX G

Cover Letter for Instruments

July 10, 1995

Dear New Student:

The Academic Advisory Centre is responsible for the coordination of the Head Start Orientation Program at the University of Windsor as well as several other programs that help students succeed at university. As part of a thesis for the degree of Master of Education, I am collecting data about students' academic achievement, learning style and career decision-making process. This information will be used to identify possible topics that should be addressed in orientation and other student support programs. The supervisor of this thesis is Dr. Larry Morton from the Faculty of Education.

We would greatly appreciate it if you would take a few minutes to complete a cover sheet and three questionnaires which have been approved by the Research Ethics Committee of the Faculty of Education. The study will also include a review of your OAC grades and the grades you obtain in your first semester at the University of Windsor in an attempt to relate the two. You can be assured that your responses and your grades will be kept under lock and key and held completely confidential. Your student leader will provide you with instructions and all of the materials that you will require. In addition, you are certainly welcome to contact me if you have any questions before, during or after the study. I can be reached at (519) 253-4232, ext. 3462.

Participation in this study is voluntary and you are free to withdraw from it at any time. Completion of the instruments and your signature on the cover sheet will be taken as an indication of your consent. If you have any complaints about the instruments or the study in general, you are invited to contact the Research Ethics Committee of the Faculty of Education at (519) 253-4232, ext. 3800.

Thank-you in advance for your cooperation.

Sincerely,

Karen Benzinger
Supervisor of Student Programs
Academic Advisory Centre
<table>
<thead>
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<th>Karen Benzinger</th>
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</tr>
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<tr>
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