TOLERANCE FOR AMBIGUITY IN ACCOUNTING AND OTHER BUSINESS MAJORS

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Chapter I

Introduction

There is a strong demand for accountants who have a diversity of skills and knowledge, and the ability to apply them in an environment subject to constant change (Cooper, 1996; Demery, 1995; "Number Of Entry-Level Hires," 1994; Hermanson, Hermanson, and Ivancevich, 1995; and Sundem, 1994). This demand is found in the fields of public and private accounting, which employs of accounting students, and sets the demand requirements for college accounting graduates (Cooper, 1996; Demery, 1995; Freedman, 1996; Half, 1994; "Number Of Entry-Level Hires," 1994; Scroppo, 1994; and Usry and Calvasina, 1994).

This demand for accountants with a wide breadth of skills as well as the ability to use them comes from some major international accounting firms, who are the largest firms in the public accounting industry. Brent C. Inman, the partner and national director of recruiting for Coopers and Lybrand, states that his firm wants people who are broad thinkers who are able to analyze data, and at the same time, are able to work well with other people. Charles B. Eldridge, the partner and national director of recruiting and university relations for Ernst & Young, also emphasized these skills, and added that it is also necessary for these people to possess communications skills and a process orientation ("Number Of Entry-Level Hires," 1994).

Industry also demands such individuals. Changes in technology and flat organizational designs have caused the decline of conventional roles in accounting (Cooper, 1996; and Freedman, 1996). One of the requirements of the emerging role of the management accountant is to add value by centering on the strategic intent of the firm (Freedman, 1996). This role should require less time in traditional areas such as financial accounting, taxes, and auditing. Instead, more time will be devoted to gaining an understanding of the firm's "product and process technology, operations, systems, marketing, strategy, and the behavioral and organizational issues relating to the implementation of new systems and processes"(Cooper, 1996, p. 38).

Demand for accountants skilled in a diversity of areas comes from the accounting industry in general, career consultants, and one business futurist (Demery, 1995; Half, 1994; Scroppo, 1994; and Usry and Calvasina, 1994). Future accountants must possess the knowledge of how a business operates. Because future career paths are unknown, management abilities as well as the ability to communicate are stressed by Rick Elam, the Vice President for Education at the American Institute of CPAs (Demery, 1995). Those who are able to manage complex difficulties and devise intelligent solutions to problems will add value to their firms, whether as a public or private accountant (Usry and Calvasina, 1994). In the future, the accounting profession will exhibit less of its number-crunching characteristics, and will move toward the interpretation and analysis of business decisions. As businesses move into an international arena, accountants will need to be able to interpret tax laws domestically as well as internationally. They will need to advise business executives through the usage of data retrieved instantaneously in order to react as

quickly as possible to customer wants and needs (Scroppo, 1994). Creativity is a requirement of the current finance and accounting environment; those able to meet this challenge will be those who are most likely to be promoted quickest as well as move furthest in their career fields (Half, 1994).

The public accounting industry seems to indicate by their employment practices that there are not enough of these accountants, because they are hiring people from backgrounds other than accounting to fill new needs (Demery, 1995; and "Number Of Entry-Level Hires," 1994). David Price, the managing partner of the Dayton office of Ernst & Young, stated that, "We'll seek the MBA and pay a premium in order to get the top-notch people and the breadth and leadership they bring" (Demery, July, 1995, p. 12). Charles B. Eldridge, partner and national director of recruiting and university relations of Ernst & Young, asserted that all their employees must be team players, must maintain a process orientation, and must be able to communicate as well as analyze well. According to Eldridge, "In today's changing and increasingly competitive professional services marketplace, we want people who add value in all aspects of their work, who look at the way an entire business operates, and who--right from the beginning--are able to think on their feet, understand a client's business thoroughly and proactively develop solutions to problems" ("Number Of Entry-Level Hires," 1994; p. 94) In the same article, Brent C. Inman, partner and national director of recruiting, stated that they have keyed in on the best students from the best schools, and have selected employees from all majors, which have included the liberal arts, in addition to the traditional business, law, and accounting majors. Price Waterhouse also includes MBAs as approximately 10% of their new hires.

Arthur Andersen as well as Deloitte & Touch were included as additional members of the large international accounting firms hiring graduates with liberal arts degrees and MBAs. ("Number Of Entry-Level Hires," 1994).

Summary

Previously, it was stated that there is found a strong demand for accountants who have a diversity of skills, knowledge, and the ability to apply them in an environment subject to constant change (Cooper, 1996; Demery, 1995; "Number Of Entry-Level Hires," 1994; Hermanson, Hermanson, and Ivancevich, 1995; and Sundem, 1994). This demand stems from both the public and private accounting industry, who employs accounting students, and sets the demand requirements for college accounting graduates (Cooper, 1996; Demery, 1995; Freedman, 1996; Half, 1994; "Number Of Entry-Level Hires," 1994; Scroppo, 1994; and Usry and Calvasina, 1994). Public accounting employment practices indicate that there are not enough of accountants meeting the above demand, for they are hiring people from outside the field of accounting to fill their needs (Demery, 1995; and "Number Of Entry-Level Hires," 1994). The question is whether accounting programs attract such students into the field of accounting as a major, or are they found, instead, in other business majors?

Statement of the Purpose

The purpose of this study is to determine whether the level of tolerance for ambiguity in accounting majors differs in the Sophomore, Junior, and Senior years of college, and whether such levels differ from those of nonaccounting business majors in the Sophomore, Junior, and Senior years of college.

Problem of the Study

The problem of this study is to determine whether the level of tolerance for ambiguity initially differs between accounting majors and other nonaccounting business majors, and whether such levels change as a result of college study and maturation. The results of this study will be utilized as one source which indicates whether different personality types might be sought for the study of accounting, or whether the curriculum for accounting, as well as that for other business majors, might need to be revised (if tolerance for ambiguity decreases over the three years in the study).

Need for the Study

Change, in our society is here to stay, according to Fullan and Stiegelbauer (1991), who state that:

> It isn't that people resist change as much as they don't know how to cope with it. . . . . It is not as if we have a choice whether to change or not. Demands for change will always be with us in complex societies" (Fullan and Stiegelbauer, 1991, p. xiv).

One of the major factors that they assert is involved in the implementation of change is the "difficulty and extent of change required of the individuals responsible for implementation. . . The actual amount depends on the starting point for any given individual or group" (Fullan and Stiegelbauer, 1991, p. 71).

Although these authors are writing about the educational change process, many of their theories translate to the field of business in the functions of leadership and in the implementation of the change process. The school principal plays a major role in initiating

change; psychological issues that affect the principal are similar to those challenging the teacher, who plays a part in the actual implementation of change. The psychological condition of the teacher may be more or less inclined toward the contemplation and execution of change. "Psychological state can be a permanent or changeable trait, depending on the individual and on the conditions" (Fullan and Stiegelbauer, 1991, p. 77). This is very similar to the description of personality given by Greenberg and Baron (1995), who state:

> Personality is the unique and relatively stable pattern of behavior, thoughts, and emotions shown by individuals. In organizations, both an individual's personality and the demands of the context combine to influence behavior" (Greenberg and Baron, 1995, p. 116).

Tolerance for ambiguity is a variable of personality which represents the tendency to interpret ambiguous situations as something to be desired (Budner, 1962). It has been subjected to psychological research for nearly 50 years (Frenkel-Brunswik, 1948). It has been studied on an individual level as a variable of personality by Budner (1962), as well as a combination of personality and national culture (Hofstede, 1980), and has been utilized to explain personality differences between people within and without organizations (Anderson & Schwartz, 1992; Nutt, 1993; and Tsui, 1993).

In the field of accounting, the accountant must be able to mange and control change. Therefore, the psychological state of the accountant must be inclined to tolerate ambiguity. An individual who is comfortable in a fluctuating environment must not be intolerant of ambiguity, for those intolerant of ambiguity have been found to prefer the

familiar over the unfamiliar as well as to positively reject the different or unusual (Feather, 1967; Feather, 1969; Harrington, Block, and Block, 1978; McPherson, 1983; Muuss, 1960; Raphael and Xelowski, 1981; Raphael and Chasen, 1980; and Tatzel, 1980), and to be uncreative and /or are cognitively simplistic (Bostic and Tallent-Runnels, 1991; Ebeling and Spear, 1980; Feather, 1964; Foxman, 1976; Hoover, 1992; Rotter and O'Connell, 1982; Shaffer and Hendrick, 1974; Shaffer, Hendrick, Regula, and Freconna, 1973; andTegano, 1990).

Accountants have been found (through a review of the literature) to value security, routine, flexibility, and do not value creativity and empathy (Dinus and McIntyre, 1979). In addition, they have shown traits of orderliness, parsimony, and obstinacy (Schell and DeLuca, 1991), and have also been found to be socially conforming, stable introverts (Granleese and Barrett, 1990). Conventionality was found to be a significant predictor of the accounting college major choice in a study performed by Kleinman (1992). This research indicate that accountants may not be tolerant of ambiguity, but none have directly measured it through the utilization of a tolerance for ambiguity scale.

A relationship has been found between the level of tolerance for ambiguity and choice of vocation (Church, Waclawski, and Burke, 1996; Geller, Faden, and Levine, 1990; and Merrill, Camacho, Laux, Lorimor, Rhornby, and Vallbona, 1994), but no research has compared levels of tolerance for ambiguity in accounting and in other business majors. Other business majors are chosen because many of the vocational characteristics previously cited as necessary for accountants to possess are attributable to these fields. For instance, they must focus on the strategical intent of the firm (Freedman,

1996). They will spend more of their time gaining an understanding of the firm's "product and process technology, operations, systems, marketing, strategy, and the behavioral and organizational issues relating to the implementation of new systems and processes"(Cooper, 1996, p. 38). Future accountants must possess the knowledge of how a business operates. Management abilities as well as the ability to communicate were stressed (Demery, 1995). The profession will exhibit less of its number-crunching characteristics, and will move toward the interpretation and analysis of business decisions (Scroppo, 1994). Creativity is described as a requirement of the current finance and accounting environment (Half, 1994).

No research has been found that compares levels of tolerance for ambiguity in accounting majors to levels of tolerance for ambiguity found in other business majors at the inception of, and during the pursuit of their majors. Since there is no previous research that has utilized a tolerance for ambiguity measure to differentiate between those in different careers in business, this study will employ the results of a personality inventory (which encompasses more traits of personality than tolerance for ambiguity) that has been used in career counseling. This inventory, the Myers-Briggs Type Indicator (MTBI), draws from Jungian type theory. Four basic modes of perception and judgement are examined in the test: extraversion (is interested in the external environment) (E) or introversion (is interested in the internal environment of ideas) (I), sensing (prefers to perceive through utilization of the five senses) (S) or intuition (prefers to perceive through the world of ideas) (N), thinking (uses logic to judge) (T) or feeling (uses feelings to judge) (F), and judgment (makes judgements to provide order for the person's life) (J) or

perception (keeps an open mind, waiting for more facts to come in before the person passes judgment)(P). (Myers and Myers, 1995).

Most, if not all, business categories are found in the following occupational codes: ISTJ, INTJ, ESTJ, and ENTJ (Macdaid, McCaulley, and Kainz, 1995). Only two letters of the four-letter type codes differ (Introversion versus Extroversion, and Sensing versus Intuition). However, only the sensing versus intuition appears to differentiate tolerance for ambiguity levels (though it is not a direct test of tolerance for ambiguity), with intuition representing high tolerance for ambiguity, because intuitive types are, "by nature initiators, inventors, and promoters; having no taste for life as it is. . . they are generally restless" (Myers and Myers, 1995, p. 63).

Characteristics of intolerance for ambiguity (with tolerance for ambiguity being its opposite) have been shown to be the seeking for certainty and the avoidance of ambiguity (Hamilton, 1957, and Keinan, 1994), and preferring the familiar over the unfamiliar as well as the positive rejecting of the different or unusual (Feather, 1967; Feather, 1969; Harrington, Block, and Block, 1978; McPherson, 1983; Muuss, 1960; Raphael and Chasen, 1980; Raphael and Xelowski, 1981; and Tatzel, 1980). Those who are intolerant of ambiguity are uncreative and /or are cognitively simplistic (Bostic and Tallent-Runnels, 1991; Ebeling and Spear, 1980; Feather, 1964; Foxman, 1976; Hoover, 1992; Rotter and O'Connell, 1982; Shaffer and Hendrick, 1974; Shaffer, Hendrick, Regula, and Freconna, 1973; and Tegano, 1990). Therefore, only those four-letter vocation codes which contain "N," will be utilized to predict tolerance for ambiguity.

Careers that business majors enter within the first several years after graduation (accountants; administrators: managers and supervisors; auditors; Certified Public Accountants; consultants: management analysts; managers: retail stores; managers: sales; and public accountants) were analyzed from Myers-Briggs Type Indicator Atlas of Type Tables (MacDaid, McCaulley, and Kainz, 1991, pp. 121, 122, 123, 130, 136, 154, 155, 161.). Although many of the percentages of people found in the intuitive type for accounting and other business professions are similar, the accounting profession has the category with the lowest percentage of people in that type in Table 1.1 (see accountants category), while the sales category found in the other business professions has the highest percentage (and it is extremely high) of people of that type found on the table. This should indicate that a larger percentage of other business majors will be more tolerant of ambiguity than will be accounting majors, and therefore, because we will use an average of the tolerance for ambiguity scores, the level of tolerance for ambiguity should be higher for the other business majors (notice that the Myers-Briggs categories do not give levels, or amounts, of intuition maintained by the occupations, only the percentages of people found with such trait). Therefore, for each year of college, the tolerance for ambiguity level should be higher for other business majors than for accounting majors, and the following hypotheses are proposed:

Hypothesis 1

In the sophomore year of college, the tolerance for ambiguity level will be higher for other business majors than for accounting majors.

Hypothesis 2

In the junior year of college, the tolerance for ambiguity level will be higher for other business majors than for accounting majors.

Hypothesis 3

In the senior year of college, the tolerance for ambiguity level will be higher for other business majors than for accounting majors.

Glover, Romero, and Peterson (1978) and Smock (1955) found that learning is associated with an increase in the level of tolerance for ambiguity, and Church, Waclawski, and Burke (1996) found that as the number of courses taken increased, so did tolerance for ambiguity scores. Therefore, as the number of college courses increase, tolerance for ambiguity levels should increase, and the following hypotheses are proposed:

Hypothesis 4

There should be an increase in the level of tolerance for ambiguity in accounting majors between the sophomore and senior years of college.

Hypothesis 5

There should be an increase in the level of tolerance for ambiguity in other business majors between the sophomore and senior years of college.

Limitations

The validity, as well as the generalizability, of this, as well as any other research study may be affected by factors contained in such study. These factors will be identified and examined below.

Limitations inherent in this study will now be discussed. First is the sample utilized in the study. The sample was a convenience sample drawn from several sections of Elementary Accounting I and II, Principles of Management, and Business Policy courses at Oklahoma State University. These courses were chosen because all are required of business majors, the population from which the study was drawn. The Elementary Accounting I and II courses typically are enrolled in by Sophomore students, while the Principles of Management course is typically a Junior course, and the Business Policy course is a typical Senior course. These courses, therefore, were chosen to represent the business Sophomore, Junior, and Senior classes.

The data obtained was cross-sectional and did not explain whether accounting majors or nonbusiness majors change in tolerance of ambiguity levels over time.

Definition of Term

Tolerance for (or of) ambiguity--This is a tendency to interpret ambiguous situations as something to be desired. Intolerance of ambiguity is a "tendency to perceive (or interpret) ambiguous situations as sources of threat" (Budner, 1962, p. 29). Ambiguous situations are those which are not able to be satisfactorily categorized or structured by a person due to insufficient cues. These situations may be either new, complex, or contradictory. Reactions to stimuli which indicate "repression and denial. . . anxiety and discomfort. . .destructive or reconstructive behavior. . .or avoidance behavior " (Budner, 1962, p. 30) indicates that a person is threatened (Budner, 1962).

Chapter II

Literature Review

Change and Psychological State

In the prior chapter, the need for accountants who possess a variety of skills, as well as the knowledge and the ability to implement them in an environment susceptible to constant change was discussed. Change, in our society is here to stay, according to Fullan and Stiegelbauer (1991), who state that:

> It isn't that people resist change as much as they don't know how to cope with it. . . . . It is not as if we have a choice whether to change or not. Demands for change will always be with us in complex societies" (Fullan and Stiegelbauer, 1991, p. xiv).

