THE COMPOSITION, CLASSIFICATION, AND CREATION OF NEW VENTURE FORMATION EXPERTISE

by

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FINAL READING APPROVAL

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I have read the dissertation of Ronald K. Mitchell in its final form and have found that (1) its format, citations and bibliographic style are consistent and acceptable; (2) its illustrative materials including figures, tables, and charts are in place; and (3) the final manuscript is satisfactory to the supervisory committee and is ready for submission to The Graduate School.

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ABSTRACT

This study answers the question: Is the occurrence of new venture formation (NVF) associated with individual expertise? The research provides a multiple test of expert information processing theory (EIPT) in the NVF setting. Three consequences of an affirmative answer to the research question are implied:

1. the components of expertise should conform to theoretical constructs specified by EIPT,
2. discrimination between experts and novices using EIPT constructs should be possible, and
3. individuals' NVF expertise should be susceptible to enhancement as asserted by EIPT.

A theoretical model is proposed, and the three foregoing implications are tested in three consecutive studies using survey data.

Study 1 uses exploratory and confirmatory factor analysis in a LISREL model to identify three components of NVF expertise: "arrangements," "willingness," and "opportunity-ability." Study 2 employs multiple discriminant analysis to demonstrate that discrimination between NVF experts and novices is possible using the NVF component-constructs identified in Study 1. Study 3 utilizes an experimental expertise enhancement intervention to demonstrate using t-tests and multiple discriminant analysis, that individuals' NVF expertise in susceptible to enhancement as asserted by EIPT.

In this dissertation, two heretofore disparate fields, entrepreneurship theory and expert information processing theory (EIPT), are combined. This "new combination" (Schumpeter, 1934) results in the following contributions:

1. The composition of NVF expertise is delineated on the basis of empirical findings,
2. The classification of individual venturers into more finely discriminated categories between expert and novice is made more practical, and
3. The process of creating additional expertise in NVF novices is documented, better understood, and improved.

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CHAPTER 1

INTRODUCTION

> What astonishes me in the United States is not so much the marvelous grandeur of some undertakings as the innumerable multitude of small ones. (Alexis de Tocqueville, 1835)

Most new ventures begin as small undertakings. During the century and a half since de Tocqueville, the innumerable multitude of new venture undertakings in the United States has driven the century's economic growth by creating jobs, innovations, and opportunities for global business expansion.

In the past few decades, virtually all of the net new jobs created in the United States have come, and are likely to continue to come, from new and expanding firms (Timmons, 1990). During the 20 years from 1965 to 1985, the 35 million job increase in the U.S. economy consisted of 40 million jobs from small- and medium-sized businesses that offset a decline of 5 million jobs in big businesses and virtually flat job growth in the government sector (Birch, 1988). Demographers estimate that by the year 2000 there will be 30 million firms in the United States, a 167% increase from the 18 million firms in the economy in 1988 (Swain, 1988). New job creation and new venture formation (hereinafter referred to as "**NVF**") are inextricably linked.

New firms also mean innovation. Since World War II, 50% of all innovations, and 95% of all radical innovations such as the micro computer, overnight express packages, and fast food, have come from new and smaller firms (Timmons, 1990). Evidently, a large proportion of the value added in our economy by innovation comes from NVF.

Additionally, in an increasingly globalized economy, NVF is a source of economic progress. An unprecedented and sustained global entrepreneurial effort is now underway (Byrne, 1993; Timmons, 1990). New ventures are forming at unparalleled rates, and the spirit that infuses them is reshaping economies and markets around the world (Byrne, 1993). NVF appears to be a global phenomenon as well.

Unfortunately, the results of NVF are dichotomous. Newly formed ventures tend to be either highly rewarding successes, or painful failures (Timmons, 1990). Unrivaled formation rates also coincide with unequaled failure rates (Cooper, Dunkelberg, & Woo, 1988; Shapero & Giglierano, 1982). The success-failure dichotomy challenges entrepreneurship researchers to illuminate the underlying dynamics of NVF so that the productive-destructive aspects of starting businesses can be better managed.

One dynamic force in NVF is the entrepreneur. The new

ventures that create jobs, foster innovation, and help keep the economy competitive in an increasingly globalized economy, are not formed in a vacuum. Each new venture is created by a person--an entrepreneur. Since the foregoing three effects of NVF are pervasive, a thorough understanding of the influence of individual entrepreneurs on NVF is therefore of critical importance to the scholarly community, the business community, and to society as a whole.

A Crossroads for Entrepreneurship Research

After over 200 years of study in the field of entrepreneurship, no theory that clearly explains when an entrepreneur might appear or form a venture has been developed (Bull & Willard, 1993, p. 183). In the following paragraphs (1) three theory streams that have addressed the entrepreneur and NVF are summarized, (2) present research challenges are explained, (3) one new approach to understanding entrepreneurs and NVF is described, and (4) an expertise-based approach to understanding entrepreneurs and NVF is suggested.

The entrepreneur and new venture formation

The theories that have attempted to explain the relationship between the entrepreneur and NVF stem first from

research and theory building in the field of economics. These theories view the contribution of the entrepreneur to be the creation of new enterprise (Low & MacMillan, 1988; Rumelt, 1987; Schumpeter, 1934), an outcome-based approach to understanding NVF.

Second, during the past 25 years, a great deal of research effort has also been expended in attempts to "describe" entrepreneurs as the key component in NVF. These efforts can be termed a characteristics-based approach.

Third, as an outgrowth of strategic management research, attention during the past 10 years has been focused on how the performance of the venture itself is influenced by the entrepreneur. This stream of research is known as the new venture performance (hereinafter referred to as **"NVP"**) -based approach (Herron, 1990; Kunkel, 1991; McDougall, 1987; Sandberg, 1986).

At present, then, entrepreneurship research stands at the confluence of these three literature streams: economic, characteristics, and NVP. Unfortunately for the field, each stream has its shortcomings.

Research challenges in entrepreneurship

Challenges in entrepreneurship research vary, depending

upon the particular theory stream. For example, the economic stream has not been sufficiently operationalized. Even very recent journal articles advocate economic theories of entrepreneurship, but leave the empirical tests to future research (Baumol, 1993; Bull & Willard, 1993). Also, efforts to isolate psychological or demographic characteristics that are common to all entrepreneurs have met with failure. Apparently no "typical" entrepreneur exists (Brockhaus & Horowitz, 1986; Bull & Willard, 1993; Sexton & Bowman-Upton, 1991). Until Herron (1990) demonstrated that entrepreneurial skill and skill propensity are related to NVP, the persistent attempts of researchers in the NVP stream to link entrepreneurial characteristics to performance (Cooper, Willard & Woo, 1986; Kunkel, 1991; MacMillan & Day, 1987; McDougall, 1987; Sandberg, 1986) met with little success.

Yet, despite this lack of evidence, practitioners and venture capitalists continue to consider the individual who forms the venture to be critical to its success (Hall & Hofer, 1993; Herron, 1990; Sandberg, 1986; Stuart & Abetti, 1990). Thus actual practice within the entrepreneurship community differs from much of the research reported to date. Therefore, new approaches that explain the contribution of the entrepreneur to NVF are called for (Bull & Willard, 1993;

Herron, 1990; Sandberg, 1986; Stevenson & Harmeling, 1990; Willard, Kreuger, & Feeser, 1992).

One new approach to understanding entrepreneurs and NVF

In one new approach to understanding entrepreneurs and NVF, Bull and Willard (1993, p. 188) apply economic stream-based principles to theory building, proposing four constructs that focus on the entrepreneur as the catalyst for NVF: (1) venturing motivation, (2) expertise, (3) expectation of gain, and (4) environmental support.

However, the use of these constructs in an attempt to better explain the role of the entrepreneur in the occurrence of NVF raises at least three issues. First, little empirical support exists for a theory that relies on entrepreneurial characteristics such as motivation, except Herron's (1990) finding that the propensity for an entrepreneur to apply venture-related skills (skill propensity) is related to NVP.

Second, Bull and Willard's notion of expertise is narrow, corresponding more closely to the notion of ability or skill (Herron, 1990), than to the more comprehensive notion of expertise described and commonly accepted by information processing theory, the field where expertise has been studied

for over 20 years (Lord & Maher, 1990).

Third, a theory that integrates characteristics-based constructs (motivation and expertise) with economic constructs (expectation of gain and environmental support) encounters the difficulties in operationalization that are typical of the economic literature stream. Because Bull and Willard do not operationalize their theory nor do they suggest a likely means to do so, a model that operationalizes their theoretical constructs is needed if progress toward a more explanatory theory of NVF is to continue.

An expertise-based approach

Recently, the information processing models of expert information processing theory (hereinafter referred to as **"EIPT"**) have been introduced into the management domain (Lord & Maher, 1990). One model in particular, the expert information processing model, has constructs that appear to closely parallel the key NVF ideas of both Herron (1990) and Bull and Willard (1993) as illustrated in Table 1-1. The apparent similarity of EIPT constructs to the NVF constructs of Bull and Willard (1993) and Herron (1990), suggests the possibility

Table 1-1
Parallels Among Three EIPT Constructs, and NVF Constructs from the Entrepreneurship Literature

EIPT	Bull and Willard	Herron
. Ability	. Expertise	. Skill
. Willingness	. Motivation . Gain Expectation	. Skill Propensity . None
. Enabling Resources	. Environmental Support	. None

that EIPT might be applied to improve our understanding of the role that individual entrepreneurs play in the occurrence of NVF.

Research Questions

The need to operationalize a more explanatory theory of NVF, combined with the promise of EIPT to satisfy that need, stimulates the main research question guiding this dissertation:

> Is the occurrence of new venture formation associated with individual expertise?

Three consequences are implied should this association exist. First, the components of expertise should conform to

theoretical constructs specified by EIPT; second, discrimination between experts and novices using EIPT constructs should be possible; and third, individuals' NVF expertise should be susceptible to enhancement as asserted by EIPT. The following paragraphs develop the research subquestions that follow from these expectations.

The composition of NVF expertise

EIPT holds that experts out-perform novices within their specialized domain because they can recognize immediately that which novices may miss or require great effort to discover: compliance of expertise-specific circumstances with an expert script (Glaser, 1984). This assertion implies that components of NVF expertise should be revealed by individuals' recognition of expertise-specific cues (script cues). Accordingly, the first of the three research subquestions implied is:

1. Can components of new venture formation expertise be delineated using script cue recognition-based indicators of new venture formation constructs?

The classification of NVF expertise

Bull and Willard also assert that there is no typical entrepreneur (1993, p. 187). However, the possibility that underlying components of expertise exist raises the hope that

finer distinctions among NVF experts and novices may be developed--possibly leading away from the notion of "typical entrepreneur" and toward the notion of "NVF expert." This dissertation asserts that entrepreneurship research has progressed to the point that the next logical step in the development of a key capability in the field is to be able to discriminate differences in NVF experts and novices, using components of entrepreneurial expertise developed from script cue recognitions. Accordingly, the second research subquestion suggested is:

2. Can script cue recognition-based indicators of NVF component constructs be used to discriminate between NVF experts and novices?

The creation of NVF expertise

EIPT also suggests the potential for creating enhanced entrepreneurial expertise. Specifically, EIPT proposes that the creation of "knowledge scaffolds" in novices (enhancing expertise) occurs when novices compare their scripts with those of experts in an in-depth contact setting (Glaser, 1984; Lord & Kernan, 1987; Norman, Gentner & Stevens, 1976). Certain experiential learning methods qualify as in-depth contact (Collins & Stevens, 1982; Glaser, 1984; Lord & Kernan, 1987; Petranek, Corey & Black, 1992), suggesting the third

research subquestion:

3. Does an expertise enhancement method that provides novices in-depth contact with experts enhance novice expertise such that their script cue recognitions more closely approximate those of experts?

Significance of the Research

The entrepreneurship literature consists of numerous studies that analyze the relationship of the entrepreneur to NVF according to economic, characteristics-based, and NVP criteria. Although a great deal has heretofore been learned, research is at a crossroads because consistent evidence regarding the underlying dynamics of the entrepreneur-NVF relationship has not yet been identified. Further, little research synthesizes key ideas in the field. Identification and testing of theories that explain and synthesize these underlying dynamics is needed to better understand and manage the entrepreneur-NVF relationship, because of its significant impact upon job creation, innovation, and international economic competitiveness.

The research described here moves toward such a perspective by conducting multiple tests of theory to determine whether the occurrence of NVF by individuals is associated with entrepreneurial expertise. Although the premise that NVF expertise is an underlying dynamic in the entrepreneur-NVF

relationship may seem to be intuitive, this notion has only recently been suggested (Bull & Willard, 1993), and has neither been operationalized nor supported. Additionally, as noted previously, other research streams in the field of entrepreneurship have failed to provide this evidence. As a result, an application of the EIPT notion of expertise to the field of entrepreneurship has the potential to synthesize key elements of the economic, characteristics-based, and NVP research streams through the identification of key dynamics in the entrepreneur-NVF relationship. If this synthesis is accomplished, the following contributions are envisioned:

1. **The composition of NVF expertise could be delineated on the basis of empirical findings.**

A model that identifies the various components of NVF expertise as "underlying dynamics" of the entrepreneur-NVF relationship, would contribute markedly to future research that addresses new questions such as those posed by Bull and Willard (1993), and extends previous work such as Herron (1990). Bull and Willard (1993) suggest investigations into how formal expertise (1) affects the recognition and pursuit of opportunities, and (2) accounts for the geographic clustering of new ventures (1993, p. 193). Herron (1990) has contributed a vital link between two characteristics of entrepreneurs and NVP. The identification of other, expertise-

based components, could constitute a natural extension of Herron's work.

2. **The classification of individuals into more finely discriminated categories between expert and novice could be made practical.**

For at least the past decade, scholars in the field have been advancing typologies that categorize entrepreneurs (Bird, 1989; Derr, 1984; Vesper, 1980; Wortman, 1987), often in a theory-building sense, unaccompanied by empirical testing. The integration of several key elements of the economic, characteristics-based, and NVP research into a classification model with significant discriminating power could reveal finer-grained distinctions among experts, and between experts and novices, and could thereby contribute an element of stability, perhaps even standardization to entrepreneurship typologies. Empirical testing of these typologies might also be made more practical. Furthermore, such a model might be used in future research to help to explain the relationships between NVF or NVP, and particular types of entrepreneurs. Finally, the testing of prospective new venturers using typologies developed in this research as a map for plotting expertise levels and generating feedback, may help to prevent new venture failure, and encourage new venture formation.

3. **The process of creating additional expertise in NVF novices could be documented, better understood, and**

perhaps improved.

Improvements in creating new venture experts through training could be anticipated. Brockhaus and Horowitz (1986) maintain that " . . . one of the major concerns of those interested in the continued growth of new business is the issue of whether entrepreneurs are born, or whether they can be created through training" (1986, p. 37). Findings that document a relationship between the in-depth contact-based training techniques advocated in EIPT and enhanced NVF expertise could provide answers to such questions.

Organization of the Dissertation

The first chapter has presented an introduction to the dissertation by broadly outlining the present crossroads in entrepreneurship research, and by stating the research questions and potential contributions of the dissertation. Chapter 2 provides a theoretical context for the study and specifies the research model, propositions, and hypotheses to be tested. Chapter 3 discusses the data collection, measurement, and data analysis procedures employed in this dissertation. Chapter 4 reports results. In Chapter 5, the implications, limitations, and suggested extensions of this research are discussed, and conclusions are drawn with respect to the research objectives of this dissertation.