One of the major factors that is involved in the implementation of change is the "difficulty and extent of change required of the individuals responsible for implementation. . . The actual amount depends on the starting point for any given individual or group" (Fullan and Stiegelbauer, 1991, p. 71).

Although these authors are writing about the educational change process, many of their theories translate to the field of business in the functions of leadership and in the implementation of the change process. The school principal plays a major role in initiating change; psychological issues that affect the principal are similar to those challenging the

teacher, who plays a part in the actual implementation of change. The psychological condition of the teacher may be more or less inclined toward the contemplation and execution of change. "Psychological state can be a permanent or changeable trait, depending on the individual and on the conditions" (Fullan and Stiegelbauer, 1991, p. 77).

Allport, many years ago, explained this stable, but adaptive nature of the personality by the following definition. He stated that,

> Personality is the dynamic organization within the individual of those psychophysical systems that determine his unique adjustments to the environment . . . this organization must be regarded as constantly evolving and changing. . . Habits, specific and general attitudes, sentiments, and dispositions of other orders are all psychophysical systems. . . 'system' refers to traits or groups of traits in a latent or active condition. . . The systems that constitute personality are in every sense determining tendencies, and when aroused by suitable stimuli provoke those adjustive and expressive acts by which the personality becomes known. . . adjustments must not be considered as merely reactive adaptation. . .Adjustment to the physical world as well as to the imagined or ideal world--both being factors in the 'behavioral environment'--involves mastery as well as passive adaptation.(Allport, 1937, pp. 48-49).

A recent description of personality was given by Greenberg and Baron (1995),

which expands this definition. They state, "Personality is the unique and relatively stable pattern of behavior, thoughts, and emotions shown by individuals. In organizations, both an individual's personality and the demands of the context combine to influence behavior" (Greenberg and Baron, 1995, p. 116). All definitions agree in that the individual's personality affects how he (she) responds to the environment (Allport, 1937; Fullan and Stiegelbauer, 1991; and Greenberg and Baron, 1995).

It was previously stated that there is a strong demand for accountants who have a diversity of skills, knowledge, and the ability to apply them in an environment subject to constant change (Cooper, 1996; Demery, 1995; "Number Of Entry-Level Hires," 1994; Hermanson, Hermanson, and Ivancevich, 1995; and Sundem, 1994). Accountants must survive in a world that is constantly fluctuating. Therefore, in order to subsist , the psychological state of the accountant must be inclined to tolerate ambiguity, for such tolerance reflects the tendency to interpret ambiguous situations as something to be desired (Budner, 1962). Intolerance of ambiguity is a "tendency to perceive (or interpret) ambiguous situations as sources of threat" (Budner, 1962, p. 29). Tolerance (intolerance) of ambiguity is one of those traits within the psychophysical systems of the individual described by Allport (1937). Each person's tolerance for ambiguity is specific to him (her). Allport (1937) believes that traits, themselves, are a purely individual characteristic (ie. every person has unique traits); therefore, what is measured through measurement scales, he terms are "common traits" (Allport, 1937, p. 299), which are, "those aspects of personality in respect to which most mature people within a given culture can be compared (Allport, 1937).

Tolerance for Ambiguity

Tolerance for ambiguity has been subjected to psychological research for nearly 50 years (Frenkel-Brunswik, 1948). It has been studied on an individual level as a variable of personality by Budner (1962), as well as a combination of personality and national culture (Hofstede, 1980), and has been utilized to explain personality differences between people within and without organizations (Anderson & Schwartz, 1992; Nutt, 1993; and Tsui, 1993). Furnham and Ribchester (1995) have written a very thorough review of the topic. Many of their sources will be cited in this study, but will, however, be found in a different framework, with additional citations added.

Bochner (1965) categorized intolerance of ambiguity into primary and secondary characteristics. Primary characteristics were:

(a) rigid dichotomizing into fixed categories--''need for categorization"

(b) seeking for certainty and avoiding ambiguity--""'the "need for certainty"

(c) inability to allow for the co-existence of positive and negative features in the same object. . . "good" and "bad" traits in the same person

(d) acceptance of attitude statements representing a rigid white-black view of life

(e) a preference for the familiar over the unfamiliar

(f) a positive rejecting of the different or unusual

(g) resistance to reversal of apparent fluctuating stimuli

(h) the early selection and maintenance of one solution in a perceptually ambiguous situation

(I) premature closure (Bochner, 1965, p. 394)

Secondary characteristics listed by Bochner (1965) were:

"(a) authoritarian

(b) dogmatic

(c) rigid

(d) closed minded

(e) ethnically prejudiced

(f) uncreative

(g) anxious

(h) extra-punitive

(I) aggressive" (Bochner, 1965, p. 394)

This review of the literature will attempt to utilize (as much as possible, according to support justified to the category, by the literature) Bochner's (1965) framework. Furnham and Ribchester (1995) concluded that intolerance of ambiguity is a cognitive and perceptual process preferred by some individuals, while it serves as a personality trait for others.

Seeking for Certainty and Avoiding Ambiguity

Hamilton (1957) attempted to ascertain whether there were "consistent individual differences in response to a variety of ambiguous situations" (Hamilton, 1957, p. 201). Through eleven tests of ambiguity, he found a large percentage of significant correlations

at the $p<.01$ and $p<.05$ level. He posited that the control of ambiguity and uncertainty (the object of the constant perceptual attitude functioning in all the situations) was functioning at a level that indicated a central principle of personality organization or motivational need. In another study, he found that hysteric and obsessional patient subjects were more intolerant of ambiguity than were anxiety state subjects, and all such patients were more intolerant of ambiguity than were the control group. He stated that, "Avoidance of ambiguity as a principle and expression of cognitive control is found in association with a relatively high degree of total anxiety, but particularly where the principal defense mechanism adopted by the individual to cope with anxiety and conflicts is repression. This mechanism leads the individual to deny reality rather than acknowledge it. It becomes generalized to the perceptual field of operation, where by negative methods of limiting and restricting the individual's field of awareness and behavior, it tends to lead to the avoidance of responses which might result in uncertainty and anxiety, on account of the degree of perceptual conflict, equivocality and unstructuredness inherent in such situations. By avoiding ambiguity, the Neurotic person, and the Conversion Hysteric and Obsessional in particular, would appear to avoid both subjective uncertainty and conflictful situations. By avoiding uncertainty and conflict, the individual would appear to avoid further anxiety" (Hamilton, 1957, p. 213).

Keinan (1994) studied 174 randomly selected Israeli citizens who were either exposed (or not exposed) to missile attacks during the Gulf war from the cities of Ramat Gan, Tel Aviv, Jerusalem, and Tiberias. The subjects were administered a magical thinking questionnaire. It contained sixteen items divided into four categories containing ,

"items representing the law of similarity. . . items representing the law of contagion. . . items representing superstitious beliefs. . . control items that did not represent magical thinking" (Keinan, 1994, p. 50). Keinan states that, the law of contagion "holds that things that have one been in contact with each other may influence or change each other for a "period extending well past the termination of contact" (Keinan, 1994, p. 48). The law of similarity "holds that things that resemble one another share fundamental properties" (Keinan, 1994, p. 48). In addition, the questionnaire also included MacDonald's (1970) tolerance of ambiguity scale, and a self-report questionnaire. Utilizing multiple regression with stress level and tolerance of ambiguity as the independent variables, tolerance of ambiguity was a significant main effect found, which indicated that more frequent magical beliefs were found in subjects with lower tolerance of ambiguity than were found in those with more tolerance. This difference in levels also held true during high and low stress conditions, with both tolerance levels exhibiting more frequent magical thinking under high stress conditions. A significant interaction was detected between the two independent variables, which might suggest that the more intolerant person employs magical thinking (as operationalized by the questionnaire) as the means to resolve ambiguous situations into situations that are less ambiguous, or more certain.

Preference for the Familiar over the Unfamiliar and Positive Rejecting of the Different or Unusual

Using Australian subjects, Feather (1967) discovered that subjects' choice of booklets (of differing views in regard to the Vietnam war) varied according to their

intolerance of ambiguity levels. Those with high intolerance (Budner, 1962) choose booklets that converged with their beliefs (measured by a 24-item attitude questionnaire); there were no such preferences among the low intolerance group (difference between groups significant at the $p < .05$ level). Feather concluded that the highly intolerant individual is more likely to search for information congruent with his or her attitude. In 1969, Feather employed a group of American subjects in a similar study. Subjects rated the degree and direction of their interest in reading four sets of information (each combining two levels of novel arguments with two levels of sign--pro versus con arguments toward American intervention in South Vietnam). Measures were taken of their attitudes toward American intervention(measured by an eight-item attitude scale), intolerance of ambiguity (Budner, 1962) and dogmatism (Form E of the Dogmatism Scale). A highly-significant interaction was found between intolerance of ambiguity and consistent attitudes ($p < .01$) and between dogmatism and consistent attitudes ($p < .01$). Those with high intolerance and high dogmatism scores (in contrast to those with low scores) preferred information consistent with their beliefs. Significant interactions were found between intolerance of ambiguity and novelty, and between dogmatism and novelty ($p < .05$). Those with high intolerance and high dogmatism scores tended to prefer familiar (in contrast to novel) information. Results of both studies support the conclusions that highly intolerant and highly dogmatic people tend to prefer familiar information consistent with their attitudes.

McPherson (1983) discovered that subjects with low tolerance for ambiguity (MacDonald, 1970) were more likely to seek supportive information than high-tolerance

subjects ($p < .04$). However, the hypothesis that the greatest support-seeking behavior would result when a conceivable threat to self-esteem was put together with low information utility reached significance only for high-tolerance subjects only ($p < .05$). Therefore, for the high-tolerant subjects only, utility compensated for the consequences of threat.

Tolerance for ambiguity in children has been the focus of several studies. Muuss (1960) discovered that children (sixth graders) who scored higher in a causal orientation to their social environment (they were more able to understand how human behavior operates) were more tolerant of ambiguity than those with a low-causal orientation score. Harrington, Block, and Block (1978) exercised three studies that evaluated tolerance of ambiguity in children. At 3 ½ years, children intolerant of ambiguity (in relation to those tolerant of ambiguity as measured by their teachers trained in psychological evaluation) delayed entering within, restricted their behavior within, inflicted noncreative structure upon, and prematurely withdrew from these ambiguous situations. The authors stated that intolerance of ambiguity can be measured reliably and with validity in children at the age of 3 ½ years. This level of ambiguity remains stable for both sexes through the age of 4 ½ years, and from that age to 7 years of age in boys. They explained that intolerance for ambiguity is valuable in revealing individual differences in approach-avoidant responses of preschool children to new and ambiguous situations, that it is strongly associated with and may be evidence of a higher order personality construct that they term ego resiliency, and may be inspired by and/or may influence parents' child-raising perspectives and teaching behaviors.

Raphael and Xelowski (1981) found that girls who dropped out of a study were less tolerant of ambiguity, using Budner's (1962) scale, than girls who remained. Raphael and Chasen (1980) initially found that low tolerance for ambiguity was significantly related to staying at home (versus away) and to aspirations toward a traditional vocation, but was negatively related to socio-economic level in girls in their senior year of high school. However, when the effects of intelligence were removed, only the findings for preference for a traditional occupation remained significant. Tatzel (1980) discovered that tolerance for ambiguity, using Budner's (1962) questionnaire, in adult college students significantly correlated with faculty's ratings of students on elements theoretically related to such tolerance (desire for structure, receptivity to new ideas, and stability in life).

Acceptance of Attitude Statements Representing a Rigid White-Black View of Life as well as the Early Selection and Maintenance of One Solution in a Perceptually Ambiguous Situation

Frenkel-Brunswik (1948) collected several samples of data from 1500 public school children in California (ages of 11--16 years). He discovered that highly-racially prejudiced children exhibited high levels of intolerance of ambiguity, distortion of reality, and rigidity. These same children tended to agree with statements contained in a personality inventory devised to disclose "a dichotomizing attitude, a rejection of the different, or an avoidance of ambiguities in general" (Frenkel-Brunswik, 1948, p. 123). Next, the author set up experiments utilizing as subjects a lower middle-class social group living within a boundary set up by statute. In one of these experiments (in which pictures of a dog turned into a cat through a progressive set of picture cards), prejudiced subjects

tended to fixate longer on the first card and reacted slower to the changing cards. As a result of this, and other case studies cited, the author stated that "intolerance of ambiguity must be related to a reluctance to think in terms of probabilities and preference to escape into whatever seems definite and therefore safe" (Frenkel-Brunswik, 1948, p. 130). As a result, the intolerant person endeavors to categorize details into as few categories as possible. In the process, many relevant details are excluded, and many nonrelevant details are included. The author concluded that there is " a prevalence of premature reduction of ambiguous cognitive patterns to certainty in the prejudiced subjects, as revealed by a clinging to the familiar, or by a superimposition of one or many distorting cliches upon stimuli which are not manageable in a more simple and stereotyped fashion" (Frenkel-Brunswik, 1948, p. 140), and that intolerance of ambiguity is related to rigid stereotyping (Frenkel-Brunswik, 1948).

Authoritarian

Positive correlation between intolerance of ambiguity and authoritarianism has been supported by many studies. Million (1957) studied the relationship between intolerance of ambiguity (measured by number of trials to form a norm), rigidity (measured by extent of shift from a prior norm), and authoritarianism (measured by the California F scale) in autokinetic experiments under ego- and task-involving conditions. According to Million, Frenkel-Brunswik's belief that authoritarians were ambiguity-intolerant was supported (authoritarians formed norms under both ego- and task-orienting conditions)($p<.001$).

In a study of subjects from India, Bhushan discovered that leadership preference (a 30-item Likert scale) related to authoritarianism and intolerance of ambiguity ($p < .01$). Those with high authoritarianism and intolerance for ambiguity scores preferred authoritarian leadership to democratic leadership (Bhushan, 1970). Pawlicki and Almquist (1973) found that there was a significant difference between members of a women's liberation group and college female nonmembers. The members possessed a more favorable attitude toward the Women's Liberation Movement ($p < .001$), a lower level of authoritarianism (measured by the F-scale) ($p < .001$), a feeling of being more in control of their environment ($p < .006$), and were more tolerant of ambiguity (measured by the Rydell-Rosen Tolerance of Ambiguity Scale) ($p < .003$) than were the nonmembers.

Ethnically Prejudiced

Two early studies evaluated the relationship between intolerance of ambiguity and ethnocentrism. Block and Block (1950), measured intolerance for ambiguity by using an autokinetic effect (utilizing a fixed source of light) to calculate the time in which subjects formed a frame of reference, and measured ethnocentrism through the exercise of the Berkeley Ethnocentrism scale. They found that ambiguity intolerance was positively associated with the magnitude of ethnocentrism ($p< .01$). Continuing this line of inquiry, O'Connor (1952) examined the relationship between ethnocentrism, intolerance of ambiguity, and abstract reasoning ability. Ethnocentrism was measured by the California E scale, intolerance of ambiguity was calculated by the Walk's scale, and abstract reasoning ability was gauged by responses received to a syllogism scale. A relationship was found between ethnocentrism and the other two variables--intolerance of ambiguity

and a relatively poor ability to reason abstractly. However, there was no relationship between intolerance of ambiguity and abstract reasoning ability other than the mutual proclivity to vary with the degree of ethnocentrism.

Uncreative and/or Cognitively Simplistic

Bostic and Tallent-Runnels (1991) ran a factor analysis on scores obtained from ninety-nine public school students in the eleventh grade from three high schools in a large southwestern school district utilizing seven commonly used measures of cognitive style (including MacDonald, 1970). Three factors emerged: a slow, deliberate, methodical thinking style factor, an integration of new information with old information factor, and an independent, multidimensional thinking factor. This last factor is the factor into which MacDonald's scale item's loaded, as well as scores obtained from a group embedded figures test and a test which measures cognitive complexity versus simplicity. This factor was termed a flexibility versus rigidity factor.

Rotter and O'Connell (1982) investigated the relationship between cognitive complexity, intolerance of ambiguity (Budner, 1962), and sex roles. Male and female androgynous and cross-sexed subjects had more tolerance of ambiguity than did sex-typed subjects ($p < .001$ for androgynous, $p < .05$ for cross-sexed), and were more cognitively complex than undifferentiated subjects. More cognitively complexity was found in cross-sexed subjects than sex-typed subjects. There was a negative correlation between cognitive complexity and intolerance for ambiguity (as intolerance of ambiguity decreases, cognitive complexity increases) ($p < .01$).

The relationship between intolerance for ambiguity and dissonance reduction has been studied by some authors. In an experiment by Shaffer, Hendrick, Regula, and Freconna (1973), a number-circling task (differing in effort required) was completed by subjects (who varied in level of intolerance for ambiguity as measured by Budner's 1962 scale). Differences in levels of intolerance for ambiguity were related to differences in endeavors to reduce dissonance; subjects with low levels of intolerance for ambiguity enhanced the high effort task ($p < .05$ for task interest and enjoyment). The opposite was true for high intolerance subjects who assessed the low effort task as more interesting and enjoyable. Another study utilized a similar task (Shaffer and Hendrick (1974). Low-ambiguity intolerant subjects (MacDonald, 1970) enhanced the high-effort task more than the high-intolerant subjects ($p < .05$ for task enjoyment, and $p < .10$ for task interest). High-ambiguity intolerant subjects viewed both task levels as boring, and attempted to reduce dissonance through the derogation of the experiment as well as the experimenter much more than the low-intolerance subjects ($p < .001$). The purpose of the dissonance-reducing mechanism was to depreciate their (the subjects') efforts in order to make them equate with boring task completion. Results for both experiments report the same findings for low-ambiguity intolerant subjects, but the dissonance-reduction mechanisms differed among experimental conditions for high-ambiguity intolerant subjects.

Ebeling and Spear (1980) found that high-ambiguity tolerance (Budner, 1962) subjects performed significantly better on ambiguous and nonambiguous tasks than those with low-ambiguity tolerance. This study's results differ from those of Shaffer, Hendrick, Regula, and Freconna (1973), and Shaffer and Hendrick (1974) in that subjects with low

tolerance for ambiguity rated the more ambiguous task as easier, more enjoyable, reported that they performed better on it, and were more satisfied with their performance on it than the less ambiguous task (no change in results for those with high ambiguity tolerance).

Tegano found that high tolerance for ambiguity (MacDonald, 1970) ($p < .01$) and playfulness ($p < .001$) correlated with creativity (Myers-Briggs Creativity Index) (Tegano, 1990). Tolerance for ambiguity (measured by the Rorschach test) was related to self-actualization in a study by Foxman (1976). Higher tolerance for ambiguity was found in those with high self-actualization (versus those with low self-actualization).

Hoover, (1992) administered three instruments (Budner's 1962 scale, a creative thinking scale, and a formulating hypothesis scale) to 40 students who had finished the fifth grade and were enrolled in a gifted student's summer school program. Tolerance for ambiguity results did not relate significantly to either of the other two scales. Scores obtained in the study were compared to a prior study of ninth grade students. No significant differences were found in tolerance for ambiguity levels of the two groups of students. When subscores of the present study were included in a principal components factor analysis with varimax rotation, tolerance for ambiguity subscores combined with scores obtained from the mean best quality measure subscores (which were the average overall pages of the responses in which the subjects indicated were their best responses).

Feather (1964), in a study of male college students, discovered a significant positive correlation between evaluating syllogisms (arguments) with a consistent proreligious attitude and both intolerance of ambiguity (Budner, 1962) and dogmatism. A significant negative correlation was found between intolerance of ambiguity and critical

ability scores. Subjects with a consistent anti-religious attitude had a significantly higher critical ability score and a significantly lower intolerance of ambiguity score than the proreligious subjects.

Anxious

Two groups of subjects (stressful versus security experimental conditions) were administered a series of five picture-recognition tasks (15 cards per task--ambiguous to fully emerged), with the trial of correct recognition (of the picture) and the trial of first response (how many cards until first response obtained) recorded (Smock, 1955). It was hypothesized that psychological stress would result in increased intolerance for ambiguity, and this was supported by generally significant differences between the two groups (borderline statistical significance at $.10 > p > .05$ for the first response trial, and $p < .001$ for the correct response trial). These results were explained as a function both of premature closure responses made by such subjects and their proclivity to hold to such initial responses under conditions of stress. The other hypothesis--that experimental learning tends to decrease intolerance of ambiguity was supported (significant at $p < .001$ level for differences between series 1 and series 5 for first response, and at the $p < .001$ for correct response). Therefore, psychological stress generally results in intolerance for ambiguity, and experimental learning tends to decrease intolerance of ambiguity.

Shavit (1975) found a significant interaction between tolerance (Budner, 1962) and locus of control ($p < .05$) in an experiment in which subjects were exposed to incongruence involving self-deprecation. Lower levels of distress, compliance, and defensive projection indicated more ego strength. Distress was highest among external-

tolerant and less within the internal-tolerant group. Agreement (compliance) as well as projection was highest among the internal-intolerant and external-tolerant, and lowest among the internal-tolerant.

According to Furnham and Ribchester (1995), tolerance for ambiguity seems to have clinical applicability to such psychotherapeutic techniques as mediation, hypnosis, relaxation training and yoga. An individual's tolerance for ambiguity level may serve as a baseline as shifts are made to varied levels of consciousness. Evaluation of tolerance for ambiguity may also be made to filter out those people who are not able to deal with this type of consciousness change.

Summary of Intolerance (Tolerance) for Ambiguity Characteristics:

In summary, support was found for some of the categorizations found in Bochner's (1965) framework. This framework, which was originally formulated for intolerance of ambiguity only, will also be utilized to summarize some of the characteristics of tolerance for ambiguity, because both have been the subject of many studies. Under the category "seeking for certainty and avoiding ambiguity" (Bochner, 1965, p. 394), Hamilton (1957) found individual differences in the avoidance (or nonavoidance) of ambiguous situations in a sample of control and neurotic subjects. Keinan (1994), in a study of randomly selected Israeli citizens who were exposed (not exposed) to missile attacks during the Gulf war discovered more frequent magical beliefs in subjects with lower tolerance for ambiguity than were found in those with more tolerance.

Bochner's (1965) category "preference for the familiar over the unfamiliar and positive rejecting of the different or unusual" (Bochner, 1965, p. 394) was supported by research. Feather (1967), Feather (1969), and McPherson (1983) found that subjects intolerant of ambiguity preferred information that was consistent with their attitudes. Muuss (1960) discovered that children (sixth graders) who scored higher in a causal orientation to their social environment (they are were more able to understand how human behavior operates) were more tolerant of ambiguity than those with a low-causal orientation score. Harrington, Block, and Block (1978) evaluated tolerance of ambiguity in children. They found that intolerance for ambiguity can be measured reliably and with validity in children at the age of 3 ½ years, and that it is valuable in revealing individual differences in approach-avoidant responses of preschool children to new and ambiguous situations. (Raphael and Xelowski (1981) found that girls who dropped out a study were less tolerant of ambiguity than girls who remained. Raphael and Chasen (1980) found that low tolerance for ambiguity was significantly related to aspirations toward a traditional vocation by women. Tatzel (1980) discovered that tolerance for ambiguity in adult college students significantly correlated with faculty's ratings of students on elements theoretically related to such tolerance (desire for structure, receptivity to new ideas, and stability in life).

"Acceptance of attitude statements representing a rigid white-black view of life as well as the early selection and maintenance of one solution in a perceptually ambiguous situation" (Bochner, 1965, p. 394) represents another category of Bochner (1965) which has been confirmed by research. Frenkel-Brunswik (1948), utilizing data collected from

several samples of public school children, found highly-racially prejudiced children exhibited high levels of intolerance of ambiguity, distortion of reality, and rigidity. These children agreed with statements devised to disclose a "dichotomizing attitude, a rejection of the different" (Frenkel-Brunswik, 1948, p. 123). The author concluded that, "intolerance of ambiguity must be related to a reluctance to think in terms of probabilities and preference to escape into whatever seems definite and therefore safe" (Frenkel-Brunswik, 1948, p. 130).

The secondary characteristic of tolerance of ambiguity, "authoritarian" (Bochner, 1965, p. 394) is supported by several research studies. Million (1957) found that authoritarians were ambiguity-intolerant in autokinetic experiments under ego- and task-involving conditions. Bhushan (1970) discovered that leadership preference related to authoritarianism and intolerance of ambiguity. Those with high authoritarianism and intolerance for ambiguity scores preferred authoritarian leadership to democratic leadership. Pawlicki and Almquist (1973) found that there was a significant difference between members of a women's liberation group and college female nonmembers, in that the members possessed a more favorable attitude toward a lower level of authoritarianism, and were more tolerant of ambiguity than were the nonmembers.

The "ethnically prejudiced" secondary characteristic of Bochner (1965, p. 394) found support in two studies. Block and Block (1950) found that ambiguity intolerance was positively associated with the magnitude of ethnocentrism. O'Connor (1952) discovered a relationship between ethnocentrism and intolerance of ambiguity as well as a

relatively poor ability to reason abstractly. However, there was no relationship between intolerance of ambiguity and abstract reasoning ability other than the mutual proclivity to vary with the degree of ethnocentrism.

The "uncreative and/or cognitively simplistic" secondary characteristic of Bochner (1965, p. 394) has been addressed by many studies. Bostic and Tallent-Runnels (1991) found through factor analysis, that MacDonald's (1970) tolerance for ambiguity scale loaded on a factor that was a multidimensional thinking factor. Rotter and O'Connell (1982) discovered a negative correlation between cognitive complexity and intolerance for ambiguity (as intolerance of ambiguity decreases, cognitive complexity increases). The relationship between intolerance for ambiguity and dissonance reduction has been studied by some authors, with mixed results (Ebeling and Spear, 1980; Shaffer and Hendrick, 1974; and Shaffer, Hendrick, Regula, and Freconna, 1973). Tegano found that high tolerance for ambiguity and playfulness correlated with creativity (Tegano, 1990). Tolerance for ambiguity was shown to be related to self-actualization; higher tolerance for ambiguity was found in those with high self-actualization (versus those with low self-actualization) (Foxman, 1976). Hoover(1992) discovered, through factor analysis, that tolerance for ambiguity subscores combined with scores obtained from the best responses of students. Feather (1964), in a study of male college students, discovered a significant positive correlation between evaluating syllogisms (arguments) with a consistent proreligious attitude and both intolerance of ambiguity (Budner, 1962) and dogmatism. A significant negative correlation was found between intolerance of ambiguity and critical ability scores (Feather, 1964).

The "anxious" secondary characteristic of Bochner (1965, p. 394) was supported by the studies of Smock (1955) and Shavit (1975). Smock (1955) found that psychological stress resulted in increased intolerance for ambiguity and that experimental learning decreases intolerance of ambiguity. Shavit (1975) found a significant interaction between tolerance (Budner, 1962) and locus of control in an experiment in which subjects were exposed to incongruence involving self-deprecation. Lower levels of distress, compliance, and defensive projection indicated more ego strength. Distress was highest among external-tolerant and less within the internal-tolerant group. According to Furnham and Ribchester (1995), tolerance for ambiguity seems to have clinical applicability to such psychotherapeutic techniques as mediation, hypnosis, relaxation training and yoga.

Tolerance of Ambiguity and Organizations

Harlow (1973), in a study of ninety-eight graduate engineers and engineering managers, predicted that promotional preference (the desire to attain the job of their immediate supervisor, should it become available) would be negatively related to tolerance for ambiguity (Budner, 1962) for those engineers with high job satisfaction. Instead, she found a significant positive relationship between desire for promotion and tolerance for ambiguity. However, in a separate test of thirty-three graduate engineers who managed engineers, the hypothesis was confirmed.

Keenan and McBain (1979), in a study of middle managers in a large public organization, discovered a significant negative relationship between tolerance of ambiguity (Budner, 1962) and job satisfaction in a job with role ambiguity (person has insufficient

information to perform a job adequately). A significant positive relationship was found between tolerance of ambiguity and tension in a job with role ambiguity. Stronger relationships were found between these variables and those subjects intolerant of ambiguity. However, these relationships did not reach statistical significance.

Lysonski and Andrews (1990), in a study of 166 product managers in the consumer-packaged goods industries (those listed in the Fortune 500), posited that role autonomy, need for affiliation and tolerance of ambiguity (measured by a subset of Budner, 1962, scale items) would moderate the relationship between role pressures (role conflict and role ambiguity) and personal outcomes (job satisfaction, job-related tension, and perceived performance). Tolerance for ambiguity was not found to moderate any of the above relationships. However, tolerance for ambiguity had a main effect on job satisfaction. Lysonski and Durvasula (1990) attempted to replicate the above study. Sixty-seven product managers of New Zealand Telecom (a former monopoly of government telecommunications in New Zealand) were used as subjects. Identical tests and statistical procedures utilized in the prior study were also employed in this study. In this study, unlike the results of the prior study, the role ambiguity-job-related tension relationship was moderated by tolerance of ambiguity. The authors state that moderating properties of role autonomy, need for affiliation, and tolerance of ambiguity might be situation-specific and therefore, not generalizable to all settings. However, an alternate explanation might concern the tool used in the study, Budner's (1962) scale, which does not have high reliability.

Frone (1990) employed meta-analysis on seven intolerance of ambiguity moderator studies. He discovered that there was a statistically stronger positive relationship between role ambiguity and indices of strain with high intolerance of ambiguity employees than with those who had low intolerance of ambiguity (IE. tolerance of ambiguity is a moderating variable between role ambiguity and indices of strain). Frone remarked that in order to counteract the problems of role ambiguity, organizations need to avoid placing employees who are very intolerant of ambiguity into positions that are high in role ambiguity. He stated that this might be attained through the measurement of tolerance for ambiguity in the selection of employees and through training managers to be sensitive to the effects of tolerance of ambiguity.

Roskin and Margerison (1983), in a study of 36 British managers participating in a management training seminar, found no significant relationship between tolerance of ambiguity (Budner, 1962) and managerial effectiveness (measured by consensus of the manager's subordinates in simulation training). However, this was a small study and may not be generalizable to all organizations. Ashford and Cummings (1985), in a study of 172 employees from the marketing department of a public utility, found a significant positive association between the frequency of feedback-seeking behavior and the perceived ambiguity in the respondents' job. Tolerance for ambiguity was found to moderate the relationship between role ambiguity and contingency uncertainty (the person's encountered uncertainty between his/her current job performance evaluations and second-order outcomes) and the resultant feedback-seeking behavior of employees. The more ambiguity intolerant (Norton, 1975) the individual in a highly ambiguous role was,

the more he/she would seek feedback. The more ambiguity intolerant the individual in an uncertain context was, the more he/she would seek feedback. Bennett, Herold, and Ashford (1990) reanalyzed data from the Ashford and Cummings (1985) study noted above. Tolerance for ambiguity loaded on two factors (job-related and problem-related) in a factor analysis performed in the prior study. Ashford and Cummings suggest that separate use of the tolerance for ambiguity factors is needed. Their study found job-related tolerance for ambiguity was significantly negatively related to solicited feedback on performance from a supervisor, solicited feedback on performance from co-workers, gleaned feedback on performance, solicited feedback on potential from a supervisor, solicited feedback on potential from co-workers, gleaned feedback on potential, role ambiguity, and contingency uncertainty. Not as many relationships were found for the other measure of tolerance for ambiguity. Problem solving tolerance for ambiguity was significantly negatively related to role ambiguity and contingency uncertainty. It was also only found to be significantly negatively related to gleaned feedback on performance and significantly positively related to solicited feedback on potential from a supervisor. Using multiple regression, the authors of the study also found that more job-related tolerance for ambiguity resulted in significantly less feedback-seeking behavior on performance solicited from supervisors as well as gleaned, and significantly less feedback-seeking behavior on potential solicited from supervisors as well as gleaned. When utilizing problem-solving tolerance for ambiguity as an independent variable, the only significant result found was a negative relationship with feedback-seeking behavior on potential that was gleaned.

Summary of Tolerance for Ambiguity in Organizations:

Some relationships have been found between desire for promotion and tolerance for ambiguity. Harlow (1973), in a study of ninety-eight graduate engineers and engineering managers, found a significant positive relationship between desire for promotion and tolerance for ambiguity. However, in a separate test of thirty-three graduate engineers who managed engineers, she found a negative relationship between these variables.