CHAPTER 2

A THEORETICAL FRAMEWORK

This chapter places the propositions and hypotheses in this study in the context of previous work in entrepreneurship and EIPT. The chapter consists of seven sections. Section one traces the development of NVF research from its beginnings in the economics literature to its present status in that literature. Section two describes the characteristics-based approach, with specific attention to the conflicting findings that plague this stream. Section three chronicles the developments in the field of strategic management that provide the setting for the NVP literature stream, and summarizes the most recent work in this area. Section four summarizes the possibilities for integration that arise from the present crossroads in entrepreneurship research. The fifth section describes the key notions of EIPT as they are expected to apply to NVF research. Section six advances an expertise-based model of NVF that integrates prior work. Section seven delineates the research model.

Economic Theories

Theory development in economics-based new venture formation research may be traced through three periods: (1)

early economic theories, (2) the work of the Austrian School of Economics, and (3) relatively recent attempts at theory development that build upon this prior work. Although a great many scholars have taken an economic approach to the topic of entrepreneurship in general, relatively few speak directly to the topic of NVF. The parts of this section that follow, review the contributions of key scholars who do, in chronological order.

Early economic theories

Some analysts trace the concept of entrepreneurs and entrepreneurship back at least as far as the publicans of the Roman Empire (Badian, 1972). The noun "entrepreneur," first found to be in use during the 15th century, originated with the French verb "entreprendre," connoting "to do something," traceable to the 12th century (Hoselitz, 1960). The first formal economic theory of entrepreneurship appeared in the latter years of the mercantilist age in the writings of Richard Cantillon (McMullan & Long, 1990) in which the earliest commentary on NVF is recorded.

Cantillon's (1755) notion of self-employment (i.e., an independent venture *outside* employee status) is characterized by the term "undertaker." According to Cantillon, "undertaking" business relationships separate from employment for

wages, results in a new business entity. By becoming self-employed, individuals form new ventures. Under Cantillon's definition, "undertaking" and NVF are therefore synonymous. Unfortunately, under this definition even beggars and robbers create new enterprise (Cantillon, 1755). Consequently, a more precise characterization of those who form new ventures is needed.

In the middle of the 18th century, the Abbé Nicholas Baudeau provided a step toward the additional precision required. Referring to agriculture, the most common economic setting of the time, Baudeau advocates three key requirements for NVF that continue to figure heavily in NVF theory today. Baudeau states:

> Nothing is more evident, [than that] we need a numerous race of farmers or chief farmers endowed with the knowledge of their art, moved by a great desire to translate their knowledge into action. (Baudeau, [1767] 1910, p. 51)

Here Baudeau introduces two of his three requirements for NVF: "desire" and "specialized knowledge." He suggests that the third requirement, "an environment that provides capital and resource support," should be provided by "owners" through a lease arrangement (McMullan & Long, 1990, p. 59).

Baudeau was also one of the first scholars to describe two key consequences of NVF that have occupied scholars and

practitioners to this day: jobs and innovation. First, Baudeau anticipates that entrepreneurs with appropriate backing could form businesses that " . . . undertake all the risk and expense of hiring and paying ordinary workers" (Baudeau, 1910, p. 50), the essence of job creation through NVF. Second, Baudeau asserts that innovation is one of the principal consequences of NVF. He states, "The entrepreneur bears uncertainty, organizes and supervises production, introduces new methods and new products and searches for new markets" (Hoselitz, 1951, p. 210). As reiterated in the work of Schumpeter cited later in this section, the enacting of these innovative combinations is the essence of NVF.

Additionally, Baudeau saw the public policy implications of NVF. He argues that entrepreneurs should and could be educated, and that government policy should be modified to encourage entrepreneurship (McMullan & Long, 1990), because entrepreneurs " . . . must have the capacity of economically combining the appropriate goods and services to the end of (their) greatest profit" (Hoselitz, 1951, p. 209). With these assertions, Baudeau solidifies the main idea behind NVF: that individual economic combinations (new venture formation) generate separately identifiable benefits (jobs, innovations, and profits). The work of Baudeau affirms the notion that NVF is one of the primary contributions of the entrepreneur.

The "Austrian School"

The next step toward achieving an acceptably precise theory of NVF was taken by early scholars in the Austrian School of Economics. Menger (1871), Schumpeter (1934), and Hayek (1937) each contribute to a more thorough understanding of the key components of NVF.

Menger (1871), father of the Austrian School, suggests the notion of an entrepreneurial "act of will" or motivation that initiates a production process. Schumpeter (1934) suggests that the ability to carry out certain "new combinations" that include: (1) the introduction of a new good, or new quality of good, (2) the introduction of a new method of production, (3) the opening of a new market, (4) the conquest of a new source of supply of raw materials or components, or (5) the reorganization of an industry, stimulates the discontinuity or disequilibrium that results in NVF (1934, p. 74). Those who possess the knowledge and ability to enact these outcomes he calls entrepreneurs. Hayek (1937) suggests that entrepreneurial expectations are a driving force in NVF. He asserts that venture-type activities depend upon the veracity of producer expectations relative to consumer intentions.

Recent theory development

Adherents of the Austrian view continue into the present. The work of Leibenstein (1968), Kirzner (1982), and Bull and Willard (1993) extends and clarifies earlier developments in the economic stream.

Leibenstein (1968) describes NVF where the entrepreneur marshals all resources necessary to produce and market a product that answers a market need. Consistent with Leibenstein, Kirzner (1982) focuses on environmental alertness: the opportunity recognition and venture ideation that results in NVF. Kirzner sees the entrepreneur as possessing particular resources such as industry knowledge and contacts that enable entrepreneurs to perceive the gaps that need to be filled and to be able to fill them.

Most recently, scholarly interest in the Austrian view of NVF, particularly in the work of Schumpeter (1934), has culminated in the work of Bull and Willard (1993). Bull and Willard suggest a Schumpeterian theory of NVF that is "acceptably precise" though "tentative" (1993, pp. 186, 188). Following the primary dicta of the Austrian School, and echoing Baudeau, they assert that NVF is an economic discontinuity that occurs under conditions that include task-related motivation, expertise, the expectation of gain, and a supportive environment. Bull and Willard set out to "build theory"

through the explicit definition of each condition, but do not proceed from definition to operationalization. Nevertheless, these definitions contribute a useful beginning point for this study, and are therefore explained in the paragraphs that follow.

Bull and Willard define "motivation" to include reasons for carrying out new venture formation, including the determination not to work for someone else, the desire to accept responsibility for solving problems, setting goals and reaching those goals through one's own efforts, a desire to know the outcomes of decisions, a dedication to the values embodied in some core task or to achieving a utility embodied in a core task, and a desire to experience entrepreneurial highs such as enthusiasm, excitement, a sense of having fun, and experiencing the fulfillment of a vision (1993, pp. 188-189).

Their notion of "expertise" consists of knowledge from previous work experience (e.g., an incubator organization) or related to a particular technology of use to the venture, the perception of outsiders that he or she has been investigated by them and has been determined to have potential, knowing the essentials of operating a successful business, and linkages between entrepreneurs and opportunities (1993, pp. 189-190).

The Bull and Willard notion of "expectation of gain for

self" encompasses conditions that indicate the capability to resist the appropriation of entrepreneurial rents by powerful outsiders (e.g., isolating mechanisms and first mover advantages [Rumelt, 1987]), the speculative ability to see into and enhance one's position in the future, and interactions between social, cultural, and personal factors that precipitate the entrepreneurial event. Bull and Willard closely relate the expectation of gain for self to motivation (1993, pp. 191-192).

Included in Bull and Willard's definition of "environmental support" are elements such as: available role information from predecessors, existing know how with proven value in the marketplace, existing support networks, existing linkage between aspiring entrepreneurs, resources, and opportunities, an infrastructure that supports entrepreneurship, and opportunistic and collective efforts of independent actors in common pursuit of a technological innovation.

Because the Bull and Willard theory is current, relatively well defined, and in need of operationalization, it offers a useful theoretical framework from which to draw a priori notions for this study. However, a model that integrates and operationalizes their theoretical constructs is needed.

The notions of EIPT regarding expertise have potential

to do this when applied to NVF research. The reader is invited to note this suggestion for future reference as an EIPT-based model of NVF is later proposed in section six.

Characteristics-based Theories

Beginning with Jean-Baptiste Say (circa 1810), the "qualities" or characteristics of the entrepreneur have figured prominently in the entrepreneurship literature. Say asserts:

> In the course of such complex operations there are an abundance of obstacles to be surmounted, of anxieties to be repressed, of misfortunes to be repaired, and of expedients to be devised. Those who are not possessed of a combination of these necessary qualities, are unsuccessful in their under-takings; their concerns soon fall to the ground. (Say, [1847] 1964, p. 331)

Here, Say advances the appealing notion that some combination of personal characteristics is related to new venture success. Based upon the appeal of this idea, an entire literature stream has developed, begun first with theoretical speculations (Knight, 1921; Marshall, 1964; and others) and descriptive studies (Berlew, 1975; McClelland, 1965; Coulton & Udell, 1976; and others), and followed only recently (in the past two decades), with rigorous analysis (Brockhaus, 1980; Brockhaus & Nord, 1979; Hull, Bosley & Udell, 1982; and others).

With the rise of social science in the nineteenth century, and particularly of social psychology in the twentieth century, a research infrastructure was developed within which characteristics-based theories of the entrepreneur could be rigorously explored. These advances have resulted in attempts to verify the causal links between entrepreneurs' psychological and/or demographic characteristics and various outcomes (Sexton & Bowman-Upton, 1991) as envisioned by Say. However, although work in this literature stream has succeeded in creating a substantial body of descriptive research, empirical results have often been unclear (Brockhaus & Horowitz, 1986; Sexton & Bowman-Upton, 1991).

Two primary branches exist in the characteristics-based literature stream. The first branch attempts to distinguish entrepreneurs based on psychological characteristics. The second branch attempts to distinguish them on the basis of demographic characteristics. In the two parts of this section that follow, several representative studies from each branch are summarized, along with disconfirming results where applicable.

Psychological characteristics

Psychological characteristics-based research focuses on a very broad range of psychological characteristics including

(not exhaustively) the need to control and direct, self-confidence, a sense of urgency, good health, comprehensive awareness, realism, superior conceptual ability, needs for status, objectivity in interpersonal relations, emotional stability, attraction to challenge, level of creativity, need for achievement, belief in an internal locus of control (belief in the ability to control the environment through individual actions), risk-taking propensity, and more (Coulton & Udell, 1976; McClelland, 1965; McClelland & Winter, 1969; Rotter, 1966; Welsh & White, 1981). Cattell (1947, 1957) " . . . reduced Allport and Odbert's (1936) list of over 18,000 trait terms to 16 basic traits using cluster and factor analysis" to form the basis for some of the psychological characteristics-based research (Herron 1990, p. 51).

Examples of subsequently disconfirming research on the most commonly cited psychological traits: the need for achievement, belief in an internal locus of control, and risk-taking propensity (Sexton & Bowman-Upton, 1991) illustrate the present level of confusion in this research stream. The difficulty arises because the factors that describe entrepreneurs " . . . also tend to describe successful people in many areas, such as business, art, music, and education" (1991, p. 9). The citation of a few of the unclear areas follows.

Need for achievement

McClelland (1965) asserts that a need for achievement drives people to become entrepreneurs. However, the research continues to show that while entrepreneurs are high achievers, the same thing has been discovered about successful executives (Brockhaus & Horowitz, 1986).

Internal locus of control

Based on Rotter's (1966) work, Berlew (1975) finds that successful entrepreneurs not only desire personal responsibility for their success, but perform best in situations where they have personal responsibility for results--tending to be internally rather than externally controlled. But when Brockhaus and Nord (1979) compare the locus of control beliefs in entrepreneurs and managers, the groups do not differ significantly. Hull, Bosley, and Udell (1982) in a survey of over 300 University of Oregon alumni intended to distinguish between the personalities of entrepreneurs and nonentrepreneurs, find that internal locus of control is the one factor that shows no significant difference.

Risk-taking propensity

Coulton & Udell (1976) report that one of the personality characteristics that is most important in identifying

entrepreneurial types of individuals is risk-taking propensity. However, Brockhaus (1980) finds no significant differences in the general risk preference patterns of a group of entrepreneurs and a group of managers. Also, Sexton and Bowman (1983) find no significant difference in the risk-taking propensity of entrepreneur students and those of the general student body.

Demographic characteristics

The demographic characteristics-based body of research attempts to ascertain the association, if any, between demographic characteristics and the decision to become an entrepreneur. Although a range of variables such as age, years of marriage, years in the labor force, number of previous jobs, years of formal education, number of previous attempts to start a business, being the oldest child in a family or the child of an owner-manager, holding membership in professional and/or trade organizations, profit expectations, outside encouragement, anticipated difficulties, and evaluation of personal shortcomings, have been examined (Brockhaus & Horowitz, 1986), empirical findings are mixed.

Examples of subsequently disconfirming research on the most commonly cited demographic traits: being the child of an owner-manager, and level of education (Litvak & Maule, 1971;

Vesper, 1982) illustrate the present lack of clear evidence in this research stream.

Child of an owner-manager

Litvak and Maule (1971) find that successful high-technology entrepreneurs have fathers who are owner-managers. When Brockhaus and Nord (1979) asked managers and new entrepreneurs if any close relative or friend had owned a business, they found no significant difference between the two groups.

Level of education

Vesper (1982) asserts that the most likely entrepreneurs to fail are those with experience but no education. Previous findings of Brockhaus and Nord (1979), which show the level of education to be significantly less for successful entrepreneurs than for managers, raise questions about just what level of education is appropriate. Accordingly, Brockhaus & Horowitz assert that ". . . one of the major concerns of those interested in innovation and continued growth of new business is the issue of whether entrepreneurs are born or whether they can be created through training" (1986, p. 37). At present this issue remains unresolved.

Thus, although the characteristics-based approach focuses the study of entrepreneurs on psychological and

demographic characteristics in an attempt to discover the causal factors in entrepreneurial activity (Sexton & Bowman-Upton, 1991), the resulting descriptive research is generally inconclusive (Brockhaus & Horowitz, 1986; Sexton & Bowman-Upton, 1991).

Theories of New Venture Performance

This section reviews a portion of the "venture focused" literature salient to this study. As previously discussed, the venture-focused approach arises out of the strategic management paradigm. Examining work on the nature of new ventures, and particularly new venture performance, provides valuable context for the present research because the NVP literature is the stream most closely related to this study.

The rise of the strategic management paradigm during the 20th century has provided a research scaffold that supports turning the focus of entrepreneurship research more toward the venture itself. Strategic management concerns itself, not just with NVF, but with the performance of ventures as influenced by specific actions of strategic decision makers. A review of the developments in the field of strategic management in the first part of this section provides the setting for the NVP literature stream. The second part of this section summarizes the most recent work in NVP.

Strategy and new venture performance

The field of business strategy is newer than that of entrepreneurship. Prior to the latter half of the 20th century, the term strategy was applied primarily in the military context. Alexander the Great (325 B.C.), Sun Tsu (300 B.C.), and Julius Caesar (55 B.C.) each contributed to the doctrines of strategy as applied to military performance--winning wars.

The application of strategic concepts to the organizational, and specifically the business setting, began with the work of Barnard (1938, 1948) as he explored the functions of the executive in organization and management, with special attention to the results attainable through conscious, deliberate, purposeful cooperation. Simon (1945, 1957) added concepts of structure and decision making. Bain (1948, 1950, 1951, 1954) built upon the work of Mason (1939) to advance the notion that industry structure (the number of sellers and buyers, the level of product differentiation, the existence of barriers to entry, and the extent of vertical integration) profoundly affects conduct (pricing and advertising), which in turn affects performance (social allocative efficiency and firm profits).

Selznick (1948, 1949, 1957) and Drucker (1954) added the key observation that certain decisions are critical, such that

Chandler (1962) was able to propose that structure and conduct are actually *preceded* by strategy as the fundamental variable, which could be employed through executive coordination to affect results. Following Chandler's insight, Ansoff (1965), Ansoff and Brandenburg (1967), Odiorne (1969); Ansoff, DeClerck and Hayes (1976), Andrews (1971, 1980), Porter (1980, 1985), Rumelt (1984, 1987), Conner (1991), and others have asserted that managerial action can affect crucial organizational outcomes.