Relationships have been found between tolerance for ambiguity and jobs with role ambiguity. Tolerance for ambiguity had a main effect on job satisfaction of people in organizations (Lysonski and Andrews, 1990), and such tolerance has moderated the role-ambiguity-job-related tension relationship of employees (Lysonski and Durvasula, 1990). It was found that tolerance of ambiguity is a moderating variable between role ambiguity and indices of strain (Frone, 1990), and has been found to moderate the relationship between role ambiguity and feedback-seeking behavior (Ashford and Cummings, 1985). Norton (1975) found that the more intolerant of ambiguity that an individual was, the more likely he/she would seek feedback.

Roskin and Margerison (1983) found no significant relationship between tolerance of ambiguity (Budner's scale, 1962) and managerial effectiveness. However, this was a small study and may not be generalizable to all organizations. In addition, the scale used does not have high reliability (Budner, 1962).

Questionnaire Measures of Tolerance of Ambiguity

Walk's A Scale was one of the first tests utilized to measure tolerance of ambiguity, and was first published by O'Connor (1952). This scale contains eight items, with responses marked on a seven-point continuum, based on the direction and strength of perspectives. This scale has been used to study the relationship between tolerance of ambiguity and ethnocentrism (O'Connor, 1952), and authoritarian-submission (Kenny and Ginsberg, 1985). The internal reliability of the instrument has been called into question by Ehrlich (1965), who states that it has "virtually no internal consistency" (Ehrlich, 1965, p. 591), and concluded that "further uses of Walk's A Scale as an unitary measure of 'intolerance of ambiguity' are not warranted' (Ehrlich, 1965, p. 594). Indeed, from 66 correlations among 12 measures of tolerance of ambiguity (including Walk's scale), only seven were found to be significant ($p < .05$) in a study made by Kenny and Ginsberg (1985).

At approximately the same time that Walk's scale was being developed, other scales were generated, including some in which little psychological measurement was performed. One early test developed, that measured tolerance of ambiguity, was that of Budner (1962). His test consisted of 16 items. Data was derived from 17 small samples ($n=15$ on the lowest sample size, to $n=88$ on the largest sample size). It appears to be free of acquiescent and social desirability response bias. However, the mean of the scales computed by Cronbach's alpha formula was 0.49, which indicates the scale is not a very reliable measure of tolerance of ambiguity.

Another of the tests developed that measured tolerance for ambiguity was generated by Rydell and Rosen (1966). This 16-item scale was developed as an addition to a prior test scale (Self-Other Test, Form B). According to the authors, it exhibits viewpoints toward "social situations, chance events, and problem-solving situations." In a test (Self-Other Test, Form C, of which the tolerance for ambiguity scale is a part) given to 105 male university students, significant positive product-moment correlations (at the $p < .05$ level) were found between tolerance for ambiguity and cognitive bookworm (involves book reading, and shows a high value placed on theoretical and abstraction knowledge), enthusiastic intellectual scale (this places trust in reason and enjoys pursuits of the intellect), and intellectual lie scale (also called overdriven, compulsive, defensive cognizer). Significant negative product-moment correlations (at the $p < .05$ level) were found between tolerance for ambiguity and self-confident intellectualism (shows a need for freedom to follow cognitive pursuits, as well as displays cognitive self-confidence, and a possibly disdainful attitude toward others), social anti-intellectualism and religious anti-intellectualism (both of which are to engender the expression of not only anti-cognitive, but anti-intellectual activity), and incurious dependence (this is basically similar to the prior anti-intellectual items, but is a slothful, rather than social or religious way of seeing things). Test-retest correlations for this sample after a two-month interval were 0.57, and were 0.71 for 41 male university students after a one-month interval.

In a second test, an initial sample (n=100) was given Form B of the Ambiguity scale. A second sample (n=41) was administered the Self-Other Test, Form C. In Form B, tolerance for ambiguity significantly correlated positively with Cognitive Bookworm

and negatively with Social Anti-intellectual, both at the $p < 0.01$ level. In Form C, the same results occurred, except that the Social Anti-intellectual finding was only significant at the $p < 0.05$ level. There was also a significant positive correlation between tolerance of ambiguity and the theories and relationships scale (measures cognitive motivation, the person likes to figure things out, etc.) ($p < 0.01$ level), and enthusiastic intellectual scale ($p < 0.05$ level). There was a significant negative correlation between tolerance for ambiguity (at the $p < .05$ level) and religious anti-intellectualism. These results tend to associate positively the tolerance of ambiguity with a cognitive orientation and negatively with its reverse, an anti-cognitive orientation. Rydell (1966) used this test and found significant differences between mean semantic scale ratings made by low tolerance for ambiguity subjects and high tolerance for ambiguity subjects ($p < .001$).

A. P. MacDonald, Jr. (1970) developed a 20-item ambiguity tolerance test (AT-20), which included 16 items from the Rydell-Rosen (1966) test, and added four more items. This test has good measurement characteristics; it has shown a coefficient of internal consistency of 0.86 ($r = .73$ when using the more conservative Kuder-Richardson Formula 20) in a sample of 74 female undergraduate students at Cornell University. Later, when administered to 789 undergraduate students at Ithaca College, an r of 0.63 (K-R 20) resulted. Retest reliability (for a group of 24 male undergraduate students) has been estimated at 0.63. Correlations have been found between tolerance for ambiguity using this test, and performance in ambiguous tasks (scrambled words test). This test (AT-20) has been shown to relate to dogmatism, rigidity, and church attendance. It also has been shown to be free from social desirability response bias.

Norton (1975) developed the MAT-50 scale because, he stated, such scales as Budner (1962), Rydell and Rosen (1966), and MacDonald (1970) contained problems such as "low internal reliability and the absence of adequate validity evidence" (Norton, 1975, p. 607). The MAT-50 was exposed to tests seven times in order to develop high reliability. An *r* of .88 was generated as the internal reliability (K-R20) for the seventh version of this scale. An *r* of .86 was produced as the test-retest reliability after a period of 10 to 12 weeks. Norton tried to achieve three types of validity: content validity (through content analysis and subjective analysis by 20 subjects), criteria-related validity (through comparison to other measures of tolerance for ambiguity, and measures of dogmatism and rigidity), and construct validity (through results from four empirical studies). The latest version of the MAT-50 is fairly long; the example illustrated in pages 616-618 contains 61 items.

Bhushan and Amal (1986) created a situational test of intolerance of ambiguity in India. This is a 40-item test which utilizes ambiguous situations (either novel or complex), and uses one of the four modes of demonstrating intolerance of ambiguity in the statement. Subjects are to indicate whether such statement was true for him (her), and to what extent. After a four week time period, the test-retest reliability was 0.79. Content validity was established through content analysis by a panel of experts. Concurrent validity was confirmed by correlation with other tests for tolerance of ambiguity. Construct validity was established through correlations with rigidity and authoritarianism.

McLain (1993) developed a new 22-item scale, the MSTAT-1, to measure tolerance of ambiguity in response to the poor psychometric weaknesses of other such

scales. The 22 items resulted from an initial pool of 40 items. The resulting scale was distributed to 148 undergraduate organizational behavior students at a Midwestern medium-sized university. A factor analysis indicated one single dimensional factor. Convergent validity was obtained by correlating its results with those of three other scales of tolerance for ambiguity (significant at the $p < .05$ level). Some nomological validity was obtained. Its scale item scores displayed a significant positive correlation with willingness to take risks ($p < .05$ level), as well as receptivity to change ($p < .05$ level), and a negative correlation with dogmatism ($p < .05$ level). However, McLain was not able to obtain a significant correlation of his instrument with cognitive complexity. This lack of robustness, he explains, could possibly have been due to the poor reliability of the cognitive complexity scale utilized.

Several authors have sought to analyze the various measures of tolerance for ambiguity, including Kirton(1981). Kirton states that reviews of the literature for tolerance of ambiguity "have shown that the concept has become overextended and its elements remain unsupported by the confused data collected, and scales with inadequate psychometric performance have been used" (Kirton, 1981, p. 407). Subjects ($n = 562$) completed Budner's (1962) scale, and MacDonald's (1970) scale, along with scales that assessed dogmatism, inflexibility, conservatism, hostility, neuroticism, and extraversion. After disappointing results, items that did not distribute more than 80-20% were discarded. As a result, Budner's (1962) scale lost 9 items, and MacDonald's (1970) scale lost 9 items. The shortened scales improved internal reliability (Budner, from a K R-20 of 0.49 to 0.65; MacDonald, from a K R-20 of 0.62 to 0.71) as well as achieved more

consistent results. Correlations between the two scales were high (0.56), but significantly higher than the other scales found in the correlation matrix. When all five tests (these two scales for tolerance for ambiguity as well as scales for dogmatism, inflexibility, and conservatism) were dealt with as five single items of a single scale, internal reliability reached 0.86. Kirton indicated that his study confirmed that dogmatism, inflexibility, and conservatism were related to tolerance for ambiguity. He states that scales should strengthen and illustrate their parent theories by demonstrating evidence that they include the elements specified by their theories, and by displaying assumed relationships with associations derived from such theories.

Furnham (1994) studied four measures of tolerance of ambiguity (Budner, 1962; Norton, 1975; MacDonald, 1970; and Walk in O'Connor, 1952) through content, correlational, and factor analysis. Two subjects were given all 101 items. Agreement was reached that there were 19 positive and 82 negative statements about ambiguity. Ten of the positive items contained statements considered to be neutral objective statements (many taken from Budner, 1962), and nine of such items were considered to be statements about self, which were taken mainly from Norton (1975). Almost 80% of the items were negative, and these negative items were split into three divisions, items about self (30 items), pathological anxiety statements (18 items), and neutral objective statements (14 items). A total of 5 major factors captured most of the items.

Coefficient alphas obtained were best for the long scales (Norton = 0.89, MacDonald = 0.78), and were just below 0.60 for the shorter scales. Intercorrelations between scales were all positive and significant, ranging from a high of 0.82 (accounting

for two-thirds of the variance) to a low of 0.44 (accounting for approximately one-fifth of the variance). All scales were factor-analyzed (with the exception of Norton, due to its 8-fold factor structure). Furnham states that each of the scales, which were purported to be unidimensional, were found to contain several factors. The MacDonald scale had 6 factors, the Walk scale had 3 factors, and the Budner scale had four factors. A higher-order factor analysis was ran on the 21 factors stemming from the four initial scales. The first factor had 6 of the 8 Norton and 2 MacDonald subscales that loaded on it (accounting for approximately one-third of the variance). The second factor (accounting for approximately one-tenth of the variance) contained 1 subscale from each of the four original scales, while the third factor (accounting for slightly less than one-tenth of the variance) had 3 subscales from MacDonald. Only approximately one-twentieth of the variance was explained by each of the other two factors, each of which contained 1 subscale factor from Walk, and one from Budner.

Furnham and Ribchester (1995) state that review of tolerance of ambiguity literature is made confusing because many studies have utilized different scales. They state that when findings fail to replicate (or show inferior results) using different scales, "one cannot be sure where the findings are not robust, whether the scales are indeed not measuring the same thing, or whether the measures are marked by construct irrelevancies and psychometric deficiencies" (Furnham and Ribchester, 1995, pp. 189-190). Any replications found in studies using different scales for tolerance of ambiguity is evidence of their hardiness. Only a few studies have tried to establish concurrent validation of the instruments used to measure tolerance of ambiguity (Furnham, 1994). This makes a

review of the literature problematic, because if findings are (or are not) replicated using different measures of tolerance for ambiguity, one does not know whether the "findings are not robust, whether the scales are indeed not measuring the same things, or whether the measures are marked by construct irrelevancies and psychometric deficiencies. . . the replication of a finding using different AT measures is a testament to their robustness (Furnham, 1994, p. 409).

Summary of Questionnaire Measures of Tolerance for Ambiguity:

The major questionnaire scales utilized to measure tolerance for ambiguity will now be summarized. Walk's A Scale was one of the first tests utilized to measure tolerance of ambiguity (O'Connor, 1952). It is short; it contains eight items, and has been used to study the relationship between tolerance of ambiguity and ethnocentrism (O'Connor, 1952), and authoritarian-submission (Kenny and Ginsberg, 1985). Furnham (1994) found that it had a coefficient alpha = 0.58.

Budner's (1962) scale consists of 16 items. It appears to be free of acquiescent and social desirability response bias. However, the mean of the scales computed by Cronbach's alpha formula was 0.49, which indicates the scale is not a very reliable measure of tolerance of ambiguity. Furnham (1994) shows a coefficient alpha of 0.59, which is slightly higher.

Rydell and Rosen (1966) derived a 16-item scale. Test results, using this instrument tend to associate positively the tolerance of ambiguity with a cognitive orientation and negatively with its reverse, an anti-cognitive orientation. Test-retest

correlations for this scale have been as high as 0.71 after a one-month interval (Rydell and Rosen, 1966). Rydell (1966) used this test and found significant differences between mean semantic scale ratings made by low tolerance for ambiguity subjects and high tolerance for ambiguity subjects.

A. P. MacDonald, Jr. (1970) developed a 20-item ambiguity tolerance test (AT-20), which included 16 items from the Rydell-Rosen (1966) test, and added four more items. This test has good measurement characteristics; it has shown a coefficient of internal consistency of 0.86 (r = .73 when using the more conservative Kuder-Richardson Formula 20). Retest reliability has been estimated at 0.63. Correlations have been found between tolerance for ambiguity using this test, and performance in ambiguous tasks (scrambled words test), and it has been shown to relate to dogmatism, rigidity, and church attendance. In addition, it has been shown to be free from social desirability response bias.

Norton (1975) developed the MAT-50 scale. An *r* of .88 was generated as the internal reliability (K-R20) for the seventh version of this scale. An *r* of .86 was produced as the test-retest reliability after a period of 10 to 12 weeks. Norton tried to achieve three types of validity: content validity (through content analysis and subjective analysis by 20 subjects), criteria-related validity (through comparison to other measures of tolerance for ambiguity, and measures of dogmatism and rigidity), and construct validity (through results from four empirical studies). The latest version of the MAT-50 is fairly long (61 items). Furnham (1994) found this scale had a coefficient alpha = 0.89.

Furnham and Ribchester (1995) state that review of tolerance of ambiguity literature is made confusing because many studies have utilized different scales. When findings fail to replicate (or show inferior results) using different scales, "one cannot be sure where the findings are not robust, whether the scales are indeed not measuring the same thing, or whether the measures are marked by construct irrelevancies and psychometric deficiencies" (Furnham and Ribchester, 1995, pp. 189-190).

Of the tests described above, that purport to measure tolerance for ambiguity, the AT-20, developed by MacDonald, Jr. (1970) appears to be one of the most reliable measurement instruments. It is short (20 items), has an *r* reported as high as 0.86, and retest reliability of 0.63. It also has exhibited construct validity when its score for tolerance of ambiguity was compared to scales measuring related subjects (dogmatism, rigidity, church attendance) and measuring performance of ambiguous tasks (MacDonald, Jr., 1970). Furnham (1994) obtained a coefficient alpha of 0.78 for this test. The only other tolerance for ambiguity measuring instrument that rates higher in reliability, and that has also been widely used is the MAT-50, whose latest version has 61 items (Norton, 1975). A coefficient alpha of 0.89 was established for this scale by Furnham (1994), and an $r = .88$ (K-R20) by Norton (1975). Because of its length, it was not utilized in the current study.

Evaluation of Cognitive Tests

Several of the tests utilized in the evaluation of tolerance of ambiguity have not been questionnaires, but rather have been either perceptual or cognitive tests (Draguns and Multari, 1961; Hamilton, 1957; Kenny & Ginsberg, 1958). Since tolerance for ambiguity

was envisioned by Frenkel-Brunswik as both a conceptual as well as a cognitive variable, many inquiries have been made into such tolerance through the implementation of either perceptual or cognitive tests. These tests have been subjected to the criticism that they have not related well to the construct itself. Bochner (1965) was one such critic, who, in evaluating Hamilton's work, stated that the type of task employed by Hamilton, rather than the theory for tolerance of ambiguity, was flawed (IE. results of the task could be construed as either evidence for or against tolerance for ambiguity). Another such criticism was aimed at Draguns and Multari (1961), whose task results, also could produce conflicted findings. Kinny and Ginsberg (1958), utilizing 12 measures of intolerance of ambiguity (including 2 questionnaire measures) found few intercorrelations between these measures. They concluded that there was little justification for a general construct of intolerance of ambiguity. Most of these measures of intolerance of ambiguity did not relate to authoritarian-submission.

Bochner (1965) sought to avoid many of the problems inherent in many of the above studies by inventing tasks of his own to measure tolerance for ambiguity. Though he admits that these tasks are not perfect, in their measurement of tolerance of ambiguity, it does appear that these are to be viewed as an improvement in such measurement. The two tasks developed were:

1. Need for categorization test. Attribute (a) 'need for categorization,' implies that in a situation in which there are no clear cut categories or classes, persons with a high need for categorization, when instructed to

classify the stimulus objects, will order them into *more* categories than persons with a low need for categorization.

2. Need for certainty test. Attribute (b) 'need for certainty,' implies that in a situation where there are no clear cut categories or classes, persons with a high need for certainty, when instructed to classify the stimulus objects, will take *more time* than persons with a low need for certainty." (Bochner, 1965, p. 397).

Kreitler, Maguen and Kreitler (1975) distributed 7 tasks producing 12 measures of intolerance for ambiguity and self-report measures of cognitive orientation to 45 subjects in three sessions. Through a review of the literature, they predicted, and found through cluster analysis of the major behavioral measures, that intolerance of ambiguity involves three behavioral clusters. The clusters discovered are as follows. They include one's being unwilling or unable to accept:

1. Situations with multiple interpretations
2. Situations which are not easily categorized, defined, or placed into one's familiar mode of cognition or experience
3. Situations which are contradictory, inconsistent, or conflictful

In the above study, results of cognitive orientation tasks (as shown by the three clusters) were confirmed, almost perfectly, to behavioral measures of intolerance of ambiguity (Budner, 1962; Rydell and Rosen, 1966; and Walk's Scale as per O'Connor, 1952). Of the three behavioral scales, only the behaviors tapped by Rydell and Rosen (1966) were predicted by all three cognitive orientation clusters. Perhaps this multi-

faceted structure found in intolerance for ambiguity helps in the interpretation of the conflicting findings generated by previous studies. As stated by Bochner (1965), "a concept such as 'intolerance of ambiguity' has ultimately no meaning apart from the procedures through which it is operationalized. . . Frenkel-Brunswik intuitively felt that intolerance of ambiguity had wide relevance as a descriptive and aetiological variable. The evidence for such generality is slight. This may be because existing measures are inadequate in one way or another, or because Frenkel-Brunswik's intuition was faulty" (Bochner, 1965, p. 399). It appears that most measures utilized have been inadequate, not capturing the full multi-dimensional character of tolerance for ambiguity. Because of this, study results have both conflicted and correlated with each other, which has been very problematic to those studying intolerance of ambiguity. However, now that this multi-dimensionality is known, it can be used to help interpret such findings.

Tolerance for Ambiguity and Vocations other than Accounting

Geller, Faden, and Levine (1990) made a cross-sectional study of medical students in their first four years of study. They found that tolerance for ambiguity (a modified version of the Budner, 1962, scale) levels did not differ significantly among years in medical school (however, the authors indicate that their sample may have been biased toward the stability of tolerance for ambiguity levels over the four years of school due to over representation of white females in the third year of school). Significant relationships were found between tolerance for ambiguity and both sex and age of entrance to medical school; men, nonwhite, and younger students at age of entry had a lower tolerance of ambiguity level. Also evaluated was the effect of tolerance for ambiguity on specialty

preference. Surgery students had a significantly lower tolerance for ambiguity than did medicine students; a similar relationship was found between surgery students and psychiatry students. Ob/gyn students had a lower tolerance for ambiguity than psychiatry students. The authors state that studies should be conducted at "other types of professional schools with a comparable age range of students to improve generalization of results" (Geller, Faden, and Levine, 1990, p. 623).

Another study of medical students was performed by DeForge and Sobal (1991). Subjects were 175 students entering the University of Maryland School of Medicine in August of 1982. They completed Budner's (1962) scale, and also listed their top three specialty preferences as well as certain demographic information. Specialty choices categorized into seven groups ranked in descending order from low to high tolerance of ambiguity according to Budner. Medical specialty choices upon graduation were also obtained for these students. Tolerance for ambiguity scores displayed no differences by major, MCAT score (Medical College Administration test score), gender, birth order, specialty preference, or specialty choice. Results of a multiple regression indicated that there was no significant relationship found between tolerance of ambiguity and either their initial specialty choice or their final specialty choice.

Merrill, Camacho, Laux, Lorimor, Thornby, and Vallbona (1994) studied first-year and senior medical students. A 106-item questionnaire (which included Budner's 1962 scale) was given to 170 first-year medical students and 287 senior medical students. The 25 items in the scale which were to represent intolerance of uncertainty in medicine were factor analyzed. Two scales were constructed from items with factor loadings above 0.36,

an aversion to uncertainties in clinical medicine (ITA1) and preference for highly structured training environs (ITA2). These two factors accounted for differences in student's choice of career in medicine ($p < .05$). Students with the most tolerance for ambiguity (lowest ITA1 scores) selected internal medicine for their residency, and students with less tolerance for ambiguity (higher ITA1 scores) selected radiology, surgery, anaesthesiology, and surgical subspecialties.

Church, Waclawski, and Burke (1996) ran a survey of 357 organization development practitioners randomly selected from membership listings of three professional organizations. One of the scales used, the Change Agent Questionnaire (CAQ) was developed from a combination of a leading leadership scale and Budner's (1962) scale. Comparisons were made with scores obtained from this sample to some of Budner's norm's. These practitioners were less tolerant of ambiguity than were many first- through third-year medical students, but more tolerant of ambiguity than were college students in general who were enrolled in introductory sociology and psychology courses. In evaluating the results of a multiple analysis of variance, intolerance of ambiguity was discovered to be the only dependent variable affected by the subject's level of course work. From a post hoc analysis of group means, it was found that as the number of courses taken increased, so also did the level of tolerance for ambiguity increase. The authors believe that if obtaining more education affects tolerance of ambiguity, then there might possibly be a stronger support for initiating an OD certification process, especially if these items relate to better consulting effectiveness.

There was a significant negative relationship between a person's level of intolerance of ambiguity and the perception of major concepts of change management.

As with the above study, other studies have found that the level of intolerance for ambiguity can be decreased (IE. tolerance for ambiguity can be increased) by experimental learning. The association between tolerance for ambiguity, dogmatism, and risk-taking preferences in a cross-cultural simulation game was the focus of a study by Glover, Romero, and Peterson (1978). Significant changes in scores were found for the experimental groups only in comparisons between pre and post simulation scores (there was no difference found between experimental versus control groups in pretest scores). An increase in tolerance for ambiguity (using the scale of Budner, 1962) ($p < .01$), and a decrease in dogmatism ($p < .01$) was found, but no significant change emerged for risk-taking preferences . Comparison of posttest results between the groups revealed significantly higher tolerance for ambiguity scores ($p < .01$) and significantly lower scores on the dogmatism scale for the experimental groups over those of the control group. Furnham and Ribchester (1995) state that this was one of the few studies found in which tolerance for ambiguity was utilized as the dependent variable. What is especially noteworthy in regard to this study, is the findings that intolerance for ambiguity levels can be altered. However, the authors of the study caution that it is not known whether such change will endure (Glover, Romero, and Peterson, 1978). Smock (1955) also found that experimental learning decreased the level of intolerance for ambiguity.

Summary of Tolerance for Ambiguity and Vocations other than Accounting:

A relationship has been found between the level of tolerance for ambiguity and choice of vocation (Church, Waclawski, and Burke, 1996; Geller, Faden, and Levine, 1990; and Merrill, Camacho, Laux, Lorimor, Rhornby, and Vallbona, 1994). Geller, Faden, and Levine (1990) and Merrill, Camacho, Laux, Lorimor, Rhornby, and Vallbona (1994) found, using Budner's (1962) scale and a modified version of that scale, that the level of tolerance for ambiguity varied according to specialty choice of medical school students. This was in contrast to DeForge and Sobal (1991) who, in a study of medical school students, utilizing Budner's (1962) scale found no such difference between vocational specialties. However, since Budner's scale only has a coefficient alpha of 0.59 (Furnahm, 1994), one does not know whether the differences in results are due to the measure or to problems with the samples (or studies). Church, Waclawski, and Burke (1996) discovered that, in a study of organizational development practitioners, that as course work increased, so did the tolerance for ambiguity level of the practitioners increase. They also found that "practitioners with higher level degrees and greater exposure to academic course work provided responses indicating significantly greater tolerance of ambiguous situations." (Church, Waclawski, and Burke, 1996, p. 51). Two studies also discovered that learning is associated with an increase in the level of tolerance for ambiguity (Glover, Romero, and Peterson, 1978; and Smock, 1955). Glover, Romero, and Peterson's (1978) study utilized a cross-cultural simulation game while Smock's (1955) study employed an experimental ambiguity task.

Tolerance for Ambiguity and the Accounting Profession

Bedeian, Mossholder, Touliatos, and Barkman (1986) ran a sample on 1,080 accountants, chosen randomly from national membership lists of the American Society of Certified Public Accountants, National Association of Accountants, American Association of Women Accountants, and Association of Government Accountants. Respondent demographic characteristics were obtained through a biographical data questionnaire, and personality traits were measured utilizing the California Psychological Inventory. Using the data from the CPI Manual, male participants were compared to mathematicians, bank managers, and business executives, and females were compared to office workers and supervisors, mathematicians, and telephone company supervisors. Occupation was significant for all 18 CPI scales, and Tukey's tests of comparisons were calculated for the 7 scales with an omega-square of >= 0.10. Only 1 of the scales demonstrated a general pattern of significant differences between the selected male comparison groups and all three accountant groups, which was in relation to Tolerance, in which all three accountant groups had the lower score than did bank managers and business executives. All three accounting male groups scored lower on Socialization than did bank managers, and lower than mathematicians in Achievement via Independence and Flexibility. All three male accounting groups were combined, and utilizing independent t tests, were compared to the male norm sample. Because of the large sample size, several were significant; however, the largest omega-square was 0.07 (no other was over 0.04) for Dominance. Male accountants, therefore, are very similar to related occupational groups, and of the population in general in regard to personality. Occupation was significant for 15 of the 18

CPI scales, for the females; however, none had an omega-square of >= 0.10. The three female accounting groups were combined and compared against the CPI female norm sample. Again, due to large sample size, several t values were significant. However, the largest omega-square was 0.04 for Achievement via Independence, and only one other omega-square was greater than one. As the authors state, it may not be accountants' personalities that cause the familiar accounting stereotype, but it may arise from the nature of accounting work itself.

Dinus and McIntyre (1979) tested 250 university student volunteers (from 17 accounting courses that were taught by 9 professors) (101 accounting majors, 149 non-accounting majors). Usable ACT scores were available only for 184 students. Three personality performance tests (Problem Persistence Test--to measure how many problems students would actually try to solve, the Whole-Parts Test--which indicates whether students will try to organize their environment into segments or wholes, and the Einstellung Test--which measures whether one will attempt to develop a set method for problem-solving, the strength of such set, and whether such set can be overcome by the person), and the Accountant Personality Inventory. Significant differences were found between majors on the Accountant scale of the Accountant Personality Inventory ($p<.001$), as well as on the Success scale of such inventory ($p<.001$). Accounting majors not only preferred system and organization, but they actually enjoyed and were persistent in solving problems. Other valued traits included security, routine, conventionality, flexibility, as well as conscientiousness. However, low accountant values were given to creativity and empathy. Accounting majors worked longer than did non-accounting

majors on the Problem Persistence Test ($p<.005$). Significant differences were found between majors (IE. in considering fewer problems unworkable) ($p<.001$). Accounting majors also had a higher mathematics ACT score than did non-accounting majors ($p<.01$). In the Whole-Parts test, there were no significant differences between the success groups. In the Einstellung Water Jug Test, a higher percentage of Accounting majors as well as a higher percentage of the successful students were able to solve the set-breaking problem ($p<.001$). On their personal data sheets, more accounting majors reported having an accountant for a relative ($p<.04$), and considered accounting courses to be more challenging ($p<.001$) and more interesting ($p<.001$) than non-majors. Some of the major reasons that accounting majors choose accounting as a career were (in order of frequency of choice): that there was a big demand for accountants, money, good background for business, and enjoyed working with figures. Few votes were given prestige, security, parents' influence, and friends' influence. The complete Accountant Personality Battery explained 74% (r^2) of the predictor-criterion variance.

Kleinman(1992) studied 810 accounting and non-accounting majors from ten schools in the New York/New Jersey area, using the Occupations' Subscales of Holland's (1985) Self-Directed Search. The Conventional Subscale Score ($p<0.01$) (these are the people who abide by the rules and are very careful and restrained) and the Enterprising Subscale Score ($p<0.01$) were the two significant predictors of college major choice, with the former being positively associated with being an accounting major, and the latter being negatively associated with being an accounting major.

Schell and DeLuca (1991) sampled 2049 Canadian accountants (1497 chartered accountants--public and private, 251 junior accountants--public accountants, and 301 junior accountants who had left public accounting in phase 1 of their study). In phase 2 of their study, questionnaires were sent to 500 randomly selected accountants--partners, managers, seniors, and junior accountants. For phase 1, the Job Descriptive Index was used to measure over-all job satisfaction, 2 measures of job commitment were developed (one with a Cronbach alpha reliability coefficient of 0.81), the Jenkins Activity Survey, Form C was used to measure Type A behavior, and items adapted from the McElroy, Morrow, and Wall 1983 study on office design were to identify office orderliness (Cronbach alpha was 0.84). For phase 2, 40 items from the Gottheil Oral Trait Scale and 40 items from the Gottheil Anal Trait Scale were included in the questionnaire in order to assess task-identification versus people-identification, as are purported to be reflected in anal and oral orientations. In both phases several demographic items were included. The accounting groups appeared to show orderliness, parsimony, and obstinacy traits, which supports the hypothesis that accountants have an obsessive-compulsive profile. The lower-level career stages exhibited lower job satisfaction than did the higher-level career stages. Public accountants disagreed with the statement that they would remain in their jobs until they retired. The lower-level career stages reported lower attitudinal commitment. Partners, as a group, profiled themselves as less hurried, and with more people-orientation than would be shown by an obsessive-compulsive profile; however, this obsessive-compulsive profile was evidenced by the group of senior accountants. The seniors were job-application active (stayers less than leavers), low-job commitment

behaviorally (stayers less than leavers), (stayers were Type B, leavers were Type A), were not satisfied with the work itself (stayer less satisfied than leaver), were highly impatient on the Type A scale (stayers less than leavers), had a family income in the higher $73,000 scale (stayers had $52,000 scale area), and stated they had low satisfaction with their relationships with superiors (stayers had less than leavers). Public accountants received a higher mean task (anal) scores than people (oral) scores. Partners had the lowest anal mean scores, and managers and seniors had the highest mean task (anal) scores. The authors indicate that as long as the obsessive-compulsive people are admitted into public accountancy, with the long delays in extrinsic and intrinsic rewards, the accounting profession will continue to have the problem of turnover.

Granleese and Barrett (1990) tested 305 members (39% response rate, only 100 usable questionnaires) taken at random from the 1988 List of Members of the Institute of Chartered Accountants of Ireland, using the Eysenck Personality Questionnaire as well as a Personal History Inventory. Only 9% were female, and 69% of the total sample were Catholic. Most of the male accountants came from a middle-class background, with the modal response being lower middle class. According to the EPQ response, the accountant sample was seen as a socially conforming, stable introvert. The males scored similarly to the norms of the EPQ manual for accountant scores on Psychoticism, Neuroticism, and Extroversion. There were no main effects for organizational setting for social conformity.

Summary of Tolerance for Ambiguity and the Accounting Profession:

Accountants were found to value security, routine, flexibility and not value creativity and empathy in a study of university accounting and nonaccounting student

volunteers (Dinus and McIntyre, 1979). In addition, they were discovered to show traits of orderliness, parsimony, and obstinacy in a study of Canadian private practice and Chartered accountants (Schell and DeLuca, 1991), and were found to be socially conforming, stable introverts in a study of Irish Chartered accountants (Granleese and Barrett, 1990). Conventionality was found to be a significant predictor of the accounting college major choice in a study performed by Kleinman (1992). All of these studies utilized various personality inventories and tests, but none employed a specific tolerance for ambiguity scale.