Building, then, upon the work of scholars in the latter half of the 20th century, strategy is defined as the pattern of decisions that determines and reveals the objectives, purposes and goals of the organization, produces the principal policies and plans for achieving them, and specifies the range of business, the kind of economic and human organization, and the nature of the organization's contributions to stakeholders, society, employees and customers (Andrews, 1991). This definition of strategy highlights (1) the almost total dependence upon the actions of management to reveal and determine crucial directions for the organization, and (2) the pervasive and wide-ranging influence that strategic decisions have upon the performance of an organization. It puts the focus on performance as the primary outcome of strategic activity, and upon the actions of key decision

makers as critical to that performance.

By logical extension, the strategic management viewpoint leads to the notion that identifying the actions of key venture decision makers--namely entrepreneurs--that affect new venture performance, is crucial to an understanding of entrepreneurship. However, until Herron (1990), links between particular features of entrepreneurial action and NVP were not confirmed.

Recent work in new venture performance

The recent research in the NVP stream that leads up to Herron (1990) begins intuitively with the following reasoning. If, despite the conflicting results of entrepreneurial characteristics research, venture capitalists continue to believe that NVP is a function of the characteristics of the entrepreneur (Hall & Hofer, 1993; MacMillan, Seigel & Narasimha, 1985; Stuart & Abetti, 1990), along with industry structure, and venture strategy (Herron, 1990; Sandberg, 1986), it follows then that relationships ought to exist that can be verified empirically. In several empirical tests of this reasoning, NVP was found to be a function of industry structure, venture strategy, and particularly of the interaction effects of industry structure and venture strategy (Kunkel, 1991; McDougall, 1987; McDougall, Robinson & DeNisi,

1992; Sandberg, 1986), but little evidence was found to indicate that the characteristics of the entrepreneur affect NVP (Sandberg, 1986).

In a major step forward, Herron (1990) found a relationship between certain characteristics of the entrepreneur, specifically skill and skill propensity, and NVP. However, the more fundamental question of relating characteristics of entrepreneurs to NVF was not specifically addressed by Herron, nor has it been empirically addressed in other literature.

Possibilities for Integration

Thus at present, research on the topic of NVF stands at a crossroads. Herron (1990) successfully integrates the characteristics-based and the NVP literature streams, finding that the characteristics of skill and skill propensity are related to NVP. Bull and Willard propose a framework that can possibly integrate the economic literature stream with the work of Herron (1990). Bull and Willard's constructs of expertise and motivation closely parallel Herron's variables, skill and skill propensity. By adding the economics-based constructs of gain expectation and environmental support to form a comprehensive theory of NVF, Bull and Willard propose a theory that can encompass in one theory both Herron's findings, and key constructs from the economic view of NVF.

Now, a model that operationalizes all four theoretical constructs is needed. Of additional worth is a model that permits this operationalization while retaining the integrative nature of Bull and Willard's theory.

Recent developments in expert information processing theory (EIPT) offer an opportunity to operationalize the Bull and Willard model within such an integrated framework. EIPT proposes constructs that closely parallel those of Bull and Willard, and Herron, but which are integrated because they approach NVF from a new vantage point.

The unifying notion--the new lens for viewing NVF proposed in this research--is that the occurrence of NVF by individuals may be associated with expertise. The rationale for this suggestion begins with assertions in EIPT that relate the exceptional performance of experts to the specialized information processing capability associated with an expert "script." In the next step toward operationalizing an integrated model of NVF, the EIPT literature is reviewed to explore its usefulness in creating a research model.

Expert Information Processing Theory (EIPT)

During the past three decades, the application of information processing principles to the study of organizations has increased (Lord & Maher, 1990). One information processing

model in particular, the expert model, focuses on the role that " . . . cognitive scripts, a unique type of knowledge schema, plays in generating purposive behavior in organizations" (Lord & Kernan, 1987, p. 265).

The purposive behavior of interest in this study is NVF. The unique type of knowledge schema is an entrepreneurial expert script.

EIPT suggests an expert model: that the exceptional performance of experts is due to experts' versus novices' specialized information processing capability related to an expert "script." The model depends upon three key elements: (1) expert scripts, (2) a means to distinguish between experts and novices using expert scripts, and (3) theoretical constructs that describe the components of expertise upon which experts' specialized information processing capability with respect to scripts is expected to differ.

EIPT also suggests an enhancement model. EIPT asserts that in-depth contact between experts and novices can create "scaffolds for new information" in novices thus enhancing expertise (Glaser, 1984, p. 101).

Accordingly, this section consists of five parts: (1) a description of the expert model introduced in the preceding paragraphs, (2) the definition of an expert script upon which the model depends, (3) the suggestion that script cue

"recognitions" are a possible way to measure expertise, (4) an explanation of suggested expert model constructs, and (5) a discussion of expertise enhancement.

The expert model

According to EIPT, the presence of a highly developed knowledge system in the long-term memory of experts is one of the primary reasons for the exceptional capabilities of experts in their area of specialty (Lord & Maher, 1990). These highly developed knowledge systems are organized around context-relevant scripts (Read, 1987). Glaser (1982) suggests that experts store and retrieve information from long-term memory differently than novices do. Because " . . . experts' knowledge structures [scripts] in long-term memory are larger and more easily accessed from short-term memory, . . . extensive knowledge [an expert script] substitutes for limited processing capacity in short-term memory" (Lord & Maher, 1990, p. 14). The main assertion of the expert model is simply stated: experts out-perform novices within their area of expertise because they can recognize immediately that which novices require great effort to discover--compliance of expertise-specific circumstances with an expert script. Lord and Maher stress, however, that experts are not superior information processors in a general sense, but that they

perform better only within their specific domain of expertise.

According to the expert model, an "expert" is defined as an individual who possesses an expertise-specific script that has been gained mainly through experience (Glaser, 1982; Lord & Maher, 1990). This definition implies that those with *experience* in a specific domain are expected to possess more expertise because they have developed an expertise-specific script.

Expert scripts

The term "expert script" refers to highly developed, sequentially ordered knowledge in a specific field (Glaser, 1984; Leddo & Abelson, 1986; Lord & Maher, 1990; Read, 1987). An expert script is most often acquired through extensive real world experience, and it dramatically improves the information processing capability of an individual (Glaser, 1984). Expert scripts are distinct from and should not be confused with dramatic (Goffman, 1959), forecasting (Shoemaker, 1993), or transactional (Berne, 1976; Stapleton & Murkison, 1990) scripts.

Two types of script-based differences can arise. Experts can differ among themselves; and the body of experts as a whole can differ from novices. Unlike other types of scripts, especially dramatic scripts, no exclusive set of

things to say and do describes expert actions in a specific area of expertise. Accordingly, in addition to the many experiences that are common to action in an area of expertise, each expert can be expected to have some unique experiences that make his or her "script" distinct. Conversely, novices would be expected to have little, if any, scripted information that applies to an expert domain. Hence, a NVF script for one expert venturer may be expected to vary somewhat from that of another--but not as much as when the script of an expert is compared to the "nonscript" of a novice.

Therein lies the property of scripts that is of great interest and usefulness in the study of expertise: the persistent level of relative sameness of scripts within a context-specific domain (Abbott & Black, 1986) that is absent for individuals who are unfamiliar with that domain. For example, through experience and study, expert trauma physicians, even though trained at different times and in different settings, can quickly recognize the key dynamics that speed the diagnosis of an injury case in an emergency room without necessarily possessing identical trauma treatment expert scripts. Conversely, novices would see only confusion in much of the activity in an emergency room.

In a commonly understood script, the restaurant script, Abbott & Black (1986) describe how the order or sequence of

events and the events themselves can enhance individual understanding in otherwise complex, nonidentical circumstances:

> Sometimes having recourse to knowledge of a standard sequence of events, the reasons for which we have already determined to our satisfaction, is useful in the understanding process. When a waitress comes to our table with food in a restaurant it is not necessary to figure out what caused her to arrive. It is sufficient to have knowledge of the causal sequence of events in restaurants to allow us to behave appropriately. This knowledge leaves more cognitive capacity available for use in more interesting tasks. It also allows a certain amount of ellipsis in textual accounts of situations that have a commonly recognized sequence of events. These standard sequences of events have been termed scripts. (Schank & Abelson, 1977, as cited in Abbott & Black, 1986, p. 130)

Scripts are thus defined as commonly recognized sequences and events that permit rapid comprehension of expertise-specific information by experts.

As noted earlier, the expert model suggests that the exceptional performance of experts is due to experts' specialized information processing capability related to an expert "script." The persistent level of relative sameness of scripts within a context-specific domain, that is absent for individuals who are unfamiliar with that domain, suggests an opportunity to use the recognition of expertise-specific scripted information (cues) as an empirical reference point. This notion of script cue recognitions provides a theoretical foundation for the measurement of expertise.

Script cue recognitions: Toward measuring expertise

A fundamental assertion of expert information theory is that experts interpret cues in problem statements differently than novices (Glaser, 1984). The reason for this dissimilarity of interpretation is traceable to differences in the way that individuals organize knowledge. EIPT scholars maintain that:

> . . . knowledge is *schematized* (emphasis in original), that is, organized in chunks or packages so that, given a little bit of appropriate situational context, the individual has available many likely inferences on what might happen next in a given situation. (Abelson & Black, 1986, p. 1)

This assertion leads to the speculation that if little bits of situational context (excerpts from expert scripts) are provided to individual respondents to a questionnaire as cues, their ability to recognize the context as applicable to them individually, might reveal their level of expertise.

In this study, excerpts from entrepreneurial expert scripts come from the entrepreneurship and expert-theory literatures. These excerpts provide the bits of situational context (referred to hereinafter as "script cues") that are used to discriminate experts from novices. Those individuals with expertise in NVF are expected to recognize bits of situational context (script cues) as being applicable to them.

Those without expertise are expected to make few such attributions.

Script cue recognition as attribution

The foregoing logic is confirmed by Lord and Maher (1990), who cite attribution theory as justification for using expert scripts in the research context. Read (1987) provides the foundation for this approach stating: " . . . the ways in which people typically explain and predict social behavior have a great deal in common with how people understand and tell stories" (1987, p. 300). As a story telling and story understanding device, a script " . . . provides a large bundle of information from which to generate the inferences necessary to connect a sequence of actions into a coherent whole" (1987, p. 290).

The notion of people as "story understanders and story tellers" versus the notion of people as "naive scientists" is suggested by Read as a "guiding metaphor" for making attributions (1987, p. 300). Scripts as representational "stories" are thus expected to evoke one set of attributions from experts and another from novices (Mitchell & Kalb, 1982).

Script cue recognition as more than recall

Anyone who has participated in the educational process

can relate to the requirements of examinations. In an exam, questions are posed that attempt to determine the level of an individual's knowledge about a particular subject. Most often, testing consists of determining an individual's recall and understanding of pieces of information that may or may not be set in context. In contrast, script cue recognitions occur where experts recognize the context within which the content is set, as well as the content itself.

Research in EIPT suggests that the knowledge of novices is topical versus contextual; i.e., that it is organized around the literal objects explicitly apparent in a problem statement. Hence, limitations in the thinking of novices derive from their inability to infer further knowledge from the literal cues in expertise-specific problem statements (Glaser, 1984).

However, experts' knowledge is organized around principles and abstractions that (1) are not apparent in a problem statement, (2) subsume literal objects, and (3) derive instead from a knowledge about the *application* of particular subject matter. Experts generate relevant inferences within the context of the knowledge structure or script that they have acquired (Glaser, 1984). Expert scripts specify context, because (1) they have a "sequential structure," and (2) they incorporate the "norms" that guide the actions of experts

in their area of specialty (Leddo & Abelson, 1986, p. 107). Script cue recognitions thus depend on contextually framed knowledge (Chi, Glaser, & Farr, 1988): knowledge that comes from understanding the sequences and norms of expertise-specific circumstances.

Both the entrepreneurial descriptive literature and expert theory offer clear examples of context-laden bits of information (script cues) that can become the substance of script cue recognition-based empirical investigation. The EIPT literature is replete with guidelines for expert script construction.

Appendix F describes the results of a literature review and analysis by the researcher that demonstrates how EIPT script construction criteria may be applied to transform "expert scripts" from a literature into script cue recognition statements that are consistent with EIPT.

Implications

Two implications arise from using scripts as an empirical evidential tool. The first relates to "sequence;" the second relates to "norms." First, the hierarchical, goal-subgoal organization of scripts permits individuals to make attributions that depend upon how events proceed sequentially (Leddo & Abelson, 1986). Because the level of compliance with

event sequence is readily discernable, scripts are able to offer an element of precision as an analytical device for assessing expertise.

Second, "scripts often provide context by specifying the normal behavior in a situation" (Read, 1987, p. 296). Thus, because a script is " . . . a normal background against which unexpected or deviant events can be explained" (1987, p. 297), it can function as a type of constant against which the script cue recognitions of individuals can be compared. Script norms provide stability as an empirical referent and aid in the measurement processes proposed later in this study.

Expert model constructs

As noted in the preceding discussion, experts' knowledge is organized around principles and abstractions that apply to expertise-specific circumstances (Glaser, 1984). Central to answering Research Subquestion 1, is the identification of the particular abstractions around which script cue recognitions might be expected to coalesce.

This study proposes that such abstractions, or theoretical constructs, could be considered to be the "components" of expertise. Operationally, if the occurrence of NVF by individuals is associated with expertise, then script cue recognition-based research results should confirm that

expertise consists of these components when examined in the NVF setting.

A framework

Findings reported by Leddo and Abelson (1986) suggest three possible components of expertise that can be observed in an empirical test. In interpreting the results of three studies that seek the determinants of experts' explanation for script failure, Leddo and Abelson reveal an opportunity for exploring the components of expertise.

Leddo and Abelson propose that the opportunity to distinguish novices from experts occurs at two key points in expertise-specific situations, when the performance of an expert script (an attempt to utilize expertise) might fail. According to Leddo and Abelson, these points occur either: (1) at the time of script "entry," or (2) as individuals engage in "doing" the things that serve the main goal of a script (e.g., take steps to form a new venture).

First, as conceptualized by Leddo and Abelson, script "entry" depends upon " . . . having the objects in question" (1986, p. 121). For example, an expert helicopter pilot requires a helicopter, an expert seismic geologist a seismo-graph, an expert trauma physician a well equipped emergency room.

Second, Leddo and Abelson conceptualize script "doing" to mean accomplishing the main action and achieving the purpose for being in the script. "Doing" depends upon two subrequirements: ability and willingness. Ability is defined as possessing the rudimentary techniques and skills necessary to a specialized domain (e.g., closing the deal may depend upon one's persuasive skill [1986, p. 121]). Willingness, in turn is defined as possessing the readiness, disposition, or inclination to use individual volition.

Application to NVF expertise

In the case of NVF, the "Entry" and "Doing" action thresholds parallel the requirements to form a new venture. Thus "Entry" (the beginning processes of NVF) would depend upon a supportive environment--specifically upon resources from that environment such as capital, opportunity, contacts, etc., and "Doing" would depend upon a combination of ability and willingness on the part of an entrepreneur.

The expert model suggests that expertise results from an individual's use of an expert script. When the Leddo and Abelson framework is applied to NVF, it can then be argued that NVF expertise ought to be related to individual scripts containing the "Entry"-based component, enabling resources, and the "Doing" components, ability and willingness. It

follows that discrimination among new venture experts and between experts and novices should be possible using these constructs.