The above research provides support that accountants may not be tolerant of ambiguity. No research, however, has been performed that compares levels of tolerance for ambiguity in accounting majors to levels of tolerance for ambiguity in other business majors. The "White Paper" (Arthur Andersen & Co., et al., 1989) notes that accountants must be able to solve various types of unstructured problems oriented in unfamiliar settings, as well as create and manage organizational change. This points to someone with a high tolerance for ambiguity. This paper is to determine whether there is a difference between tolerance for ambiguity levels in accounting majors and other business majors at the inception of their choice of a major (sophomore year), and whether there is such difference (or nondifference) in their junior and senior year of college. It will also compare ambiguity levels within each major between each year of college, from the sophomore to the senior year.

Myers-Briggs Type Indicator

A relationship has been found between the level of tolerance for ambiguity and choice of vocation (Church, Waclawski, and Burke, 1996; Geller, Faden, and Levine, 1990; and Merrill, Camacho, Laux, Lorimor, Rhornby, and Vallbona, 1994). None of the studies have compared levels of tolerance for ambiguity in accounting and in other business majors. Since there is no previous research that has utilized a tolerance for ambiguity measure to differentiate between those in different careers in business, this study will employ the results of a personality inventory (which encompasses more traits of personality than tolerance for ambiguity), that has been used in career counseling, in order to determine whether tolerance for ambiguity levels of accounting majors should differ from those of other business majors. This inventory, the Myers-Briggs Type Indicator (MTBI), draws from Jungian type theory (Myers and Myers, 1995). A short overview of the inventory and its relation to Jungian type theory will be presented in order to explain such inventory and theory, and to set up a framework for hypotheses of this study in relation to tolerance for ambiguiy.

According to the Myers and Myers (1995), differences in human behavior are not due to chance, but are, "the logical result of a few basic, observable differences in mental functioning" (Myers and Myers, 1995, p. 1). Such differences come about through mental preferences toward manners in which individuals perceive and judge (Myers and Myers, 1995). Four basic modes of such perception and judgement are given: extraversion or introversion, sensing or intuition, thinking or feeling, and judgment or perception.

Two Manners of Perceiving

There are two manners of perceiving, according to Jung:

1. Sensing--The five senses are used as the to perceive things directly (Myers and Myers, 1995).
2. Intuition--This is "indirect perception by way of the unconscious, incorporating ideas or associations that the unconscious tacks on to perceptions coming from outside" (Myers and Myers, 1995, p. 2). The sensing type according to Myers and Myers (1995), "Face life observantly. . . they are observant at the expense of imagination. . . very dependent on their physical surroundings. . .reluctant to sacrifice present enjoyment to future gain or good (Myers and Myers, 1995, p. 63). The intuitive type have "no taste for life as it is. . . they are generally restless. . . prefer the joy of enterprise and achievement. . . are by nature initiators, inventors" (Myers and Myers, 1995, p. 63).

Two Manners of Judging

There are two manners of judging, according to Jung:

1. Thinking--Comes to a conclusion through a logical process (Myers and Myers, 1995).
2. Feeling--Comes to a conclusion through use of a subjective process (Myers and Myers, 1995).

The thinking types "value logic above sentiment. . . are stronger in executive ability than in the social arts. . . often seem to lack friendliness and sociability without knowing or intending it" (Myers and Myers, 1995, p. 68). Feeling types, on the other hand, "value sentiment above logic. . .are stronger in the social arts than in executive

ability. . .naturally friendly. . . find it difficult to be brief and businesslike" (Myers and Myers, 1995, p. 68).

Preferences for Extraversion versus Introversion

A difference in perception and judgement is based on the individual's attention toward the world outside him (her) (extraversion) or the world within (introversion) (Myers and Myers, 1995). The named preferences coined by Jung are:

1. Extraversion--Prefers the "outer world of people and things" (Myers and Myers, 1995, p. 7).
2. Introversion--Prefers the "inner world of concepts and ideas" (Myers and Myers, 1995, p. 7).

Preferences for Judgment versus Perception

Jung lists two types of attitudes in which people percive and judge. These types, and their definition are:

1. Judgment--Closes off perception in order to arrive at a conclusion (Myers and Myers, 1995).
2. Perception--"In the perceptive attitude people shut off judgment. Not all the evidence is in; new developments will occur" (Myers and Myers, 1995, p. 8).

Dominant Process

In each of the above four preferences, utilization of one perceptual process over the other begins in childhood. The preferred method is employed more often than the other, which is disregarded. Endeavors are chosen by the child which utilize the preferred process. The child becomes more mature in the preferred area, and more childlike in the

neglected area . Surface traits manifest themselves from the preferences so chosen(Myers and Myers, 1995).

Auxiliary Process

A person is not able to survive by the dominant process alone. The opposite, neglected process must be utilized from time to time, in order that the person's personality remains balanced (Myers and Myers, 1995). The dominant process "is where they can do their best work and function at their best level. . . the less important matters are left to the auxiliary process" (Myers and Myers, 1995, p. 12).

Sixteen Personality Types

Sixteen personality types are derived from combinations of the above four categories (one dominant preference from each category). The first letter of each category's dominant preference, with the exception of intuition which starts with "N," forms one letter of the four letter occupational "type" (Myers and Myers, 1995). Those who are seeking an occupation should look to types of employment that attracts people with their own perceptive and judging processes, because "Each of the four possible combinations of perception and judgment tends to produce distinct interests, values, needs, and skills" (Myers and Myers, 1995, p. 150).

The Myers-Briggs Type Indicator (MTBI), is a "forced-choice, self-report inventory" (Willis and Ham, 1988, p. 230). Spearman-Brown split-half correlations, from several samples have ranged from ".43 to .88 for E-I, .34 to .91 for S-N, .00 to .88 for T-F, and .28 to .92 for J-P" (Willis and Ham, 1988, p. 231). Correlations that fell under .60 were for "younger, under achieving, or educationally disadvantaged individuals"(Willis

and Ham, 1988, p. 230). Therefore, for most individuals, this is a reliable instrument. The scale has also been correlated with twenty-eight or more other psychometric scales (Willis and Ham, 1988). Most, if not all, business categories are found in the following occupational codes: ISTJ, INTJ, ESTJ, and ENTJ (Macdaid, McCaulley, and Kainz, 1995).

Careers that business majors enter within the first several years after graduation (accountants; administrators : managers and supervisors; auditors; Certified Public Accountants; consultants: management analysts; managers: retail stores; managers: sales; and public accountants) were analyzed from Myers-Briggs Type Indicator Atlas of Type Tables (MacDaid, McCaulley, and Kainz, 1991, pp. 121, 122, 123, 130, 136, 154, 155, 161). (See Table 1.1).

TABLE 1.1

PRIMARY CATEGORIES OF THE MTBI TYPE INDICATOR TO WHICH MOST BUSINESS MAJORS BELONG--SHOWN BY PERCENTAGE OF TOTAL RESPONSES FOR SPECIFIC CAREER FIELD

Career Field	Source Page	ISTJ	INTJ	ESTJ	ENTJ	All "N" Types
Accountants	121	20.14	4.22	12.41	7.26	11.48
Certified Public Accountants	130	26.72	5.67	19.23	8.30	13.97
Auditors	123	20.28	9.09	15.38	9.79	18.88
Public Accountants	161	19.82	12.31	13.81	9.31	21.62
Managers: Retail Stores	154	26.27	3.16	46.52	10.13	13.29
Administrators: Managers & Supervisors	122	15.88	5.38	17.54	10.14	15.52
Consultants: Management Analysts	136	13.48	7.87	11.24	8.99	16.86
Managers: Sales	155	14.46	9.64	24.10	16.87	26.51

Note. Adapted from Myers-Briggs Type Indicator Atlas of Type Tables by MacDaid, McCaulley, and Kainz, 1991, pp. 121, 122,123, 130, 136, 154, 155, 161.

When the Intuition percentages are summed for each business major (for careers that business majors enter within the first several years after graduation), typical careers for accounting majors varied in Intuition (N) from 11.48 percent (INTJ of 4.22 percent plus ENTJ of 7.26 percent)(MacDaid, McCaulley, and Kainz, 1991, p. 121) to 21.62 (INTJ of 12.31 percent plus ENTJ of 9.31 percent)(MacDaid, McCaulley, and Kainz, 1991, p.161) (the distribution was bipolar--accountants and Certified Public Accountants were the low percentages, and auditors and public accountants were the high percentages), and percentage scores for other business majors varied from a low percentage of 13.19 (Managers of Retail Stores' INTJ of 3.16 percent plus ENTJ of 10.13) (MacDaid, McCaulley, and Kainz, 1991, p. 154) to a high percentage of 26.51 (Managers in Sales' INTJ of 9.64 percent plus ENTJ of 16.87 percent) (MacDaid, McCaulley, and Kainz, 1991, p. 155). See Table 1.1. Although many of the percentages of people found in the intuitive type for accounting and other business professions are similar, the accounting profession has the category with the lowest percentage of people in that type in Table 1.1 (see accountants category), while the sales category found in the other business professions has the highest percentage (and it is extremely high) of people of that type found on the table. This should indicate that a larger percentage of other business majors will be more tolerant of ambiguity than will be accounting majors, and therefore, because we will use an average of the tolerance for ambiguity scores, the level of tolerance for ambiguity should be higher for the other business majors (notice that the Myers-Briggs categories do not give levels, or amounts, of intuition maintained by the

occupations, only the percentages of people found with such trait). Therefore, for each year of college, the tolerance for ambiguity level should be higher for other business majors than for accounting majors, and the following hypotheses are proposed:

Hypothesis 1

In the sophomore year of college, the tolerance for ambiguity level will be higher for other business majors than for accounting majors.

Hypothesis 2

In the junior year of college, the tolerance for ambiguity level will be higher for other business majors than for accounting majors.

Hypothesis 3

In the senior year of college, the tolerance for ambiguity level will be higher for other business majors than for accounting majors.

Glover, Romero, and Peterson (1978) and Smock (1955) found that learning is associated with an increase in the level of tolerance for ambiguity, and Church, Waclawski, and Burke (1996) found that as the number of courses taken increased, so did tolerance for ambiguity scores. Therefore, as the number of college courses increase, tolerance for ambiguity levels should increase, and the following hypotheses are proposed:

Hypothesis 4

There should be an increase in the level of tolerance for ambiguity in accounting majors between the sophomore and senior years of college.

Hypothesis 5

There should be an increase in the level of tolerance for ambiguity in other business majors between the sophomore and senior years of college.

Chapter III

Methodology

The main purpose of this study is to determine whether tolerance for ambiguity differs between Accounting majors and other Business Majors. In addition, this study also attempts to determine whether this tolerance is affected by the study of business in the sophomore through senior years in college.

This chapter is organized into the following categories: hypotheses, the research design, variables, subject selection, data collection procedures, and statistical procedures.

Hypotheses

Hypothesis 1

In the sophomore year of college, the tolerance for ambiguity level will be higher for other business majors than for accounting majors.

Hypothesis 2

In the junior year of college, the tolerance for ambiguity level will be higher for other business majors than for accounting majors.

Hypothesis 3

In the senior year of college, the tolerance for ambiguity level will be higher for other business majors than for accounting majors.

Hypothesis 4

There should be an increase in the level of tolerance for ambiguity in accounting majors between the sophomore and senior years of college.

Hypothesis 5

There should be an increase in the level of tolerance for ambiguity in other business majors between the sophomore and senior years of college.

Research Design

This study used an ex post facto experimental design. In this design, there is no experimental manipulation, nor is there random assignment of subjects. Six groups were studied in this research: Accounting majors (Sophomore year) and Other Business majors (Sophomore year), Accounting majors (Junior year) and Other Business majors (Junior Year), Accounting majors (Senior year) and Other Business majors (Senior year) .

Variables

Major in college was one variable chosen for this research. This variable was either the selection of a major in Accounting, or the selection of a major in another Business field. This variable was studied because accountants have been found to be rigid in personality and are not tolerant of ambiguity (Granleese and Barrett, 1990; and Schell and DeLuca, 1991), but it was not known whether tolerance of ambiguity levels differed between accountants and other business majors.

Another variable chosen for study was student's year of college (Sophomore through Senior year). These particular college years were selected because it is not until the Sophomore year (at the university studied) that the student declares a major. The

reason for inclusion of student's year of college as a variable in this research was in order to determine whether tolerance for ambiguity was affected by additional years of college instruction.

Tolerance for ambiguity was also a variable selected for study. Research provides support that accountants may not be tolerant of ambiguity (Dinus and McIntyre, 1979; Granleese and Barrett, 1990; Kleinman, 1992; and Schell and DeLuca, 1991). The "White Paper" (Arthur Andersen & Co., et al., 1989) noted that accountants must be able to solve various types of unstructured problems oriented in unfamiliar settings, as well as create and manage organizational change. This points to someone with a high tolerance for ambiguity. A relationship has been found between the level of tolerance for ambiguity and choice of vocation (Church, Waclawski, and Burke, 1996; Geller, Faden, and Levine, 1990; and Merrill, Camacho, Laux, Lorimor, Rhornby, and Vallbona, 1994). No research has been found that compares levels of tolerance for ambiguity of accounting majors to levels of tolerance for ambiguity in other business majors. Other business majors were chosen because many of the vocational characteristics previously cited as necessary for accountants to possess are attributable the fields included under the category of other business (Cooper, 1996; Demery, 1995; Freedman, 1996; Half, 1994; and Scroppo, 1994). The level of ambiguity for accounting majors was compared to the level of ambiguity found in other business majors. This comparison was made in order to determine whether or not accountants differed from such other majors when they initially selected their major. In addition, this comparison was made each year from the Sophomore through Senior years of college in order to determine whether such

differences (if any) were affected by years of college instruction. Also, the level of ambiguity for accounting majors was compared from Sophomore through Senior years of college in order to assess whether years of college instruction had an effect on the level of tolerance for ambiguity found in accounting majors. This analysis was also performed for the other business majors.

Measure

Tolerance for ambiguity was measured utilizing the 20-item ambiguity tolerance test (AT-20) developed by A. P. MacDonald, Jr. (1970). According to MacDonald, Jr. (1970), this test has good measurement characteristics. It has shown a coefficient of internal consistency of 0.86 ($r = .73$ when using the more conservative Kuder-Richardson Formula 20) in a sample of 74 female undergraduate students at Cornell University. Later, this was administered to 789 undergraduate students at Ithaca College, and an r of 0.63 (K-R 20) resulted. Retest reliability (for a group of 24 male undergraduate students) has been estimated at 0.63. Correlations have been found between tolerance for ambiguity using this test, and performance in ambiguous tasks (scrambled words test). This test (AT-20) has been shown to relate to dogmatism, rigidity, and church attendance. It also has been shown to be free from social desirability response bias. Correct responses by each student for a High Tolerance for Ambiguity were scored by a "1," while incorrect responses were scored with a "0." Each student's total responses were then totaled, and that was the total Tolerance for Ambiguity score for that particular student.

Selection of Subjects

The sample was a convenience sample drawn from several sections of Elementary Accounting I and II, Principles of Management, and Business Policy courses at Oklahoma State University. These courses were chosen because all are required of business majors, the population from which the study was to be drawn. The Elementary Accounting I and II courses typically are enrolled in by Sophomore students, while the Principles of Management course is typically a Junior course, and the Business Policy course is a typical Senior course. These courses, therefore, are chosen to represent the business Sophomore, Junior, and Senior classes.

Those necessary to the implementation of this research were contacted--the Dean of Accounting as well as the Dean of Management. Also, the permission of those instructors whose classes were studied were obtained.

The initial sample was obtained in the spring of 1996, with additional observations acquired subsequently in order to obtain a normal distribution of observations (at least 30 observations in each sample cell, according to Berenson and Levine, 1989), and to make the results more generalizable to the population of business majors. Some of these last observations came from another university (Oklahoma City University). Verbal permission to administer the sample was secured from the Dean of the School of Business as well as the professors from whose classes the samples were procured.

Data Collection Procedures

The data was collected in each course section selected through the use of a questionnaire which utilized the Tolerance for Ambiguity questionnaire, and requested that

the students specify college major (Accounting or Other Business), class level (Sophomore, Junior, Senior), as well as other additional data (sex, age, ethnic background, whether or not accounting was completed in high school). This information was obtained for both control and analysis purposes (see Appendix A for Institutional Review Board for Human Subjects Research approval form, and see copy of questionnaire in Appendix B).

Statistical Analysis: Hypotheses 1--3

A two-factor analysis of variance was utilized to examine the level of tolerance for ambiguity in Accounting and Other Business Majors for each of the following levels of college: Sophomore, Junior, and Senior. This type of analysis, according to Bruning and Kintz (1977) is useful when studying one set of variables in conjunction with another set of variables. In this study, the Tolerance for Ambiguity Scores (MacDonald, 1970) obtained from the convenience sample of students were assigned to the following two-factor analysis of variance structure (Berenson and Levine, 1989):

Tolerance of Ambiguity Level by Year of College and Business Major

	Business Major:			
	Accounting	Other Business Major	**Totals**	**Means**
Year of College:				
Sophomore				
Junior				
Senior				
Totals				
Means				

By utilizing a two-factor analysis of variance, the effects of year of college (Sophomore to Senior) and Business Major (Accounting or Other Business Major) were able to be discovered. Also, it was ascertained whether such business major's tolerance for ambiguity was affected by their major course of study, or whether there was an interaction of such variables. This was accomplished through the use of the following F-Test ratios (Bruning and Kintz, 1977):

F = ms Year in College / ms error

F = ms Business Major / ms error

F = ms Year in College x Business Major / ms error

where:

ms Year in College = Sum of Squares for Year in College / Number of Year in College Conditions Minus 1 (ie. 3 - 1, or 2)

ms Business Major = Sum of Squares for Business Major / Number of Business Major Conditions Minus 1 (ie. 2 -1, or 1)

ms Year in College x Business Major =
Sum of Squares of Year in College x Business Major / (2 x 1) (This denominator results from multiplying the prior two denominators times each other).

The F- tests were performed at the following levels of significance: $p < .05$, and $p < .10$. Tukey's test was calculated in order to determine whether the difference between any two means was significant. A critical value was computed (See Equation Below) and this value was compared to all differences between pairs of means (Bruning and Kintz, 1977):

$$\text{Critical Value} = q\alpha \sqrt{\text{ms within group error / n (per group)}}$$

where:

q = the value obtained from Appendix K -- Significant Studentized Ranges (Two-tailed) ($p < .05$, $p < .10$ Levels)

ms within group error = Sum of Squares Within Groups / Total Degrees of Freedom minus the Between Degrees of Freedom

n = number of scores per group

Statistical Analysis: Hypotheses 4--5

A one-way analysis of variance was utilized to examine the level of tolerance for ambiguity in Accounting (hypothesis 4) and Other Business Majors (hypothesis 5) for each of the following levels of college: Sophomore, Junior, and Senior. This type of analysis

is utilized to investigate whether three or more "groups all have the same population average" (Berenson and Levine, 1989, p. 451). In this study, the Tolerance for Ambiguity Scores (MacDonald, 1970) obtained from the convenience sample of students was assigned to the following one-way analysis of variance(Berenson and Levine, 1989):

Tolerance of Ambiguity by Year of College

Year of College		
Sophomore	Junior	Senior
Mean Tolerance for Ambiguity Score	Mean Tolerance for Ambiguity Score	Mean Tolerance for Ambiguity Score

The following F-Test ratios were utilized to determine whether there was a difference in the means of each major category by year of college (Berenson and Levine, 1989):

F= Mean Square Between Groups / Mean Square Within Groups

where:

Mean Square Between Groups = Sum of Squares Between Groups / Number of Year in College Conditions Minus One (ie. 3 - 1 =2)

Mean Square Within Groups = Sum of Squares Within Groups / Number of Subjects Minus Number of Year in College Conditions

The F- test was performed at the following levels of significance: $p < .05$, and $p < .10$. Tukey's test was calculated in order to determine whether the difference between any two means was significant. A critical value was computed (See Equation

Below) and this value was compared to all differences between pairs of means (Bruning and Kintz, 1977):

$$\text{Critical Value} = q\alpha \sqrt{\text{ms within group error / n (per group)}}$$

where:

q = the value obtained from -- Significant Studentized Ranges (Two-tailed)
($p < .05$, $p < .10$ Levels)

Chapter 4

Analysis of Results

Description of Sample

The initial sample was obtained in the spring of 1996, with additional observations acquired subsequently in order to obtain a normal distribution of observations (at least 30 observations in each sample cell, according to Berenson and Levine, 1989), and to make the results more generalizable to the population of business majors. Some of these last observations came from another university (Oklahoma City University). Verbal permission to administer the sample was secured from the Dean of the School of Business as well as the professors from whose classes the samples were procured. Five hundred-eleven observations resulted. Twenty-four of the observations were unusable, which resulted in a final sample size of 487 observations (OSU=398, OCU=89). Before the observations for both universities were combined into one sample, a t-test was administered to determine if the tolerance for ambiguity level means of the two samples were equal, which would indicate that both were derived from populations that were not significantly different from each other. The result of this test was an F=1.01 , and a probability of 0.90 that the variances are unequal due to chance (IE. the means of the two samples are not significantly different), which allows the two samples to be combined. Sample demographics are described in the following tables.

Sex Distribution

The total sample distribution is almost equally divided between the sexes (see Table 2.1). However, as shown in Table 2.2, the Accounting majors are represented by an almost 70% female sample population, as contrasted to varying levels (which never exceed 60%) of females in the Other Business major sample population.

TABLE 2.1

SEX DISTRIBUTION

Sex	Frequency	Percent
Female	258	53.0
Males	229	47.0
Total	487	100.0

TABLE 2.2

SEX DISTRIBUTION BY YEAR OF COLLEGE

Year of College	Females	Percent	Male	Percent	Total
Sophomore					
Accounting Majors	27	65.9	14	34.1	100.0
Other Business Majors	53	56.4	41	43.6	100.0
Junior					
Accounting Majors	38	66.7	19	33.3	100.0
Other Business Majors	61	38.1	99	61.9	100.0
Senior					
Accounting Majors	46	67.6	22	32.4	100.0
Other Business Majors	33	49.3	34	50.7	100.0

Age Distribution

Most of the sample population contains students who are fifteen through twenty-five years of age (see Table 2 .3). However, when the total sample distribution is divided according to year of college and major (Table 2.4), a more distinct depiction of the age-sample frequencies emerges. The Sophomore and Junior classes look similar in age-category frequency levels, when contrasted against the Senior class. The Senior class contains many more students in the twenty-six to thirty-five year old category than does any other year of college.

TABLE 2.3

AGE DISTRIBUTION

Age (in years)	Frequency	Percent
15 to 25	415	85.6
26 to 35	53	10.9
36 to 45	14	2.9
46 to 55	3	0.6
Total	485	100.0
Valid Cases 485	Missing Cases 2	

TABLE 2.4

AGE DISTRIBUTION BY YEAR OF COLLEGE

Year of College	15 to 25 Years	%	26 to 35 Years	%	36 to 45 Years	%	46 to 55 Years	%	Total
Sophomore									
Accounting Majors	39	95.1	1	2.4	1	2.4	--	--	100.0
Other Business Majors	90	95.7	4	4.3	--	--			100.0
Junior									
Accounting Majors	48	85.7	5	8.9	3	5.4	--	--	100.0
Other Business Majors	146	91.8	8	5.0	2	1.3	3	1.9	100.0
Senior									
Accounting Majors	40	58.8	24	35.3	4	5.9	--	--	100.0
Other Business Majors	52	77.6	11	16.4	4	6.0			100.0

Ethnic Distribution

Most of the sample population is comprised of those from the Caucasian ethnic group, followed in size by those from the Oriental ethnic group (Table 2.5). The Senior class includes more representation from the Oriental ethnic group than are contained in the Sophomore and Junior classes (Table 2.6).

TABLE 2.5

ETHNIC DISTRIBUTION

Ethnic Group	Frequency	Percent
Afro-American	17	3.5
Caucasian	368	75.6
Hispanic	16	3.3
Oriental	64	13.1
Other	22	4.5
Total	487	100.0

TABLE 2.6

ETHNIC DISTRIBUTION BY YEAR OF COLLEGE

Year of College and Major	Afro-American	%	Caucasian	%	Hispanic	%	Oriental	%	Other	%
Soph.										
Accounting	3	7.3	34	82.9	1	2.4	1	2.4	2	4.9
Other Business	2	2.1	70	74.5	2	2.1	16	17.0	4	4.3
Junior										
Accounting	2	3.5	46	80.7	2	3.5	5	8.8	2	3.5
Other Business	8	5.0	120	75.0	4	2.5	20	12.5	8	5.0
Senior										
Accounting	--	--	50	73.5	3	4.4	13	19.1	2	2.9
Other Business	2	3.0	48	71.6	4	6.0	9	13.4	4	6.0

Note. All columns total to 100%.

Year of College Distribution

The Junior class contains more student representation than does any other class in the sample (Table 2.7). When these classes are broken into majors, a more complete picture emerges. The Sophomore Other Business majors are almost double the size of the Sophomore Accounting Majors; and in the Junior year, the Other Business majors are almost triple the class size of the Accounting Majors.

TABLE 2.7

YEAR OF COLLEGE DISTRIBUTION

Level	Frequency	Percent
Sophomore	135	27.7
Junior	217	44.6
Senior	135	27.7
Total	487	100.0

The Relationship between Year of College and Major on Tolerance for Ambiguity

A two-way analysis of variance was calculated for the relationship between year of college and major on tolerance for ambiguity level. For the two-way analysis of variance model itself, there is no difference in the means due to years of college and major (Sum of Squares=74.98, Mean Square=15.00, $F=1.55$, $p<.17$) (see Table 3.1). The only result which approaches significance is the difference in means between year of college ($p<.0783$). This only approaches significance (using Tukey's studentized range test) for the difference in means between the Senior and the Sophomore years of college ($p<.10$).

Hypotheses 1--3 are not supported. Perhaps the two-way analysis of variance would have been significant for the individual other business majors. However, that analysis was not the aim of the current research, which is the comparison, only, of the tolerance for ambiguity levels of accounting majors to those of other business majors.

TABLE 3.1

ANALYSIS OF VARIANCE OF TOLERANCE FOR AMBIGUITY LEVELS BY MAJOR AND YEAR OF COLLEGE

SOURCE	SS	DF	MS	F	P > F
Major (M)	22.26	1	22.26	2.30	.13
Year of College (Y)	49.52	2	24.76	2.56	.08
M X Y	3.32	2	1.66	.17	.84
Residual	4652.00	481	9.67		
Total	4727.10	486	58.35		

The Relationship between Year of College on the Tolerance for Ambiguity Levels of Accounting Majors

The means, and frequencies for the year of college and tolerance of ambiguity levels of accounting majors are shown below (see Table 4.1). The graphical representation is illustrated in Figure 1. A one-way analysis of variance was calculated for the relationship of year of college on the tolerance for ambiguity levels of accounting majors. For the one-way analysis of variance model itself, there is no difference in the means due to year of college (Sum of Squares=27.79, Mean Square=13.90, $p<.29$)(see Table 4.2). Hypothesis 4 is not supported.

TABLE 4.1

MEAN TOLERANCE FOR AMBIGUITY SCORES
BY MAJOR AND YEAR OF COLLEGE

	Major	
	Accounting	Other Business
Year of College		
Sophomore	7.17	7.67
	(41)	(94)
Junior	7.63	8.29
	(57)	(160)
Senior	8.19	8.43
	(68)	(67)

Note. Parentheses indicate number of subjects in category. Higher scores indicate higher tolerance for ambiguity levels.

TABLE 4.2

ANALYSIS OF VARIANCE OF TOLERANCE FOR AMBIGUITY LEVELS BY YEAR OF COLLEGE FOR ACCOUNTING MAJORS

SOURCE	SS	DF	MS	F	P > F
Between Groups	27.79	2	13.90	1.49	.23
Within Groups (error)	1519.58	163	9.32		
Total	1547.37	165	23.22		

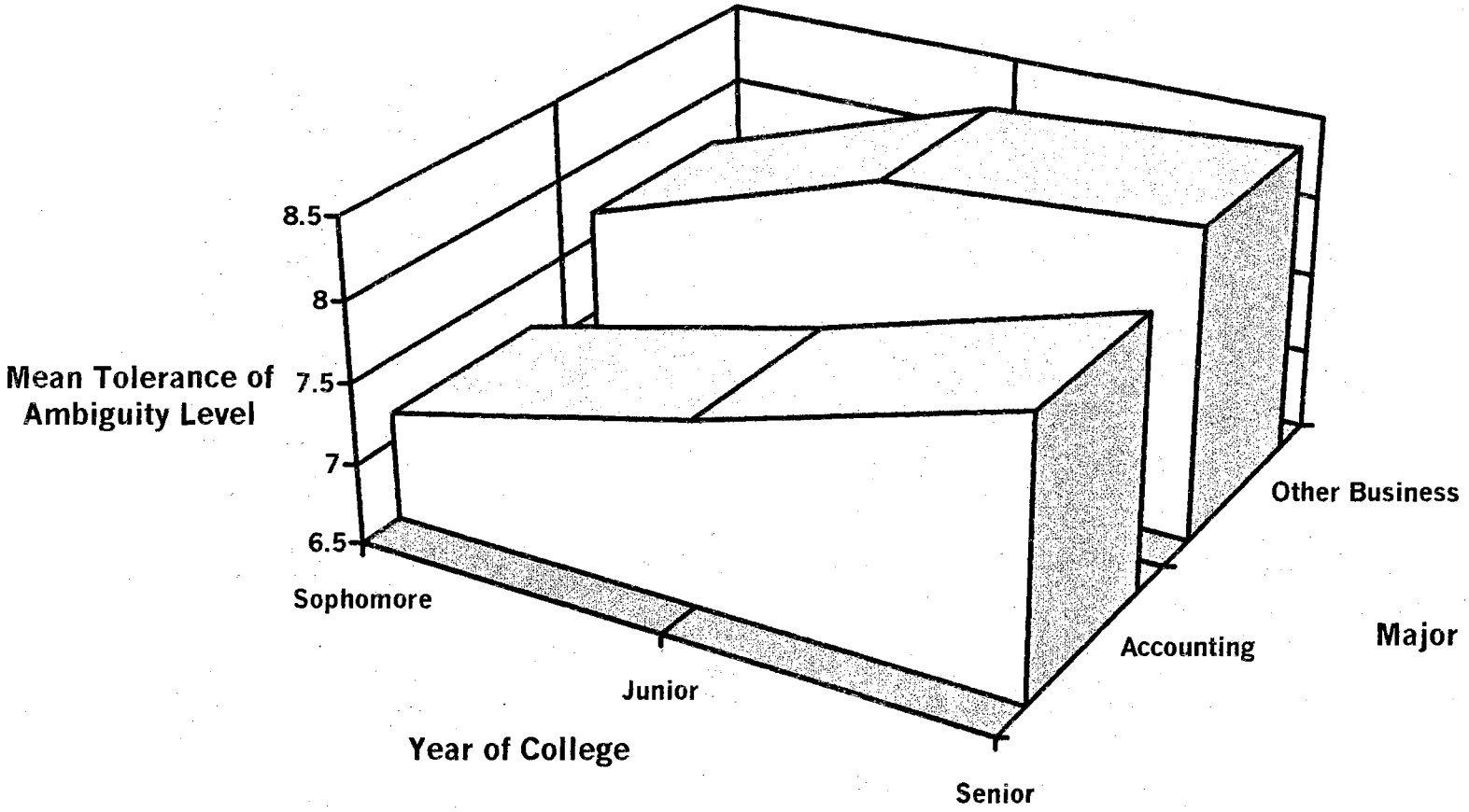

Figure 1. Means of Tolerance of Ambiguity Levels by Year of College and Major

The Relationship between Year of College on the Tolerance for Ambiguity Levels of Other Business Majors

The means, and frequencies for the year of college and tolerance of ambiguity levels of other business majors are shown above (see Table 4.1). The graphical representation is illustrated in Figure 1. A one-way analysis of variance was calculated for the relationship of year of college on the tolerance for ambiguity levels of other business majors. For the one-way analysis of variance model itself, there is no difference in means due to years of college (Sum of Squares=30.27, Mean Square=15.14, F=1.54, p<.22)(see Table 5.1). Hypothesis 5 is not supported.