With these components identified, one can focus more effectively on the issue of creating expertise through training (Brockhaus & Horowitz, 1986), because the areas in which training is necessary are made explicit. EIPT asserts that in-depth contact between experts and novices can create "knowledge scaffolds" in novices thus enhancing expertise (Glaser, 1984). One logical implication of an association between the occurrence of NVF by individuals and expertise, is that expertise enhancement affecting the identified components of expertise should occur concurrent with such in-depth contact.

Expertise enhancement

One of the major concerns of those who study NVF and the growth of new businesses is " . . . the issue of whether entrepreneurs are born, or whether they can be created through training" (Brockhaus & Horowitz, 1986, p. 37). Although the demand for entrepreneurship education is increasing (Solomon & Fernauld, 1991), little research rigorously differentiates better from worse ways of teaching entrepreneurial skills (Katz, 1991). The involvement of experienced entrepreneurs in

the process of entrepreneurship education has anecdotal support, but no generally accepted framework exists to guide the process (Hopkins & Feldman, 1986). EIPT offers both theory and practical suggestions for enhancing entrepreneurial expertise through specific types of in-depth contact with practicing entrepreneurs.

Research shows that expertise is acquired through specific processes (Galambos, 1986; Glaser, 1984; Lurigio & Carroll, 1985; McKeithen, Reitman, Reuter & Hirtle, 1981), such as significant study and experience (Lord & Maher, 1990). To enhance expertise, Glaser (1984) suggests an experiential process that utilizes individual contact with expert scripts as a primary expertise-creating technique. The process follows a course of interrogation, instantiation, and falsification whereby script rules and generalizations are tested and revised by student-novices in ways that facilitate the creation of additional expertise in individuals. Lord and Kernan (1987) refine this notion, proposing that comparing scripts is an efficient way for novices to learn expertise in a particular role.

This theory of expertise enhancement appears to have promise in creating additional NVF expertise in novices. But, because its general nature requires more specific definition for operationalization in a research setting, the researcher

consulted the simulation and gaming literature for direction in the design and implementation of an expert script-based expertise enhancement method.

Petranek, Corey, and Black (1992), for example, propose a series of activities for experiential learning that engage students in three levels of learning from a simulation: participating, writing, and debriefing. As described in Appendix E, this proposed series is used in conjunction with the enhancement processes suggested by Glaser (1984) to design the expertise enhancement method employed in this dissertation.

Participation in these expertise enhancement processes affects an individual's frame of reference (Quinn, 1988), belief structure (Walsh, 1988), and level of schemata completion (Glaser, 1984). Thus, the enhancement method is expected to positively influence an individual's expertise.

An Expertise-based Model

The basic research question in this study asks whether the occurrence of NVF by individuals is associated with expertise. As discussed in the foregoing review of the literature, if this is the case, three different but related consequences are implied: (1) there should be definable components of expertise represented by constructs that conform

to the theoretical structure of NVF expertise as suggested by EIPT, (2) evidence should support discrimination between NVF experts and novices on the basis of the indicators of these constructs, and (3) support should be found for the predictions of EIPT regarding expertise enhancement: that the enhancement method affects the components of a participants' expertise. These anticipated consequences form a set of expectations--a model on which basis the relationship between NVF and expertise may be evaluated. These expectations are now discussed in detail, and theoretical propositions are derived.

The composition of NVF expertise

EIPT suggests that the constructs "ability," "willingness," and "enabling resources" are primary components of expertise. In EIPT, ability and willingness relate to "Doing" the things an expert script requires, and the construct of enabling resources relates to "Entry" of an expert script (Leddo & Abelson, 1986). The reader may observe that these constructs closely parallel the key NVF components suggested in the foregoing review of the NVF literature. Accordingly, if the occurrence of NVF by individuals is associated with expertise:

> Proposition 1: NVF expertise should consist of three components of expertise represented by the constructs: (1) ability, (2) willingness, and (3) enabling resources.

The classification of NVF expertise

EIPT suggests a means whereby experts may be discriminated from novices. EIPT suggests that experts use specialized scripts to out-perform novices. Novices are expected to recognize cues in script problem statements differentially from experts (Glaser, 1984). This theory suggests that if the occurrence of NVF by individuals is associated with expertise:

> Proposition 2: Discrimination between NVF experts and novices using the script cue-based indicators of EIPT constructs should be possible.

The creation of NVF expertise

EIPT suggests that expertise can be developed in novices through in-depth contact with experts. This assertion bears particularly on the issue of creating entrepreneurs first raised by Baudeau (1767), and more recently by current entrepreneurship researchers (Brockhaus & Horowitz, 1986; Hopkins & Feldman, 1986; Katz, 1991; Solomon & Fernauld, 1991). Thus, it is expected that if the occurrence of NVF by individuals is associated with expertise:

> Proposition 3: An expertise enhancement method that provides novices in-depth developmental contact with

experts, should result in enhanced novice script cue recognitions that more closely approximate those of experts.

The Research Model

A test of the expertise-based model of NVF, and specifically of the three propositions (above) is required. To accomplish this, three successive studies are suggested as follows:

Study 1: To examine the underlying structure of script cue recognition data to ascertain how constructs representing components of NVF expertise conform to the theoretical model;

Study 2: To ascertain whether discrimination between NVF experts and novices is possible using the script cue-based indicators of EIPT constructs; and

Study 3: To ascertain whether the script cue recognitions of enhanced novices more closely approximate those of experts in an expertise enhancement experiment that provides to novices, in-depth developmental contact with experts.

Accordingly, the research model is sequential, with earlier results forming the foundation for later tests. Each stage of the research model is described in the paragraphs that follow.

In Study 1, support for Proposition 1 will be indicated where the script cue recognition items representing the two- and four-construct models defined in the NVF literature load

on the three EIPT factors as shown in Table 2-1 with acceptable convergent and discriminant validity and goodness of fit. This a priori structure implies the research model for Study 1 shown in Figure 2-1.

In Study 2, support for Proposition 2 will be ascertained through the testing of Hypothesis 1:

> Hypothesis 1: Differences exist among the mean vectors of the indicators of NVF component constructs across expert and novice groups.

In Study 3, support for Proposition 3 will be ascertained through the testing of Hypothesis 2:

> Hypothesis 2: Differences exist among the mean vectors of the indicators of NVF component constructs across expert, novice, and enhanced novice groups.

The research model upon which Studies 2 and 3 are based is shown in Figure 2-2.

Summary of Literature Review

In the foregoing literature review, the economic, characteristics-based, and NVP literature streams are first described. Although the economic literature stream is the oldest, it is shown to suffer from problems in operationalization. Evidence in the characteristics-based and NVP streams is shown to lack consistency in research results.

The contribution of Herron (1990), integrating the

characteristics-based stream into the NVP stream, is explained. Also, the potential of the Bull and Willard (1993) theory of NVF to integrate Herron's constructs skill (expertise) and skill propensity (motivation), with the economic

Table 2-1
A Priori Structure of NVF Constructs

EIPT	Bull and Willard	Herron
Doing:		
. Ability	. Expertise	. Skill
. Willingness	. Motivation	. Skill Propensity
	. Gain Expectation	None
Entry:		
. Enabling Resources	. Environmental Support	. None

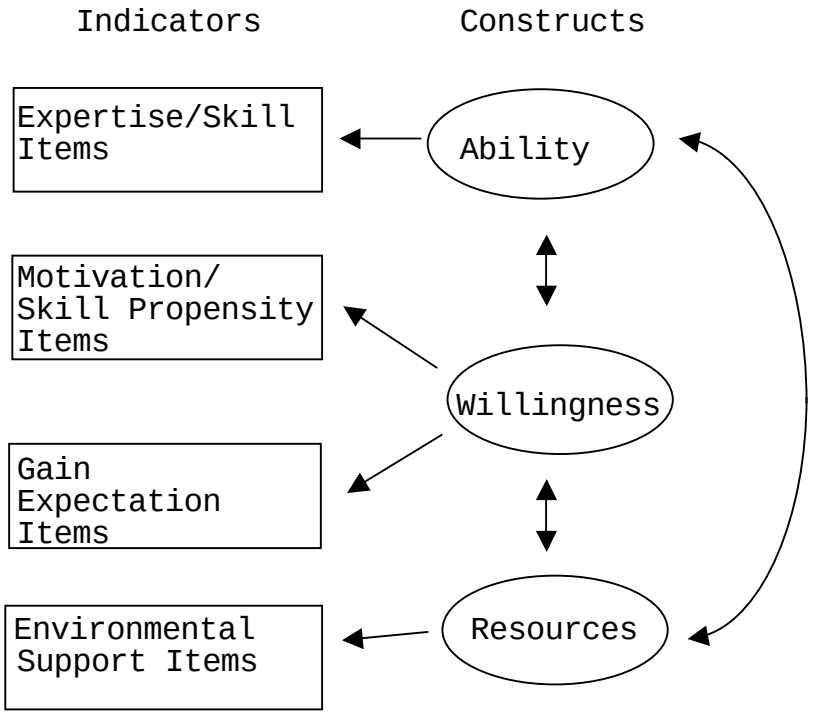


Figure 2-1
Research Model for Study 1

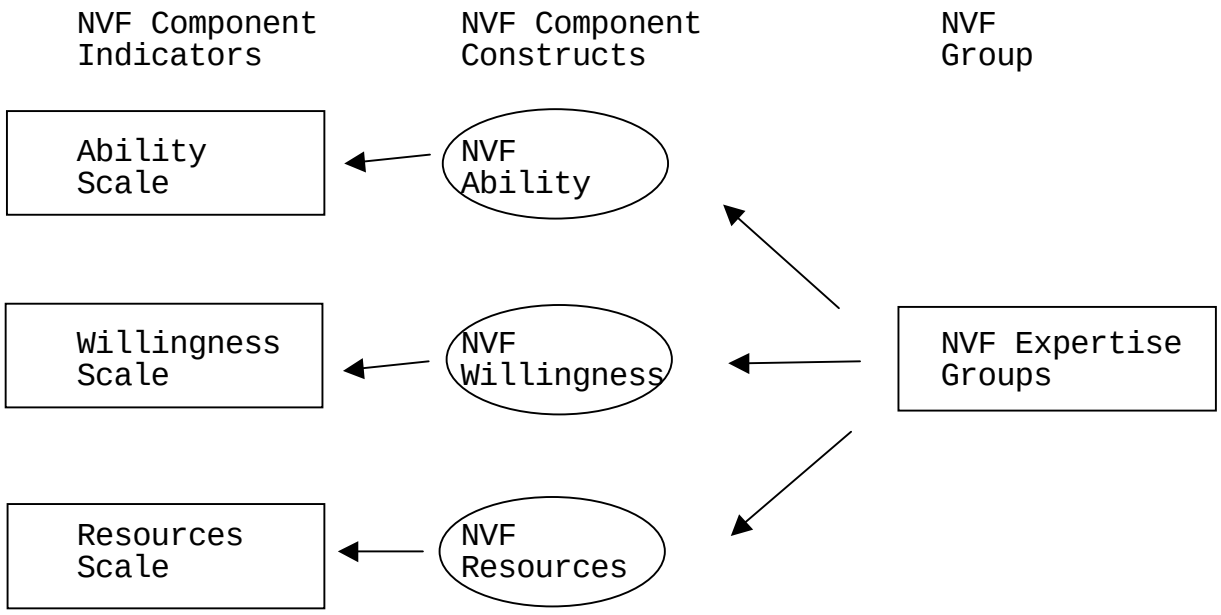


Figure 2-2
Research Model for Studies 2 and 3

constructs of gain expectation and environmental support, along with its lack of operationalization, is described.

EIPT is then introduced as a potential means to operationalize a more explanatory theory of NVF. Parallels between EIPT and NVF, and the potential to operationalize theory suggest the application of EIPT to NVF. Specifically, the occurrence of NVF by individuals is asserted to be associated with expertise.

Three consequences of this theoretical assertion are implied and are stated as propositions that lead to three successive studies. A sequential research model and related hypotheses that follow from the propositions are presented.

In Chapter 3, the method for testing the research model is addressed.

CHAPTER 3

METHOD

This chapter describes the method for testing the research model presented in the previous chapter, by reviewing data collection, measurement, and data analysis procedures for the three successive studies implied by the research model. Table 3-1 summarizes these elements as they relate to each study. The research method thus summarized is then described in detail for each successive study in the sections that follow.

Table 3-1
Summary of Research Method by Study

HEADING	STUDY 1	STUDY 2	STUDY 3
DATA COLLECTION	. SBDC Project sample . Cross-sectional survey	. SBDC Project sample . Cross-sectional survey	. SBDC project subsample with random assignment, and elimination of novices with NVF experience . Solomon 4-group experimental design
MEASUREMENT	. Script cue recognition items . Assignment of items to theoretical component constructs	. 2 categorical groups as dependent variable . Indicators of NVF component constructs as independent variable	. 3 categorical groups as dependent variable . Indicators of NVF component constructs as independent variables
DATA ANALYSIS	. Exploratory factor analysis . Chronbach's alpha . Confirmatory factor analysis	. Multiple discriminant analysis (MDA)	. *t*-tests . Multiple discriminant analysis (MDA)

Study 1: The Composition of NVF Expertise

Study 1 establishes the measurement model that is to be subsequently employed in Studies 2 and 3. It answers the first research subquestion: Can components of NVF expertise be delineated using script cue recognition-based indicators of new venture formation constructs?

This objective is accomplished through the examination of the underlying structure of script cue recognition data to ascertain how constructs representing components of NVF expertise conform to the theoretical model. Proposition 1 which states: NVF expertise should consist of three components of expertise represented by the constructs: (1) ability, (2) willingness, and (3) enabling resources as suggested by EIPT, is thus evaluated. The data collection, measurement, and data analysis methods for Study 1 follow.

Data collection

The general methodology suggested by EIPT for the operationalization of the exploratory research objectives of Study 1 is to observe the script cue recognitions of individuals. The use of secondary data sources is thus precluded, and a cross-sectional survey research design suggested. Accordingly, data collection through the use of a questionnaire that incorporates specific script cue recognition items

in an a priori relationship to the proposed theoretical components is necessary.

Data source

During the fall of 1992 and early 1993, a survey was prepared by the researcher in connection with (1) course instruction at the University of Utah, and (2) community service in a joint project involving the Utah Small Business Development Center, the Mountain West Venture Group, and the Center for Emerging Business at the David Eccles School of Business, University of Utah (the SBDC Project). Among other items, this survey contains the NVF script cues suggested in the previous chapter.

Description

The beginning point for the study is a data file consisting of 224 anonymous survey responses and demographic information. These responses come from 58 experts and from the following two groups of novices: (1) 135 respondents who lack contact with entrepreneurs or entrepreneurship, and (2) 31 respondents who have received expertise enhancement course materials and experiences (Glaser, 1984; Petranek, Corey & Black, 1992). Permission to analyze these data for this dissertation has been obtained from the University of Utah Institutional Review Board (IRB). The sources and composition

of the sample are shown in Table 3-2.

Sample limitations

The use of an existing sample poses certain limitations upon the generalizability of the results of this study. For

Table 3-2
Sample: Sources and Composition

Source	Composition			
	Expert Group	No Contact Group	Enhancement Group	Total
Students:				
Undergraduate		67	20	87
Graduate		41	11	52
Community:				
Entrepreneurs	40			40
SBDC Project	15	9		24
Other	3	18		21
Total	58	135	31	224
Male	49	93	22	164
Female	9	41	9	59
Total	58	134[1]	31	223[1]

[1] Response missing

example, all respondents to the survey are Utah residents. Additionally, approximately 95% of the survey respondents are Caucasian. As shown in Table 3-2, women are underrepresented in the sample generally, and in the expert group particularly. Also, the sample is one of convenience rather than one that has been randomly drawn. Accordingly, care will be exercised in the inferences that are drawn from analysis of these data.