TABLE 5.1

ANALYSIS OF VARIANCE OF TOLERANCE FOR AMBIGUITY LEVELS BY YEAR OF COLLEGE FOR OTHER BUSINESS MAJORS

SOURCE	SS	DF	MS	F	P > F
Between Groups	30.27	2	15.14	1.54	.22
Within Groups (error)	3132.42	318	9.85		
Total	3162.69	320	24.99		

Summary of Results

None of the hypotheses were supported at p<.05. However, some results were significant at the p<.10 level. At this level of significance, year of college influenced tolerance for ambiguity levels between the sophomore and senior years of college. For both majors, the mean tolerance of ambiguity level rises with each year of college. Students at the beginning of their major are less tolerant of ambiguity than those at the end

of their college career. However, there was no significant difference between the tolerance for ambiguity levels for individual majors tested (accounting and other business) between years of college.

Perhaps the two-way analysis of variance would have been significant for the individual other business majors. However, this analysis was not the aim of the current research, but rather the comparison, only, of the tolerance for ambiguity levels of accounting majors to those of other business majors.

Chapter V

Conclusion

This research studied the relationship of year of college (sophomore through senior) and major (accounting and other business) to tolerance for ambiguity levels. No one had previously performed research in this area. None of the hypotheses were confirmed. There was no significant relationship found between year of college and business major (hypotheses 1 through 3) and no significant relationship found between years of college within the individual major categories (accounting and other business).

This lack of significance may be attributable to several factors. This sample was drawn from only two universities, and therefore, may not be generalizable to the population of business students as a whole. In addition, the study was cross-sectional. The same study, administered at another point in time, or performed as a longitudinal study, could generate a different set of findings. Some reasons for nonsignificance are more applicable to some hypotheses than others. These will be mentioned in the context of specific hypotheses.

Hypotheses 1--3

These hypotheses were derived, first, from Myers-Briggs Type Indicator (MTBI) vocational personality type tables (whose theory is based on Jung's psychological types) (Myers and Myers, 1995). When the Intuition percentages were summed for each

business major (for careers that business majors enter within the first few years after graduation), typical careers for accounting majors varied in Intuition (N) from 11.48 percent (INTJ of 4.22 percent plus ENTJ of 7.26 percent) (MacDaid, McCaulley, and Kainz, 1991, p. 121) to 21.62 (INTJ of 12.31 percent plus ENTJ of 9.31 percent) (MacDaid, McCaulley, and Kainz, 1991, p.161) (the distribution was bipolar--accountants and Certified Public Accountants were the low percentages, and auditors and public accountants were the high percentages), and percentage scores for other business majors varied from a low percentage of 13.19 (Managers of Retail Stores' INTJ of 3.16 percent plus ENTJ of 10.13) (MacDaid, McCaulley, and Kainz, 1991, p. 154) to a high percentage of 26.51 (Managers in Sales' INTJ of 9.64 percent plus ENTJ of 16.87 percent) (MacDaid, McCaulley, and Kainz, 1991, p. 155). See Table 1.1. Although many of the percentages of people found in the intuitive type for accounting and other business professions were similar, the accounting profession had the category with the lowest percentage of people in that type in Table 1.1 (see accountants category), while the sales category found in the other business professions had the highest percentage (and it was extremely high) of people of that type. This should have indicated that a larger percentage of other business majors would have been more tolerant of ambiguity than were accounting majors, and therefore, because we were to use an average of the tolerance for ambiguity scores, the level of tolerance for ambiguity should have been higher for the other business majors (notice that the Myers-Briggs categories do not give levels, or amounts, of intuition maintained by the occupations, only the percentages of people found with such trait). Therefore, for each year of college, the tolerance for

ambiguity level should have been higher for other business majors than for accounting majors. As was stated previously, managers in sales had the largest percentage of people with Intuitive personality types from all business vocations presented. Our sample, however, had a very small number of subjects within the major of marketing. Only 31 (6.4 percent of the total sample, and 9.7 percent of other business majors) of the 487 subjects analyzed in the study had a major in marketing. This small representation of marketing majors (which maintain a very large percentage of intuitive types, and, we assumed, more subjects with a high tolerance of ambiguity), may have contributed to the lack of statistical significance findings for hypotheses 1 to 3.

Another possible explanation for the lack of robust findings is that this study utilized students in college. It may be that the differences shown in the Myers-Briggs Type Indicator (MTBI) vocational personality type tables (Myers and Myers, 1995) do not become established until after the student has gained more maturity, and / or has taken more college courses. An example of this is that Geller, Faden, and Levine (1990) and Merrill, Camacho, Laux, Lorimor, Rhornby, and Vallbona (1994) found that the level of tolerance for ambiguity varied according to specialty choice of medical school students. It is possible that this difference in tolerance for ambiguity may not be prevalent in the first four years of college. Now year of college and tolerance for ambiguity will be discussed.

Hypotheses 4--5

Glover, Romero, and Peterson (1978) and Smock (1955) found that learning is associated with an increase in the level of tolerance for ambiguity, and Church, Waclawski, and Burke (1996) found that as the number of courses taken increased, so did

tolerance for ambiguity scores. Therefore, it was proposed that as the number of college courses increases, tolerance for ambiguity levels should increase. However, the results of this study support the findings of Geller, Faden, and Levine (1990), who, in a cross-sectional study of medical students in their first four years of study, found that tolerance for ambiguity (a modified version of Budner, 1962) levels did not differ significantly among years in medical school (however, the authors indicated that their sample may have been biased toward the stability of tolerance for ambiguity levels over the four years of school due to over representation of white females in the third year of college). The findings of the prior studies were mixed, and all, with the exception of Smock (1955), who used a tolerance for ambiguity task in his study, utilized the original, or parts of, Budner's (1962) scale. Since Budner's scale has low reliability (coefficient alpha = 0.59) (Furnham, 1994), it was not known whether the mixed results were due to changes in tolerance for ambiguity between grade levels, or whether they were a consequence of weak measurement instruments. However, perhaps the studies of Glover, Romero, and Peterson (1978), Smock (1955), and Church, Waclawski, and Burke (1996) are valid. It may be possible that learning is associated with an increase in tolerance for ambiguity level, but such increase is dependent upon the particular types of courses taken, the number of courses, and the maturity of the student. This has not been addressed previously in research literature.

Recommendations for Further Research

1. Repeat the current study with the following changes. Include several universities in order to achieve more generalizability to the population of business majors. In

order to explain whether tolerance for ambiguity levels in the various majors change over time, the study should be a longitudinal, rather than cross-sectional study. The study should begin with the freshman, rather than the sophomore year of college. Some other majors (such as Art, Music, and English), which tend to be regarded as more creative disciplines by the general public, need to be included as part of the research. The other business majors variable needs to broken out into the specific major fields. In addition, graduate students of accounting and the other majors need to be added to the study. Church, Waclawski, and Burke (1996), in a study of organizational development practitioners, found that, "practitioners with higher level degrees and greater exposure to academic course work provided responses indicating significantly greater tolerance of ambiguous situations." (Church, Waclawski, and Burke, 1996, p. 51). The results of further research might add support to that study as well as make it generalizable to the fields of accounting and other professions in business. It also might provide support to the 150-hour requirement for membership into the AICPA by the year 2000.

For accounting majors and the other majors in the field of business, this research might be extended to the first few years after college, to determine whether the level of tolerance for ambiguity differs between such majors at that point in time, and to determine whether years of experience in the different professions affect the tolerance of ambiguity levels within the various fields of business. It was previously stated that there is a strong demand for accountants

who have a diversity of skills, knowledge, and the ability to apply them in an environment subject to constant change (Cooper, 1996; Emery, 1995; "Number Of Entry- Level Hires," 1994; Hermanson, Hermanson, and Ivancevich, 1995; and Sundem, 1994). These accountants are those who are subject to the world of change previously mentioned. This research might add support that those who survive in such an environment maintain a high tolerance for ambiguity. It might also be interesting to investigate the relationship between tolerance for ambiguity and success in the various professions, as measured by hierarchical- level placement of subjects in their respective sites of employment, in order to discover whether tolerance for ambiguity is associated with success in such disciplines. In addition, it might be interesting to perform the above research for the various areas within the specific professions, such as public and private practice, in the field of accounting, in order to determine whether tolerance for ambiguity differs within such areas. This knowledge might be very valuable to those enrolled in the various majors in college, who need career counseling. It might aid them in their selection of area in which to specialize within their vocational field.

2. Study the relationship between tolerance for ambiguity level and results of decision-making under different situation scenarios to determine if such level affects decisions. Tsui (1993), in a small, nonrandomly selected sample, utilized MacDonald's (1970) tolerance for ambiguity scale, and found that tolerance for ambiguity had a significant impact on the discernment of loan risk by bankers.

Many business decisions impact the success of people, products, and corporate structure. The level of tolerance for ambiguity should be studied in the context of such situations in order to determine whether it is able to influence the discernment of decision-makers, and therefore, affect the lives of people, as well as products, and corporate structure.

3. Glover, Romero, and Peterson (1978), in a study of undergraduate educational psychology students, found significant increases in tolerance for ambiguity scores (Budner, 1962) in their experimental groups in a cross-cultural simulation game. As stated previously, Budner's (1962) scale is not very reliable. Perhaps a game could be developed for situations, embedded within the context of business, and a similar experiment to that of Glover, Romero, and Peterson (1978) performed with accounting students, utilizing MacDonald's (1970) scale, in order to determine whether the levels of tolerance for ambiguity can be increased in accounting students and practitioners. If accountants need a high tolerance for ambiguity in order to survive in a world of change, as was reasoned earlier, then the possibility of increasing such tolerance might influence their very survival in that world. The following definition of Allport (1937) was expressed previously:

> Personality is the dynamic organization within the individual of those psychophysical systems that determine his unique adjustments to the environment . . . this organization must be regarded as constantly evolving and changing. . . Habits, specific and general attitudes, sentiments, and dispositions of other orders are all psychophysical systems. . . 'system'

> refers to traits or groups of traits in a latent or active condition. . . The systems that constitute personality are in every sense determining tendencies, and when aroused by suitable stimuli provoke those adjustive and expressive acts by which the personality becomes known. . . adjustments must not be considered as merely reactive adaptation. . . Adjustment to the physical world as well as to the imagined or ideal world --both being factors in the 'behavioral environment'--involves mastery as well as passive adaptation.(Allport, 1937, pp. 48-49).

This study has attempted to uncover an aspect of personality, which is included within the broad definition of traits included in the prior definition. Although the results found were not statistically significant, this study utilized a scale which has good reliability (MacDonald, 1970). Until more studies are performed that employ measurement scales which are reliable, tolerance for ambiguity will remain an element of personality which remains vague. Furnham and Ribchester (1995) were correct in their viewpoint that the review of tolerance of ambiguity literature is made confusing because many studies have utilized different scales, so that when findings fail to replicate (or show inferior results) using different scales, "one cannot be sure where the findings are not robust, whether the scales are indeed not measuring the same thing, or whether the measures are marked by construct irrelevancies and psychometric deficiencies" (Furnham and Ribchester, 1995, pp. 189-190). If accountants need a high tolerance for ambiguity in order to survive in an environment of change, as was reasoned earlier, then future research on tolerance for

ambiguity is needed, which employs good research designs and good measurement scales, in order to aid in that survival.

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APPENDIXES

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 04-17-96 **IRB#:** ED-96-115

Proposal Title: STUDYING THE DIFFERENCE IN TOLERANCE FOR AMBIGUITY BETWEEN ACCOUNTING AND OTHER BUSINESS MAJORS

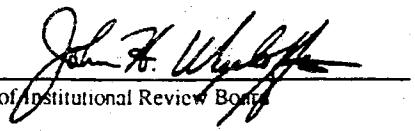
Principal Investigator(s): David S. Webster, Jane Austin

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Signature:  Date: April 19, 1996

Chair of Institutional Review Board

Demographic Information

Please complete the following by inserting an X (not more than one X per question) in the appropriate box. Thank you in advance for your time.

1. Sex: ___Male
   ___Female

2. Age: ___15 to 25 years
   ___26 to 35 years
   ___36 to 45 years
   ___46 to 55 years
   ___55+ years

3. Ethnic Background: ___Caucasian
   ___Afro-American
   ___Hispanic
   ___Oriental
   ___Other

4. Class: ___Freshman
   ___Sophomore
   ___Junior
   ___Senior

5. Major: ___Accounting
   ___Human Resource Management
   ___Management Science & Computer Systems
   ___Management Information Systems
   ___Marketing
   ___Finance
   ___Economics
   ___General Business
   ___International Business
   ___Other

6. Did you complete an Accounting Course in High School? ___Yes ___No
   If yes, did you complete: ___1 accounting course ___2 or more accounting courses

7. If you are an Accounting Major, please indicate which career field you intend to enter when you graduate(only mark one):
   Public Accounting:
   ___Auditing
   ___Tax
   ___Management Consulting
   Private Accounting
   ___Cost
   ___Government
   ___Internal Auditing

Please do not spend too much time on the following items. There are no right or wrong answers and therefore your first response is important. Mark T for true and F for false. Be sure to answer every question.

____1. A problem has little attraction for me if I don't think it has a solution.
____2. I am just a little uncomfortable with people unless I feel that I can understand their behavior.
____3. There's a right way and a wrong way to do almost everything.
____4. I would rather bet 1 to 6 on a long shot than 3 to 1 on a probable winner.
____5. The way to understand complex problems is to be concerned with their larger aspects instead of breaking them into smaller pieces.
____6. I get pretty anxious when I'm in a social situation over which I have no control.
____7. Practically every problem has a solution.
____8. It bothers me when I am unable to follow another person's train of thought.
____9. I have always felt that there is a clear difference between right and wrong.
____10. It bothers me when I don't know how other people react to me.
____11. Nothing gets accomplished in this world unless you stick to some basic rules.
____12. If I were a doctor, I would prefer the uncertainties of a psychiatrist to the clear and definite work of someone like a surgeon or X-ray specialist.
____13. Vague and impressionistic pictures really have little appeal for me.
____14. If I were a scientist, it would bother me that my work would never be completed (because science will always make new discoveries).
____15. Before an examination, I feel much less anxious if I know how many questions there will be.
____16. The best part of working a jigsaw puzzle is putting in that last piece.
____17. Sometimes I rather enjoy going against the rules and doing things I'm not supposed to do.
____18. I don't like to work on a problem unless there is a possibility of coming out with a clear-cut and unambiguous answer.
____19. I like to fool around with new ideas, even if they turn out later to be a total waste of time.
____20. Perfect balance is the essence of all good composition.

VITA

Jane Ann Austin

Candidate for the Degree of

Doctor of Education

Thesis: TOLERANCE FOR AMBIGUITY IN ACCOUNTING AND OTHER BUSINESS MAJORS

Major Field: Higher Education

Biographical:

Education: Graduated from John Marshall High School, Oklahoma City, Oklahoma in May, 1970, and received Bachelor of Science degree in Accounting from University of Central Oklahoma, Edmond, Oklahoma in August, 1974. Received Master of Science in Business Administration degree with a major in Management from University of Central Oklahoma, Edmond, Oklahoma in May, 1978. Completed the requirements for the Doctor of Education with a major in Higher Education at Oklahoma State University, Stillwater, Oklahoma in May, 1999.

Experience: Employed as a manager, and later, co-owner of Tas-T-Burger, Oklahoma City, Oklahoma from June, 1969 to August, 1974, (and from February, 1975 to February, 1978), and was employed by Arthur Andersen & Co., Oklahoma City, Oklahoma from August, 1974--February, 1975 as a junior auditor. Also worked for Hertz Corporation, Oklahoma City, Oklahoma as an Assistant Supervisor and Supervisor from February, 1978 to August, 1978, and worked for Magness Building & Development Company, Oklahoma City, Oklahoma as an accountant from August, 1978 to January, 1979. Employed by State Auditor & Inspector of Oklahoma (Tom Daxon), Oklahoma City, Oklahoma as an audit junior, senior, and supervisor from January, 1979 to October, 1981. Currently employed by Oklahoma City University (since Fall, 1981 semester to the present time (tenured associate professor). Hold license and permit to Practice Public Accounting as a C.P.A.

Professional: American Institute of C.P.A.'s, and the Oklahoma Society of C.P.A.'s.