These limitations notwithstanding, the sample does have several commendable features. First, the sample exists, and does contain individual responses to a unique set of survey items: NVF script cues. Second, the sample includes the script cue responses of approximately 58 individuals who fit a category of interest: NVF expert. Third, the data available with respect to the sample contain fairly extensive demographic information, which should make it possible to rigorously describe the sample and to clarify its generalizability. Fourth, the sample size is sufficiently large, that for purposes of the statistical analyses intended the assumptions of inferential statistics may be presumed to hold. Fifth, there is no reason to suppose that another sample would better represent the population of interest, U.S. individuals likely to come in contact with NVF opportunities.

Measurement

Operationalization of the research model in a questionnaire requires the development of script cue recognition items. As described in the preceding chapter, EIPT suggests that experts will recognize cues in problem statements, and be able to link the cues to their own expertise-specific knowledge, whereas novices will be distracted by, or attempt to focus on the literal cues themselves, being less able to make such inferences.

Each item in the questionnaire used in the SBDC Project consists of a "two-alternative" multiple choice-type question to correspond with EIPT. Alternative (a) is the script cue, extracted from either the NVF or the EIPT literature. Alternative (b) is the distracter statement, a plausible, even appealing alternative to those who are unfamiliar with new ventures. The researcher reasons that the creation of distracter statements that appeal to individuals' notions of social desirability (Crowne & Marlowe, 1964) or that conform to commonly accepted entrepreneurial myths (Smith, 1985), adds additional distinguishing power to script cue recognitions as an empirical reference point, since the likelihood that novices will select a script cue is markedly diminished by the availability of an appealing but wrong choice that only an expert could avoid. Also, since respondents were motivated to

answer the questionnaires by the desire to add to their own understanding of their approach to getting involved with a new business, there is no reason to suppose that the standardized (a) and (b) ordering of script cues and distracter statements biases results through respondents' desire to "beat the test."

This section consists of two parts. In the first part, the script cue items in the SBDC Project data that are suggested to be related to each of the four Bull and Willard constructs, along with corresponding distracter statements, are presented. In the second part, the measurement logic for the construction of scales representing these constructs is explained.

Survey items

The four Bull and Willard constructs included in the a priori research model are expertise, motivation, gain expectation, and environmental support. In reviewing the items developed, the reader should be aware that because the original descriptions of the constructs by Bull and Willard occasionally overlap, the researcher is sometimes required to select questionnaire items from the SBDC Project file that are somewhat similar, but which correspond with the different construct definitions provided by Bull and Willard (1993). The script cues from the SBDC Project survey data that are

suggested to be related to each construct, along with the corresponding item number in the original questionnaire (please see Appendices B & C), are introduced in the following paragraphs.

Expertise. As noted in the review of the literature, Bull and Willard (1993) define expertise much more narrowly than does EIPT. Nevertheless, some notions from EIPT appear to apply to both conceptualizations.

Accordingly, the script cues that "more expert" individuals are expected to recognize include items that revolve around past experiences, including the vivid recall of details, the recognition that new venture knowledge has a high priority and inspires confidence, the existence of scripted success scenarios or stories that are linked to principles versus surface features and can thus lead quickly to relevant information, and the possession of key venturing abilities such as a high demand specialty or promotional abilities. The following script cue recognition questionnaire items (including distracter statements) are thus suggested to represent Bull and Willard's notion of expertise or ability (respondents are asked to select the alternative that describes them most closely):

4. If asked to give my time to a new business I would decide based on how this venture fits:

(a) into my past experience
(b) my values

9. When confronted with a new venture problem I can:

(a) recall quite vividly the details of similar situations I know about
(b) usually figure out what to do, even if it is by trial and error

16. It is more important to know about:

(a) creating new ventures
(b) business in general - staying diversified

29. New venture success:

(a) follows a particular script
(b) depends heavily on the pluses and minuses in a given situation

30. If I try to assess the condition of a new business:

(a) a few questions lead to the relevant information
(b) total immersion in the business most effectively leads to relevant information

40. The new venture stories I recall:

(a) illustrate principles necessary for success
(b) are a telling commentary on the foibles of human nature which can rarely be predicted

42. I feel more confident:

(a) that I know a lot about creating new ventures
(b) in my overall business sense

43. I like:

(a) getting buyers and sellers together
(b) dealing with the surprises which come as a part of everyday operations

44. When I see a business opportunity I decide to invest based upon:

(a) how closely it fits my "success scenario"
(b) whether I sense that it is a good investment

47. I am very:

(a) good at a specialty that is in high demand
(b) well-rounded, with broad expertise in a variety of areas.

Motivation. Bull and Willard define NVF motivation to include reasons for forming new ventures, including the drive to put resources to work and the drive not to work for someone else; the desire to have a "say" and thereby accept responsibility for solving venture problems as they arise; setting and reaching financial goals through one's own efforts and risk-taking; a dedication to the achievement of a utility embodied in a core task that justifies employing and not wasting time that could be spent in building a venture; and a desire to experience entrepreneurial highs such as enthusiasm, excitement, taking action, and a sense of having fun, and experiencing the fulfillment of the possibilities resulting from an entrepreneurial vision.

The following script cue recognition questionnaire items are thus suggested to represent Bull and Willard's notion of motivation:

2. Are you more attracted to people who are:

(a) ready to take action
(b) thoroughly informed

7. When investing in a new venture, I think it is worse to:

   (a) wait too long, and miss a great opportunity
   (b) plunge in without enough information to know the real risks

12. Is it worse to:

   (a) waste your time thinking over an opportunity
   (b) commit time and money to a cause that may not succeed

28. If you had additional money to put to work, would you put it into a venture:

   (a) where you have a "say," even if there is no track record
   (b) managed by those you trust, who have a proven track record

31. I don't mind:

   (a) being committed to meet a regular payroll if it means that I can have a chance at greater financial success
   (b) giving a little of the value I create to the company that hired me

32. I am looking for a:

   (a) place to invest my resources
   (b) better way to manage my resources

33. Would you say you are more:

   (a) action oriented
   (b) accuracy oriented

37. Do you want things:

   (a) open to the possibilities
   (b) settled and decided

38. I have:

   (a) enormous drive, but sometimes need others' help to

complete projects
(b) a high respect for service, generosity, and harmony

46. If you have a lot of free time available, is it more desirable to:

(a) find a new venture to put your time and expertise into
(b) take the opportunity for some well deserved recreation or travel.

Gain expectation. Gain expectation is defined by Bull and Willard (1993) to include the capability to be protected from the appropriation of entrepreneurial rents by powerful outsiders (e.g., through isolating mechanisms such as patents, private information, or territory restrictions such as franchises etc. [Rumelt, 1987]); the speculative ability to see into and enhance one's position in the future (e.g., through the capability to "buy low and sell high"); and to create new combinations among social, cultural and personal factors that precipitate the entrepreneurial event. The following script cue recognition questionnaire items are thus suggested to represent Bull and Willard's notion of expectation of gain for self:

14. My new venture is/will be:

(a) protected from competition by patent, secret technology or knowledge
(b) based on a product or service with no "barriers to entry"

17. I want to get:

(a) a piece of the big money
(b) through life financially in one piece

21. I have:

(a) occasionally felt envious enough of the possessions of other people to think about stealing
(b) never thought about committing a dishonest act

23. Imagine you have just funded a new venture: Would you be worried about:

(a) not investing enough
(b) the strength of the competition

25. I value:

(a) high payoffs; intelligent craftsmanship; being one-up; well-organized projects; dependability
(b) action; optimism; generosity; responsibility; feedback; pleasing people

35. My new venture is/will be:

(a) protected from competition by franchise or other territory restrictions
(b) based on a product or service which may experience a lot of competition within a territory

39. I understand how to:

(a) buy low and sell high
(b) build a terrific team

48. I often:

(a) see ways in which a new combination of people, materials, or products can be of value
(b) find differences between how I see situations and others' perspective.

Environmental support. Included in Bull and Willard's definition of "environmental support" are elements such as: available role information from predecessors, existing know

how with proven value in the marketplace, existing support networks, existing linkage between aspiring entrepreneurs, resources, and opportunities, an infrastructure that supports entrepreneurship, and opportunistic and collective efforts of independent actors in common pursuit of a technological innovation. The following script cue recognition questionnaire items are thus suggested to represent Bull and Willard's notion of environmental support:

1. I am rarely surprised by:

   (a) developments in a new business
   (b) human nature

3. I have more highly developed contacts in the:

   (a) new venture area specifically
   (b) community generally

6. My knowledge about new businesses:

   (a) is fairly elaborate, due to the many variations I have observed
   (b) comes from my intuition; each new business has a "personality" which can be sensed

8. I own assets such as:

   (a) proprietary technology, patents, or an operating business
   (b) mutual funds, real estate, or savings accounts

11. When someone describes a problem with a new business I:

   (a) recognize key features of the problem quickly, and can suggest alternatives from examples I can cite
   (b) use my instincts to suggest questions which should be asked to solve the problem

18. I presently:

    (a) control acquisition or expansion funds in an ongoing business, or have my own funds available for venturing
    (b) will need to raise financing for my venture from third parties

20. In the last 3 years:

    (a) the size of the pool of people and assets I control has grown
    (b) I have not extended my business control over people or assets

26. During the last 3 years, it is the general consensus that my performance as an entrepreneur:

    (a) has increased
    (b) has stayed about the same or decreased

27. I am more:

    (a) aware of many new venture situations; some which succeeded, and others which failed, and why
    (b) familiar with my own affairs, but keep up on business in general

34. I have:

    (a) failed in at least one new venture
    (b) never failed in a new venture

36. I could:

    (a) raise money for a venture if I didn't have enough
    (b) provide an investor with a lot of very good ideas for a new venture

41. Are you more comfortable in:

    (a) new situations
    (b) familiar territory

45. I:

    (a) can often see opportunities for my plans to fit

with those of other people
(b) rarely find that results match what I expect.

Measurement logic

As described in the "Data Collection" section earlier in this chapter, the data used in this study are part of an existing file gathered as a part of course instruction at the University of Utah in a joint project with the Utah Small Business Development Center (SBDC) and the Mountain West Venture Group. The file contains the responses of individuals to expert script problem statements. Each script cue recognition is coded "1," each nonrecognition "0."

The basis for scale construction to measure an individual's recognition of NVF cues in expert script problem statements is found in behavioral science measurement theory (Ghiselli, Campbell, & Zedeck, 1981; Nunnally, 1978). Measurement theorists discuss the type of measurement required in this study in the context of multiple-choice tests " . . . concerning any type of ability" (Nunnally, 1978, p. 16). According to Nunnally,

> On each item the subject is scored as having passed or failed, and usually a pass is designated "1" and a failure is designated "0." This definitely is not categorization; rather it is the most gross form of ordered categories that can be obtained. The people who pass score higher on the attribute measured by the particular item than those that fail, and thus each item is a mini ordinal scale.

> Of course, when there are only two ordered categories [i.e., one item], then there are many tied scores ... Of course, it is nearly always the case that such 1's and 0's are summed to obtain total test scores, which then represent relatively continuous measurements rather than gross ordered categories. (Nunnally, 1978, p. 16)

The foregoing logic is corroborated almost verbatim by Ghiselli, Campbell, and Zedeck (1981, p. 28). In this study, each item is treated as a multiple-choice test item in which the "correct" response is the one associated with a script cue recognition, and the incorrect response (i.e., choosing the distracter alternative) is associated with nonrecognition of a script cue. Following Nunnally's logic, the final summed test score is then treated as an interval scale representing the script cue recognition level of a particular individual. The indicators of the NVF component constructs in this study are thus interval scaled quantitative variables.

Data analysis

In the preceding section describing the survey items, each script recognition cue is logically linked to the Bull and Willard construct that it represents (e.g., expertise, motivation, expectation of gain for self, and environmental support). To examine the data structure and discriminant validity, an exploratory factor analysis is conducted on the set of variables linked to these four constructs to determine

the components of NVF. If successful, items that load on factors consistent with the expectations of theory are used to form scales. Each resulting scale constitutes an indicator of a NVF component construct. To examine convergent validity, a reliability analysis using Chronbach's alpha is conducted.

To verify that the constructs fit the research model, confirmatory factor analysis is used. Confirmatory factor analysis is based on the general model developed by J`reskog (1971) in which any parameter of the factor analytic model (i.e., factor loadings, variances or covariances) can be constrained in accordance with theory. In this case the three-factor EIPT components of NVF expertise are expected. Given the substantive specifications, statistical tests are used to determine whether or not the sample data are consistent with the theoretical constructs. Such tests as a P^2 measure of the goodness of fit (J`reskog & S`rbom, 1989), the overall goodness of fit index, the adjusted goodness of fit index, and the root mean square residual, give indications of the fit of the confirmatory model with the sample data.

Study 2: The Classification of NVF Expertise

Study 2 is conducted to ascertain whether discrimination between NVF experts and novices is possible using the script cue-based indicators of EIPT constructs developed in Study 1.

Thus, Study 2 examines the second research subquestion: Can script cue recognition-based indicators of NVF component constructs be used to discriminate between NVF experts and novices?

This objective is accomplished by testing Hypothesis 1, which states: Differences exist among the mean vectors of the indicators of NVF component constructs across expert and novice groups. Proposition 2, which states that discrimination between NVF experts and novices using the script cue-based indicators of EIPT constructs should be possible, is thus evaluated. The data collection, measurement, and data analysis methods used in Study 2 follow.

Data collection

The data employed in Study 2 include those data from the SBDC Project used in Study 1, plus additional categorical data also gathered as a part of the SBDC Project (please see Appendix D). Accordingly, the research design for Study 2 is a cross sectional survey. Specifically, the categorical data in the file are designations of respondents as "experts" or "novices," depending upon how they fit the definitions given in the Measurement section which follows.

Measurement

Dependent variable

The dependent variable across which discrimination is sought as stated in Hypothesis 1, is NVF expert versus novice. NVF Experts are defined as individuals who have: (1) started three or more businesses, at least one of which is a profitable ongoing entity; (2) started a (nonlifestyle) business that has been in existence for at least 2 years; (3) experience in a combination of (1) and (2) that indicates a high level NVF knowledge; or (4) career experience indicating high levels of familiarity with new venture formation. Nonlifestyle businesses are those that are the *opposite* of a business that exists " . . . primarily to support the owners and usually has little opportunity for significant growth and expansion" (Hisrich & Peters, 1992, p. 13). NVF novices are those individuals who do not meet the criteria to be considered a NVF expert. In the data file, experts are coded "1" and novices are coded "2."

Independent variables

The independent variables in Study 2 are the indicators of the components of NVF expertise defined in Study 1. Under the assumptions of EIPT these components are proposed to be ability, willingness, and resources. As noted in the methods described in Study 1, these variables are interval-scaled

quantitative variables.

Data analysis

A multiple scale/two group multiple discriminant analysis (MDA) is conducted to test Hypothesis 1. The MDA analyzes association between a criterion variable with multiple categories (NVF expert and NVF novice) and multiple predictor variables (EIPT components of NVF expertise) as represented in the following functional relationship:

Group Membership =
f (Ability, Willingness, Resources)

Watson (1992) describes MDA as " . . . an appropriate statistical technique for (1) classifying observations among several groups," and (2) " . . . for prediction of group membership of unclassified observations and for inferential purposes (Afifi & Azen, 1972; Anderson, 1958; Cooley & Lohnes, 1971; Eisenbeis & Avery, 1972)" (Watson, 1992, p. 1). Relationships among groups are studied in three ways: (1) by testing hypotheses for differences among groups based on a set of variables, (2) by graphically portraying the groups in a parsimonious measurement space, and (3) by relating the set of variables to the measurement space.

In general, the assumptions for MDA are: (1) multivar-

iate normally distributed variables, and (2) equality of within-group dispersion matrices, that are generally indicated by the nonsignificance of Box's M, (although this test is not considered to be robust with a sample as large as the one used in this study) (Watson, 1993).

A test of the equality of group mean vectors is performed using an approximate F-test based upon Wilks' lambda. The significance of the discriminant function's eigenvalue is determined using an approximate chi-square statistic.

Classification is performed using values on a discriminant function computed for the purpose of estimating classification rates. The procedure computes the discriminant function, estimates the observation's posterior probabilities of group membership, and classifies the observation. To facilitate the maximum retention of data in the discriminant model, each observation is successively withdrawn from the computation and classified according to the function computed with the remaining cases as predictors. This procedure is known as a jackknife analysis (Lachenbruch, 1967). A canonical analysis of discriminance is also performed to enhance the differentiation among groups.

Interpretation of the findings is accomplished by evaluating the significance of the statistics related to the

discriminant function, assessing the classification effectiveness of the discriminant model (jackknife analysis), and examining the discriminant loadings where applicable.

Study 3: The Creation of NVF Expertise

Study 3 is conducted to ascertain whether the script cue recognitions of enhanced novices more closely approximate those of experts in an expertise enhancement experiment that provides to novices, in-depth developmental contact with experts. Thus, Study 3 examines the third research subquestion: Does an expertise enhancement method that provides novices in-depth contact with experts enhance novices' expertise such that their script cue recognitions more closely approximate those of experts?

This objective is accomplished by testing Hypothesis 2 which states: Differences exist among the mean vectors of the indicators of NVF component constructs across expert, novice and enhanced novice groups. Proposition 3 which states: An expertise enhancement method that provides novices in-depth developmental contact with experts, should result in enhanced novice script cue recognitions that more closely approximate those of experts, is thus evaluated. The data collection, measurement and data analysis methods used in Study 3 follow.

Data collection

Sample

The data employed in Study 3 include those data from the SBDC Project used in Studies 1 and 2, plus additional categorical data also gathered as a part of the SBDC Project. Hence, the categorical data in the file include the designation of respondents as "experts," "novices," or "enhanced novices," depending upon how they fit the definitions given in the Measurement section which follows.

Design of Study 3

Once again the research design for Study 3 requires a cross sectional survey, but in addition requires an experimental design. The minimization of threats to internal validity is especially critical in the experimental portion of this study that is designed to evaluate the effectiveness of the expertise enhancement method. The randomized Solomon Four-Group experimental design employed in this study usually provides a high level of control over threats to internal validity (Fraenkel & Wallen, 1990). In the experiment, approximately half of the individuals who participate in the enhancement exercises are randomly selected to receive both a pretest and a posttest. Threats to internal validity not generally controlled in the Solomon Four-Group design include (1) location, although effort is made to ensure that questionnaire administration locations are relatively similar; (2) data collector bias, the minimization of which is attempted through standardized instructions and scoring; and (3) implementation, which process is maintained as constant as is practical.

Measurement

Dependent variable

The dependent variable across which discrimination is

sought as stated in Hypothesis 2 is NVF expert, NVF novice, or NVF enhanced novice. NVF Experts are defined in a manner identical to that in Study 2, as are NVF novices. NVF enhanced novices are defined as NVF novices who receive the expertise enhancement course materials and experiential exercises, including one on one contact with practicing entrepreneurs through in-depth interviews about their careers, success rules, failures etc. The dependent variable in this study is thus a categorical variable represented quantitatively in the data file by the designations: 1 = NVF expert, 2 = NVF novice, and 3 = enhanced NVF novice.

Independent variables

The independent variables in Study 3 are the indicators of the components of NVF expertise defined in Study 1. Under the assumptions of EIPT these components are proposed to be ability, willingness, and resources. As noted in the methods described in Study 1, these variables are interval-scaled quantitative variables.

Data Analysis

Hypothesis test

Two analyses are used to evaluate the effects of the expertise enhancement method. The first is a pre-post- *t*-

test, and related tests of enhanced NVF novices to evaluate the magnitude and significance of treatment effects, with individuals serving as their own control. The second is a multiple scale three group MDA to evaluate the effects of the treatment relative to experts and novices as control/comparison groups. Confirmation of Hypothesis 2 is indicated by significance as previously described, and by the occupation by enhanced NVF novices of a unique position in the measurement space. Once again, a jackknife analysis (Lachenbruch, 1967) is conducted for to facilitate the maximum retention of data in the discriminant model. Confirmation of Hypothesis 2 is also indicated by an MDA classification percentage of successful classification that is greater than the a priori percentage of a given group in the sample (Eisenbeis & Avery, 1972).

General tests

Respondent age, gender, education, and pre and posttest bias, and initial similarity of the "enhanced novice" treatment group to the control group is examined using t-tests of hypotheses regarding the equality of the relevant group means.

Summary

This chapter has described the method for testing the

research model presented in Chapter 2 by discussing data collection, measurement, and data analysis procedures for each of the three studies conducted in this dissertation. Chapter Four proceeds to report the results obtained as this method is applied.

CHAPTER 4

RESULTS

The previous chapters describe the purpose of this dissertation, develop a research model, and delineate a three-study methodology to test that model. This chapter presents the results of the three studies and summarizes their application to the research question.

Results of Study 1: The Composition of NVF Expertise

Study 1 establishes the measurement model that is employed in Studies 2 and 3; and it addresses the first research subquestion: Can components of NVF expertise be delineated using script cue recognition-based indicators of new venture formation constructs? This is accomplished by examining the latent structure of script cue recognition data.

Results of Study 1 are discussed in the following order. First, results of the exploratory factor analysis are reported. These include: (1) the results of a principal components analysis, (2) a scree plot of eigenvalues, and (3) factor loadings for the two-, three- and four-factor models identified in the literature review as theoretically viable. Items are found to load unambiguously on three factors as proposed by EIPT.

Second, results of the confirmatory factor analysis of the three-factor model are reported. These include: (1) results of various goodness of fit tests, and (2) examination of scale convergent validity using coefficient alpha analysis.

Third, items loading on the three factors are analyzed to ascertain appropriate factor labels. The initial conceptualization of three factors according to EIPT is shown to need refinement. More explicit factor labels result from a reexamination of EIPT in light of the factor loading pattern.

Finally, the results of Study 1 are summarized. The first research subquestion and Proposition 1 are evaluated.

Results of exploratory factor analysis

Sample size

Forty-one items in the SBDC Project data file are suggested by theory to correspond to the Bull and Willard (1993) constructs: Expertise **(E)**, Motivation **(M)**, Gain Expectation **(G)**, and Environmental support Resources **(R)**. Hair (1992) states that the exploratory factor analysis of a sample is appropriate where the sample size is 100 or larger, and where there are " . . . four or five times as many observations as there are variables to be analyzed" (1992, p. 227). Thus, the sample of 219 valid cases after listwise

deletion is considered to be adequate in size.

Results of principal components analysis

A principal components analysis (PCA) is conducted to assist in describing the underlying structure of the data. The goal of the exploratory factor analysis in this study is to eliminate items until a smaller set of items is found to load unambiguously when the analysis is constrained according to theory to sets of two-, three- or four-factors respectively. Since the objective of the exploratory factor analysis is to produce factor results that may be utilized in subsequent statistical analyses, an orthogonal rotation such as that provided by the varimax procedure is used to eliminate collinearity (Hair, 1992). Such a rotation also facilitates easier interpretation of the solution. The results of this analysis are reported in Table 4-1.

As shown in the table, the PCA extracts 16 factors before the eigenvalues drop below 1.00. A visual examination of the relative size and distance between eigenvalues is possible using a scree plot. A plot of the eigenvalues with a value greater than 1.00 is provided in Figure 4-1.

As illustrated in this figure, the two-, three- and four-factor solutions appear to offer distinctions that, when considered in light of theory, justify further exploration. Accordingly, the model is constrained consistent with theory

to the two-, three- and four-factor solutions, and PCA with varimax rotations are conducted.

Table 4-1
Results of Extraction of Components

Factors	Eigenvalue	Percentage of Variance	Cumulative Percentage of Variance
1	4.71	11.5	11.5
2	2.35	5.7	17.2
3	1.93	4.7	21.9
4	1.80	4.4	26.3
5	1.59	3.9	30.2
6	1.54	3.8	33.9
7	1.52	3.7	37.6
8	1.45	3.5	41.2
9	1.35	3.3	44.5
10	1.30	3.2	47.6
11	1.27	3.1	50.7
12	1.20	2.9	53.7
13	1.14	2.8	56.4
14	1.07	2.6	59.0
15	1.05	2.6	61.6
16	1.02	2.5	64.1
17	0.97	2.4	66.4

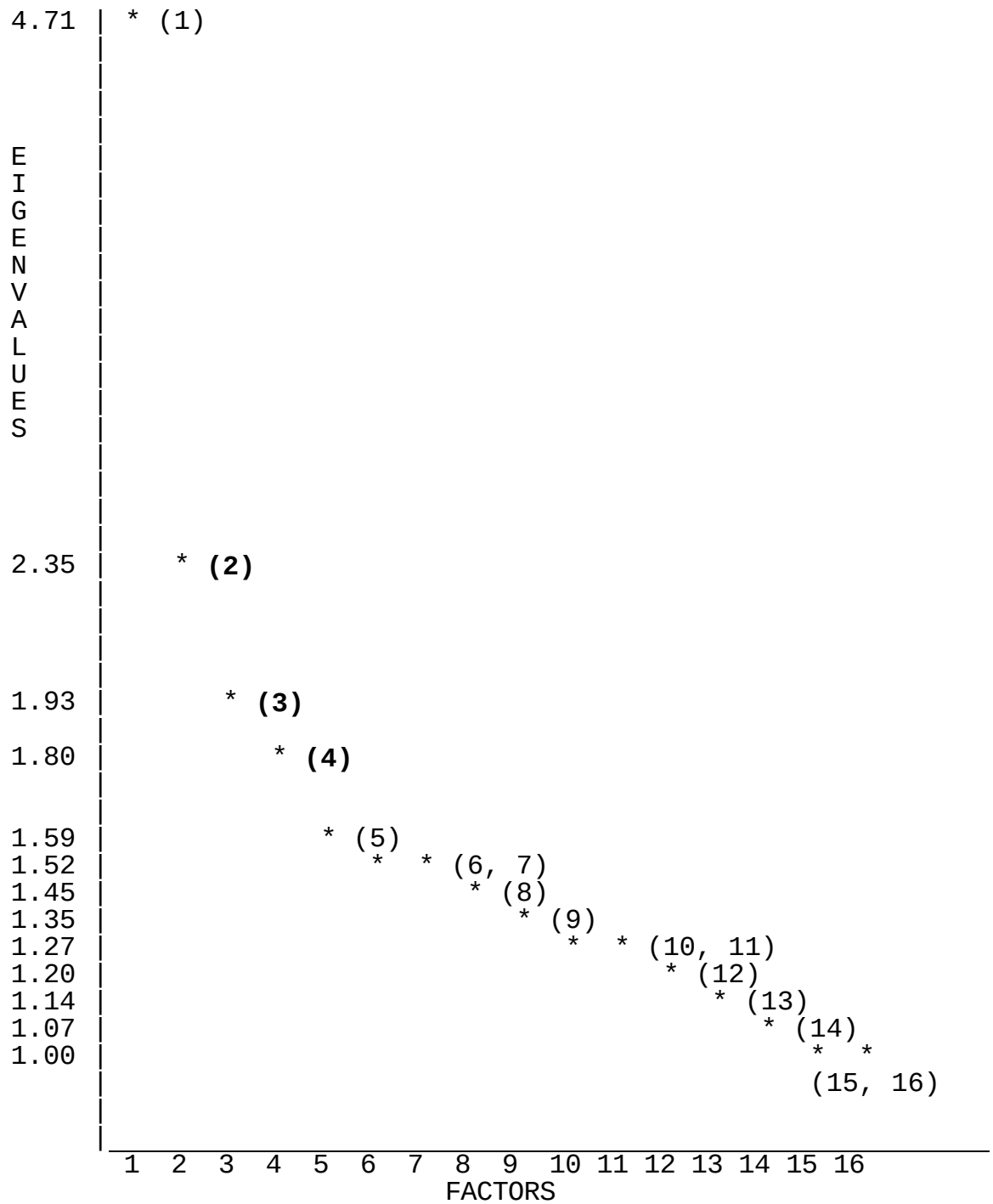


Figure 4-1
Scree Plot of Eigenvalues

Hair (1992) recommends that when the sample size is at least 200 but below 300 cases, loadings of +.14 and +.18 should be used as indicators of statistical significance at the 5% and 1% levels respectively. In this research a cutoff of +.30 is used to ensure that only items with more important relationships to each factor are included in further analysis. To enhance clarity, only loadings in excess of +.30 are reported for the two-, three-, and four-factor analyses in Tables 4-2 through 4-4 respectively. The full factor loading matrices are reported in Appendix G.

These results show that an interpretable factor structure exists for the three-construct model of EIPT. Loadings in the two-factor and four-factor exploratory analyses are somewhat more difficult to interpret and are thus ambiguous relative to the theories they are intended to represent, whereas the three-factor solution appears to offer a more clear result.

Analysis of the three-factor solution

Each hypothesized set of items in the rotated three-factor solution loads fairly cleanly on a unique factor with the exception of the gain "G" items. Further analysis of the G items reveals errors in original conceptualization that

explain their respective factor loadings.

For example, items G14 and G35 both refer to the use of proprietary knowledge in the pursuit of gain. It is clear from the factor structure that respondents included this concept within the context of expertise, as does Rumelt (1987).

Table 4-2
Factor Loadings for Exploratory Factor Analysis:
Two-Factor Theory - Herron (1990)

	Factors	
Indicator Name	1	2
M33	.6508	
M2	.4834	
M37	.4799	
M38	.4319	
M28	.4298	
M46	.3560	
M7	.3322	
M12	.3320	
M31	.3064	
R26	.5666	
R34	.4579	
R18	.4383	
R20	.4121	
R41	.4004	
R8	.3327	
R45	.3209	
G14		.6406
G35		.4595
G48	.3506	
G17	.3067	
E29		.5798
E44		.4965
E16		.4781
E42		.4522
E9		.3727
E40		.3596
E30		.3424

Table 4-3
Factor Loadings for Exploratory Factor Analysis:
Three-Factor Theory - EIPT

	Factors		
Indicator Name	1	2	3
R18	.5773		
R26	.5097		
R8	.5006		
R6	.4845		
R41	.4806		
R34	.4759		
R11	.4130		
R27	.3907		
R1	.3660		
R3	.3588		
R20	.3527		
M12		.5988	
M7		.5614	
M38		.4603	
M2		.4498	
M32		.3331	
M28		.3201	
M46		.3063	
G14			.6238
G17		.5298	
G35			.4709
G48	.3664		
E29			.5668
E16			.4716
E44			.4714
E42			.4468
E40			.3717
E9			.3336

Table 4-4
Factor Loadings for Exploratory Factor Analysis:
Four-Factor Theory - Bull
and Willard (1993)

	Factors			
Indicator Name	1	2	3	4
R18	.5286			
R8	.5106			
R6	.4906			
R41	.4827			
R26	.4800			
R34	.4642			
R11	.4193			
R1	.3883			
R27	.3863			
R3	.3632			
R20	.3187			
R45	.3075			
M31				.6230
M12		.6068		
M7		.5504		
M2		.5023		
M38		.4602		
M46		.3266		
M28		.3080		
G14			.6422	
G35			.5180	
G17		.5029		
G48	.4008			
G25				.3291
E29			.5111	
E16			.4975	
E44			.4579	
E42			.3976	
E40			.3914	
E43				.4630
E47				.3929
E4				.3807

Item G17, originally conceptualizing a gain orientation, can alternatively be interpreted to indicate motivation to venture. In attempting to operationalize a gain orientation, item G48 refers to "seeing ways for new combinations of people, materials, or products to be of value." When this item loads on the factor with all the "resources" items, it becomes clear that respondents interpreted "people, materials and products" as applying to resources versus gain, an alternative notion also included in Bull and Willard (1993). Accordingly each of these items appears to be properly included in the scale upon which it loads.

Analysis of the two-factor results

In the rotated two-factor results, the first factor contains loadings primarily from both the motivation and resources item sets, and secondarily from the gain item set (although it should be noted that the two gain items that appear to be out of place are in fact the same two that are justified in the preceding paragraph as being more properly related to motivation and resources--the primary elements of this factor).

An examination of Herron (1990) shows that his conceptualization of "skill propensity" includes mainly notions of motivation as measured by the percentage of time allocated

by respondents to applying various new venture skills. Hence, the almost balanced loadings of the M *and* R items on the first of the two factors appears to be inconsistent with Herron (1990), thus rendering the two-factor solution incompatible with the theory by which it should be justified.

Nevertheless, it is interesting to observe that the loadings on the second factor of the rotated two-factor solution are primarily those related to expertise (a possible synonym for Herron's notion of skill). Once again the two gain items that appear to be out of place are the items that are interpreted to be quite understandably related to knowledge and expertise rather than to gain (E versus G). However, given the ambiguity present in the first factor, it appears most reasonable to reject the two-factor model because it is not interpretable for purposes of this study.

Analysis of the four-factor results

The rotated four-factor solution appears to have an even less clear interpretation than that of the two-factor results. Although factors one and two represent quite clearly the notions of resources and motivation (respectively)--with the errant G items once again falling in their reconceptualized positions, factors three and four split the notion of expertise in a manner inconsistent with the theory of Bull and

Willard (1993)--the theory that justifies constraining the model to the four-factor solution. This result indicates that the existence of the theoretical constructs of Bull and Willard (1993) is not confirmed by script cue recognition-based analysis. The results seem to indicate that this nonconfirmation may be due to the instability of the gain construct, perhaps not due to troubles with theory alone, but also due to the operationalization of the Bull and Willard notion of gain within this research. Accordingly, for purposes of the subsequent analyses, the four-factor model does not appear to be appropriate.

Summary of exploratory factor analysis

Of the three competing literature review models suggested to be theoretically viable, only the three-factor EIPT-based model appears to have sufficient discriminant validity to justify its further application in this dissertation. When a multiplicity of items load consistently on the factors they were designed to depict, there is reason to believe that the latent variables, or factors, really represent the construct they were conceptualized to represent. Accordingly, the three-factor model is subjected to further testing in a confirmatory factor analysis in which the goodness of fit of the items with the hypothesized constructs is examined.

Results of confirmatory factor analysis

Confirmatory factor analysis in a LISREL model tests the adequacy of the measurement model (Anderson & Gerbing, 1988). Since LISREL uses the covariance among variables in a sample to estimate the structural parameters of their relationships, either a covariance matrix or a correlation matrix is required as input to the analysis.

Both a product moment and a polychoric correlation matrix were computed for use in the goodness of fit tests. The product moment correlation matrix uses the Pearson product moment correlation that assumes interval scaled data. A polychoric correlation matrix assumes that the data are ordinal.

As noted in Chapter 3, the data employed in this dissertation consist of script cue recognitions that are coded either "1" for a recognition, or a "0" for a nonrecognition. No data are available regarding the strength of a given script cue recognition. Since testing these alternative assumptions does not call into question the permissibility of summing the item responses to create an interval scale for further analysis (Ghiselli, Campbell, & Zedeck, 1981; Nunnally, 1978), it seems reasonable to explore the goodness of fit in the measurement model using both interval (product moment correla-

tions) and ordinal (polychoric correlations) assumptions in the LISREL model. Such a test provides an optimal opportunity to explore the acceptability of the measurement model using the "0-1" data without the interval scale limitation.

Accordingly, two models (Base1 and Base2) that include the identical items from the rotated three-factor exploratory factor analysis solution using the +.30 cutoff, were tested in a confirmatory factor analysis using both types of correlation matrix as inputs to LISREL. In addition, a modified model (Mod1) was created by eliminating all items suggested by the LISREL modification indices to detract from the optimal fit. Then, a null model in which each item is assumed to represent its own construct (i.e., assuming no measurement model exists) was computed to serve as a point of comparison.

Finally, the coefficients alpha were computed for the relevant set of scales implied by each model, to represent the changes in convergent validity, as discriminant validity (goodness of fit) is adjusted. Use of the squared multiple correlations from the LISREL analysis, which range from .048 to .320 (Appendix H), as an indicator of *item* reliability was not considered to be particularly helpful. This judgment is made on the basis of the pattern that emerges in the data structure.

As shown in Figure 4-1, the exploratory factor analysis

produces approximately 16 factors. When the model is constrained to three factors for theoretical reasons, it is likely that these factors are not "pure," because they represent a composite of notions grouped under an omnibus label. Accordingly, the wide variety of NVF concepts required at this stage of the development of an EIPT-based scale will not likely produce small error variance as each indicator is compared individually to its broad-based construct, unless the scales are restricted to a substantially smaller number of items, and the number of scales is increased. Should this procedure be followed, reliability could be enhanced, but at the cost of the richness that forms the basis for predictive validity. Results of the analyses are shown in Table 4-5.

Table 4-5
Comparison of Confirmatory Factor Analysis Results
Among Various 3-Scale Models

	Models			
Indicator Index	Base1[1]	Base2[2]	Mod1	Null
Goodness of fit index	.862	.911	.892	.697
Adjusted goodness of fit index	.838	.896	.869	.670
P^2	520.31	489.43	306.16	702.17
Degrees of freedom	347	347	227	253
p value	.000	.000	.000	.000
Root mean square residual	.069	.067	.063	.135
Coefficient alpha:				
Factor 1	.70	.70	.64	N/A
Factor 2	.58	.58	.48	N/A
Factor 3	.64	.64	.63	N/A

[1] Base1 uses product moment correlation
[2] Base2 uses polychoric correlation

Results of the goodness of fit analysis indicate that all three models are substantial improvements over the null model, and show Mod1 to provide the best measurement model. However, when the .03 increase in the goodness of fit index (GFI) between Mod1 and Base1, for example, is compared to the .06, .10, and .01 drop in coefficient alpha for each of the

three-factor scales respectively, it becomes clear that a tradeoff exists. Since a GFI in the .90 range is generally accepted as reasonable in assessing the usefulness of the measurement model (Bagozzi & Yi, 1988; Olsen & Granzin, 1993) but a coefficient alpha score below .60 is less acceptable (Eisenhardt, 1988; Finkelstein, 1992; Van de Ven & Ferry, 1980) it appears reasonable to suggest that use of the "Base" model provides an acceptable compromise.

Accordingly, the items in the rotated three-factor solution in the exploratory factor analysis are judged to provide sufficient discriminant and convergent validity to justify their use in further analysis. It now becomes necessary to examine item content relative to item grouping to determine the "labels" that adequately describe each construct.

Analysis of factor labels

Table 4-6 provides a listing of the indicators with original (Bull & Willard) theory-grouping designations, the rotated factor loadings for each indicator, and a condensed description of the content of each indicator.

An examination of the indicator content as compared to the original theory-grouping designations reveals that the original designations are at least partially inadequate to describe the nature of the constructs. Some items within

factor groupings appear to be inconsistent with their original theory-grouping designation. Since the three-factor model is intended to represent the constructs in EIPT, a brief return to the EIPT literature for assistance in improving the three-construct labels is suggested.

Table 4-6
Assignment of Factor Labels Based Upon Items

Indicator	Loading	Description of Indicator Content
R18	.5773	Have funds available for venturing
R26	.5097	Have 3 yr. NV performance increases
R8	.5006	Own technology, patents, or business
R6	.4845	Have observed many business variations
R41	.4806	Am more comfortable in new situations
R34	.4759	Have failed in at least one NV
R11	.4130	Solve NV problems with example recall
R27	.3907	Am aware of NV success, failure, & why
G48	.3664	Can combine people, material, products
R1	.3660	Am rarely surprised by NV developments
R3	.3588	Have solid contacts in NV community
R20	.3527	My 3 yr. people/asset pool has grown
M12	.5988	Time worse spent thinking v. risking
M7	.5614	Worse to wait and miss opportunity
G17	.5298	I want a piece of the big money
M38	.4603	Have enormous drive
M2	.4498	Am attracted to action takers
M32	.3331	Am looking to invest my resources
M28	.3201	Want a say with NV investments
M46	.3063	NV v. recreate with free time
G14	.6238	Will protect my NV with knowledge
E29	.5668	NV success follows a script
E16	.4716	NV v. general knowledge is better
E44	.4714	I invest based on a success scenario
G35	.4709	Will protect NV with entry barriers
E42	.4468	Confident in NV knowledge
E40	.3717	Recall NV success stories/principles
E9	.3336	Know details of NV problems/solutions

Leddo and Abelson (1986) provide theory that assists interpreting the rotated factor loadings in the three-factor model. These authors argue that the avoidance of script failure (the exercise of expertise) depends upon an individual's properly performing the actions that are most central to a given script. Specifically, Leddo and Abelson assert that two script functions (Entry, and Doing) are central, as follows:

> These privileged functions we label Entry and Doing; the former occurs early in the script, and the latter near the end. Entry presupposes the success of script entry *arrangements* . . . Doing presupposes the actor's *willingness* and the *ability to carry out the action* serving the main goal of the script. (1986, p. 121) (emphasis added)

When the content of the items loading on the first factor is examined, it can be observed that each item can fit beneath the heading "Arrangements." Having funds, a trend of performance increases, technology, and experience (the highest loading four items) all qualify as script entry arrangements. Each additional item in Factor 1 appears to qualify in the same manner.

When the content of the items loading on the second factor is examined, it can be observed that the items appear to fit under the label "Willingness." Willingness to take

risks, to act versus miss opportunity, and to go after a piece of the big money, when combined with enormous drive, an attraction to action-takers, a propensity to invest, to want a "say," and to venture versus recreate, all seem to indicate a willingness to venture.

When attempting to label the third factor according to EIPT, it becomes necessary--if the label "Ability" is to be considered as suggested in Leddo and Abelson (1986)--to define the kind of ability that is necessary in new venture formation. Stevenson, Roberts and Grousbeck (1994) assert that it is the ability to recognize, capture and protect opportunity that characterizes success in new venture formation. When this definition is applied to "Ability," it becomes clear that Factor 3 is representing new venture "Opportunity-Ability." The ability to protect a new venture with knowledge or with entry barriers, the ability represented by knowledge of specific industry scripts and success scenarios, and the ability to know how to solve new venture problems with specialized new venture knowledge are clearly the concepts embodied in Factor 3.

Summary

Hence the labels for the scales developed in Study 1 are derived, and derived to be consistent with EIPT. Research

subquestion 1: Can components of new venture formation expertise be delineated using script cue recognition-based indicators of new venture formation constructs, can be answered in the affirmative. The script cue recognition-based components of NVF expertise are:

1. NVF Arrangements,
2. NVF Willingness, and
3. NVF Opportunity-Ability.

Proposition 1 is confirmed, but with modifications. Proposition 1 asserts that NVF expertise should consist of three components of expertise represented by the constructs: (1) ability, (2) willingness, and (3) enabling resources. Based upon the results of the analyses performed, the basic three-factor structure is confirmed, but the nature of the constructs is more finely defined both in terms of construct content, and in terms of construct labels. As a result, the ex post model from Study 1 appears as illustrated in Figure 4-2. Also, by delineating the components of new venture formation expertise using script cue recognition-based indicators of new venture formation constructs, the assertion that the occurrence of new venture formation by individuals is associated with expertise is made more credible.

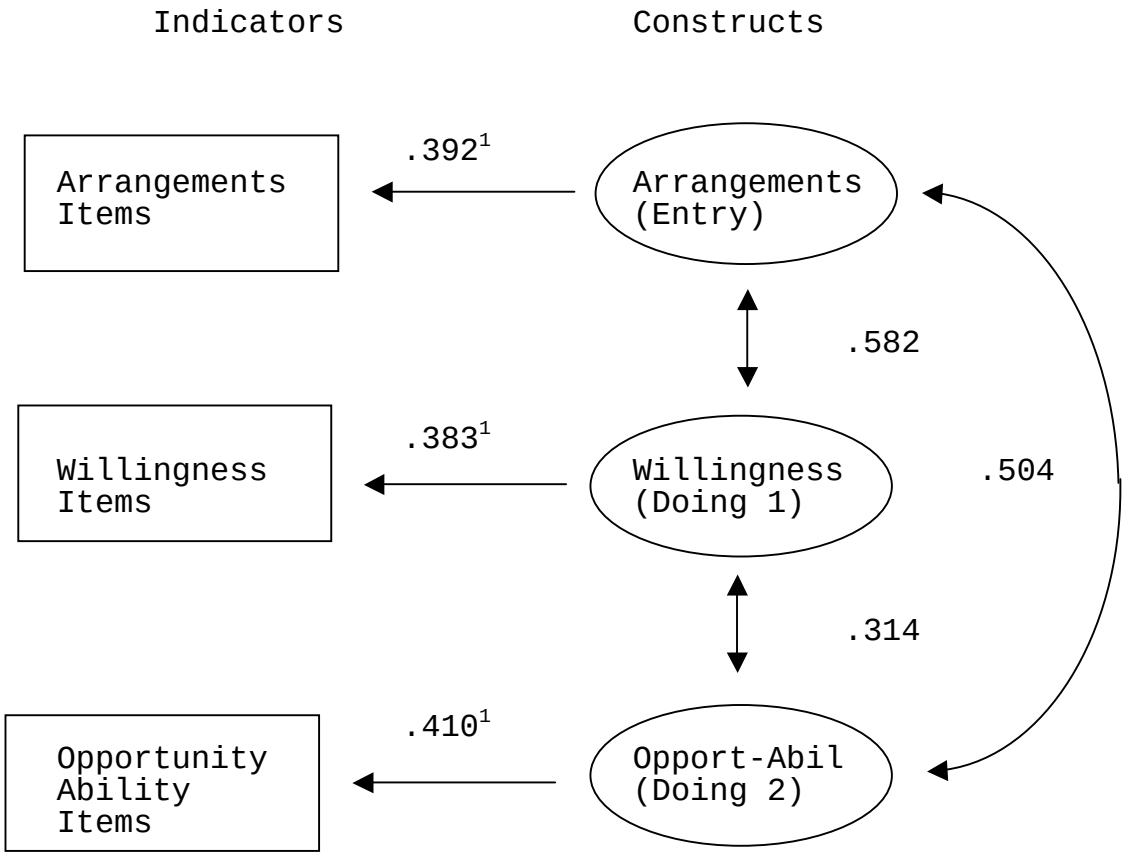
It now becomes possible to apply the new knowledge incorporated in this model to the testing of the hypotheses of

Studies 2 and 3. On the basis of the results from Study 1, the revised research model for Studies 2 and 3 could be depicted as shown in Figure 4-3. The results of Study 2 are next discussed.

Results of Study 2: The Classification of NVF Expertise

Study 2 is conducted to ascertain whether discrimination between NVF experts and novices is possible using the script cue-based NVF component indicators developed in Study 1. This objective is accomplished by testing Hypothesis 1 which states: Differences exist among the mean vectors of the indicators of NVF component constructs across expert and novice groups.

Results of this analysis are reported in two parts. First, demographics of the data are examined for indications



[1] Mean of 8_x (Pattern Coefficients) (see Appendix H)

Figure 4-2
Ex Post Model from Study 1

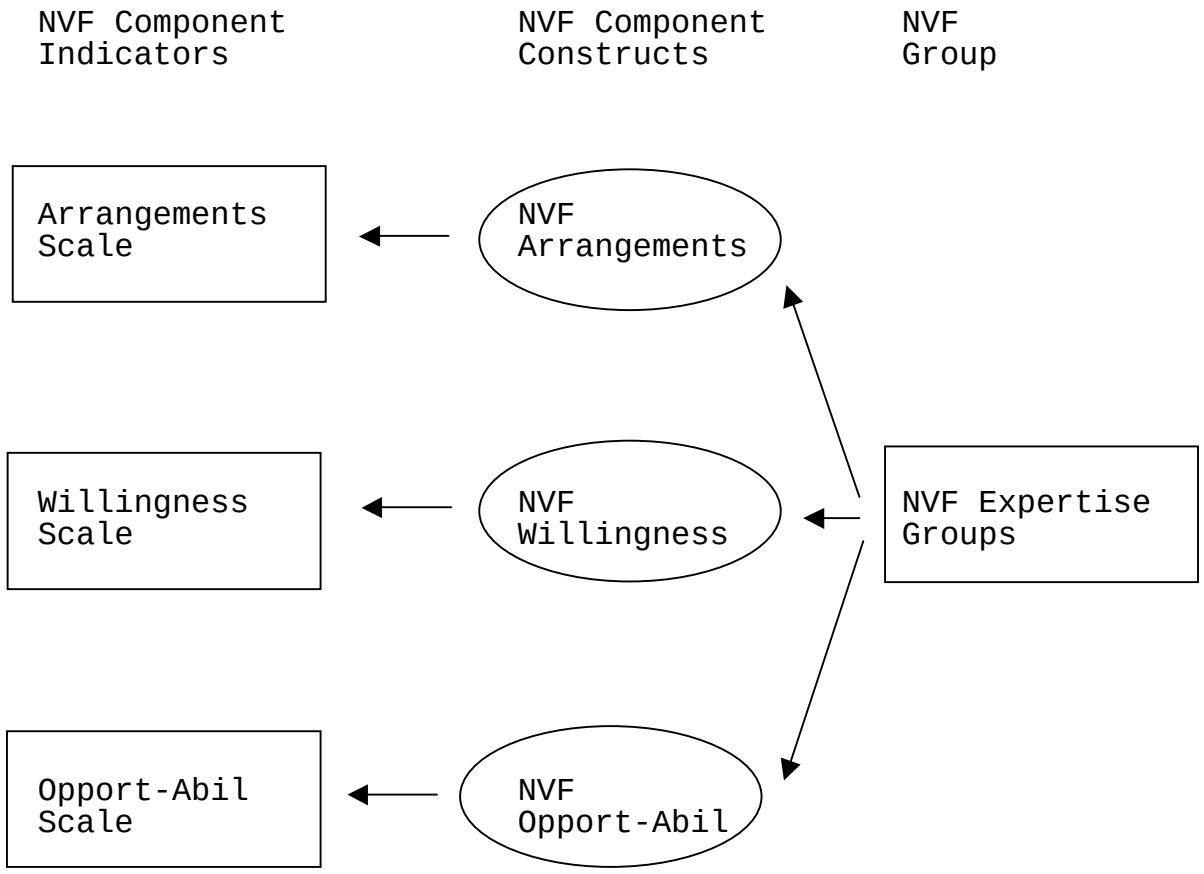


Figure 4-3
Revised Research Model for Studies 2 and 3

of contamination or bias that could invalidate the analysis. Second, a test is performed to examine Hypothesis 1.Data examination

Table 4-7 contains demographic comparisons between expert and novice groups in the SBDC Project sample. The SBDC Project beginning sample for Study 2 contains 134 novices and 54 experts for a total of 188 cases. An examination of the demographic information reveals that 39 novices claim to either be, or to have been an entrepreneur. However, the definition of a NVF expert in this study (Chapter 3) is very specific, and all 54 entrepreneurs in the sample meet these criteria. None of those novices claiming entrepreneurial experience do. Accordingly, these cases have the potential to contaminate the sample and are therefore eliminated. Demographics of the remaining 149 cases available for use in Study 2 are presented in Table 4-8.

With the exception of a 7.5% increase in the relative proportion of experts in the sample, a comparison of the demographic information in Tables 4-7 and 4-8 reveals little change in its overall complexion as a result of the elimination of so called "contaminated" novices. Table 4-9 reports the results of between groups t-tests for age or education bias in the revised sample.

As reported in the table, the null hypothesis that there

is no age or education bias between novice and expert groups

Table 4-7
Novice and Expert Group Demographic Comparisons
SBDC Project Sample - Beginning of Study

Description	Groups			
	Novice (Control)		Expert (Entrepreneur)	
	#	Percent	#	Percent
Group totals	134	100.0	54	100.0
Sample percent		71.3		28.7
I am or have been an entrepreneur	39	29.1	54	100.0
Male	92	69.2	45	83.3
Female	41	30.8	9	16.7
Caucasian	125	93.3	53	98.1
Mean age	29		44	
Yrs. college	4.62		4.78	
Self-assessed:				
Success	107	79.9	54	100.0
Lack Experience	77	57.5	6	11.1
High enthusiasm	98	73.1	49	90.7
Venture stage:				
Startup	32	23.9	13	24.1
Rapidly growing	26	19.4	22	40.7
Maturing	15	11.2	11	20.4
Declining	-	-	1	1.9
Not applicable	61	45.5	7	13.0
College senior	67	50.0	-	-
MBA	40	29.9	-	-
Community	27	20.1	54	100.0

Table 4-8
Novice and Expert Group Demographic Comparisons
SBDC Project Sample With Contaminated
Novices Removed

Description	Groups			
	Novice (Control)		Expert (Entrepreneur)	
	#	Percent	#	Percent
Group totals	95	100.0	54	100.0
Sample percent		63.8		36.2
Male	61	64.2	45	83.3
Female	33	34.7	9	16.7
Caucasian	87	91.6	53	98.1
Mean age	29		44	
Yrs. college	4.53		4.78	
Self-assessed:				
Success	71	74.7	54	100.0
Lack Experience	60	63.2	6	11.1
High enthusiasm	65	68.4	49	90.7
Venture stage:				
Startup	19	20.0	13	24.1
Rapidly growing	16	16.8	22	40.7
Maturing	9	9.5	11	20.4
Declining	-	-	1	1.9
Not applicable	51	53.7	7	13.0
College senior	49	51.6	-	-
MBA	26	27.4	-	-
Community	20	21.0	54	100.0

Table 4-9
Novice and Expert Between Groups t-Tests
For Age or Education Bias

Variable	Mean Difference	t Value	2-Tail Probability
Age[1]	2.82	$.96_{65df}$	.340
Education[1]	0.33	$.72_{70df}$	.471

[1] Comparison of Entrepreneur Experts to Community Novices

is retained, when entrepreneur experts are compared to community novices (an appropriate control group).

Tests that examine the potential for sex-based gender[1] bias (Bristor & Fischer, 1993) in the expertise indicator scales are reported in Table 4-10. The nonsignificance of the t-tests reported in Table 4-10 indicates that, in general, there is no within-group sex-based gender bias on the NVF component indicator scales. However, the observation that the separate variance estimates of significance for the expert group approach significance for both the Willingness and the Opport-Abil scales, suggests that care should be exercised as the expert-novice analyses are conducted. Accordingly, in addition to conducting a multiple discriminant analysis (MDA) for the combined group of men and women in the sample, separate MDA's for men and women separately are performed.

Table 4-10
Male and Female Respondent
Between Groups t-Tests
For Gender Bias

Variable	Mean Difference (M minus F)	t Value	2-Tail Probability
Experts:			
Arrangements	0.60	0.91_{52df}	.369
Willingness	-1.04	-1.66_{52df}	.103[1]
Opport-Abil	1.09	1.65_{52df}	.105[1]
Novices:			
Arrangements	-0.23	-0.47_{91df}	.636
Willingness	0.22	0.52_{91df}	.607
Opport-Abil	-0.33	-0.94_{91df}	.349
Enhanced:			
Arrangements	-0.48	-0.39_{23df}	.697
Willingness	-0.07	-0.08_{23df}	.938
Opport-Abil	-0.98	-1.30_{23df}	.206

[1] Although the pooled variance estimates are not significant, the separate variance estimates (.058 and .092 respectively) approach significance.

Hypothesis tests

Study 2 tests Hypothesis 1, which states: Differences exist among the mean vectors of the indicators of NVF component constructs across expert and novice groups. As noted in Chapter 3, Hypothesis 1 is confirmed when: (1) a test of the equality of group mean vectors using an approximate F-test based upon Wilks' lambda is significant, (2) the eigenvalue

of the discriminant function is significant using an approximate chi-square statistic, and when (3) the classification of cases into groups by the discriminant function in a jackknife analysis (Lachenbruch, 1967) is relatively more effective than estimating group membership using the prior probabilities of group membership contained in the sample.

The jackknife procedure is particularly useful because in the analysis each observation is successively withdrawn from the computation and is classified according to the discriminant function computed with data from the remaining cases as predictors. Thus, each case to be classified may be considered to come from the population at large, a uniquely serviceable assumption as attempts to interpret the findings are made.

The interpretation of findings is accomplished by evaluating the significance of the statistics related to the discriminant function, assessing the classification effectiveness of the discriminant function (jackknife analysis), and examining the discriminant loadings where applicable. The results of the MDA for the combined male and female sample are reported in Table 4-11. Results of the jackknifed classification analysis are shown in Table 4-12.

As shown in the tables, Hypothesis 1 is confirmed, since the test of the equality of group mean vectors using an

approximate F-test based upon Wilks' lambda is significant, the eigenvalue of the discriminant function is significant using an approximate chi square statistic, and the classification of cases into groups by the discriminant function in a jackknife analysis dramatically improves the probability of

Table 4-11
Multiple Discriminant Analysis Combined (Male & Female)
Sample Results For Expert - Novice Groups
n = 148

	Discriminant Axis I
Eigenvalue	.7842
Significance level p =	.0000***
Loadings:	
Arrangements	.9981
Willingness	.2397
Opport-Abil	.3274
Group means (centroids)	
Expert	1.16
Novice	-0.67

Related Statistic	Value	p =
Equivalent F statistic	37.643	.0000***
Box's M	4.32	.2363
Univariate F:		
Arrangements	114.10	.0000***
Willingness	6.57	.0114*
Opport-Abil	12.27	.0006***

* p < .05 ** p < .01 *** p < .001

Table 4-12
Jackknifed Classification Matrix Combined (Male & Female)
Sample Results for Expert - Novice Groups
n = 148

			Cases classified into group	
Actual Group	Prior Probability	Percent Correct	Expert	Novice
Expert	0.36913	79.6	43	11
Novice	0.63087	86.2	13	81
Total	1.00000	83.8	56	92

correctly estimating group membership as compared to using the prior probabilities of group membership contained in the sample. Also reported in Table 4-11 is the nonsignificance of Box's M, which indicates compliance with the required assumptions of MDA: (1) a multivariate normal distribution of variables in the analysis, and (2) the equality of with-group dispersion matrices.

Although a full discussion and interpretation of these results is reserved for Chapter 5, it is useful to note the main points of the analysis that can assist with this interpretation. Specifically, the order and magnitude of the loadings on the discriminant function should be noted. In the combined (male and female) analysis, the primary discriminat-

ing is accomplished by the Arrangements scale (loading .9981). Quite secondary are the Opport-Abil (.3271) and the Willingness (.2397) scales.

Also noteworthy is the dramatically improved classification capability offered by the discriminant function computed using this sample. When compared to the prior probability of correctly classifying an individual as an expert, the discriminant function more than doubles classifying capability (from 37% to 80%). The classifying capability for novices improves 36%. Overall, the NVF component scale-based discriminant function is capable of classifying approximately 84% of individuals correctly, as compared to a weighted average of 53%, a 57% improvement in classifying capability.

However, as suggested in the preliminary tests for sex-based gender bias, two additional subhypotheses should also be tested:

> Hypothesis 1_a: Differences exist among the mean vectors of the indicators of NVF components constructs across *male* expert and novice groups.
>
> Hypothesis 1_b: Differences exist among the mean vectors of the indicators of NVF components constructs across *female* expert and novice groups.

Tables 4-13 and 4-14 report the MDA results for the test of Hypothesis 1_a, and Tables 4-15 and 4-16 report the MDA

results for the test of Hypothesis 1_b.

As shown in the tables, Hypotheses 1_a and 1_b are confirmed, since the tests of the equality of group mean vectors are significant, the eigenvalues of the respective discriminant functions are also significant, and the classification

Table 4-13
Multiple Discriminant Analysis Males Only Sample Results
For Expert - Novice Groups
n = 105

	Discriminant Axis I
Eigenvalue	1.1708
Significance level p =	.0000***
Loadings:	
Arrangements	.9787
Willingness	.1404
Opport-Abil	.3627
Group means (centroids)	
Expert	1.2375
Novice	-0.9281

Related Statistic	Value	p =
Equivalent F statistic	39.418	.0000***
Box's M	2.56	.8709
Univariate F:		
Arrangements	115.50	.0000***
Willingness	2.38	.1262
Opport-Abil	15.87	.0001***

* p < .05 ** p < .01 *** p < .001

Table 4-14
Jackknifed Classification Matrix Males Only Sample Results for Expert - Novice Groups
n = 105

		Cases classified into group		
Actual Group	Prior Probability	Percent Correct	Expert	Novice
Expert	0.42857	86.7	39	6
Novice	0.57143	90.0	6	54
Total	1.00000	88.6	45	60

Table 4-15
Multiple Discriminant Analysis Females Only Sample Results
for Expert - Novice Groups
n = 42

	Discriminant Axis I
Eigenvalue	.3802
Significance level p =	.0061**
Loadings:	
Arrangements	0.8292
Willingness	0.6167
Opport-Abil	-0.0404
Group means (centroids)	
Expert	1.15
Novice	-0.31

Related Statistic	Value	p =
Equivalent F statistic	4.816	.0061**
Box's M	3.76	.7822
Univariate F:		
Arrangements	10.46	.0025**
Willingness	5.79	.0209*
Opport-Abil	0.09	.8757

* p < .05 ** p < .01 *** p < .001

Table 4-16
Jackknifed Classification Matrix
Females Only Sample Results
for Expert - Novice Groups
n = 42

			Cases classified into group	
Actual Group	Prior Probability	Percent Correct	Expert	Novice
Expert	0.21429	33.3	3	3
Novice	0.78571	90.9	3	30
Total	1.00000	78.6	6	36

of cases into groups by the discriminant functions in jack-knife analyses dramatically improves the probability of correctly estimating group membership as compared to using the prior probabilities of group membership contained in the samples. Also reported in Tables 4-13 and 4-15 is the nonsignificance of Box's M, indicating that the required assumptions of MDA are met in both analyses.

In examining the order of the loadings on the discriminant functions for the male sample as compared to the female sample, the primary discriminating is still accomplished by the Arrangements scale (loading .9787 for men and .8292 for women), although the loading on the Arrangements scale in the

analysis of the female sample decreases by approximately .15. Loadings on the Opport-Abil scale (.3627 for men and -0.0404 for women) show an even more dramatic difference between the analyses, indicating that the Opport-Abil scale contributes virtually nothing to distinguishing female experts from female novices. Loadings on the Willingness scale (.1404 for men and .6167 for women) show a reverse of the weightings in the case of the Willingness scale. Willingness figures much more heavily in the discrimination of female experts from female novices than it does in distinguishing male experts and novices. The results of the classification computation illustrate the consequences of the partition of the sample.

When compared to the prior probability of correctly classifying an individual into the expert group, the discriminant function computed using the male sample only doubles classifying capability (from 43% to 87%). The greatest improvement, however, is in the classifying capability for novices, which improves 58% (as compared to the 36% improvement for the combined male-female sample). Overall, the NVF component scale-based discriminant function computed using the male sample is capable of classifying approximately 89% of individuals correctly (up 5% from 84%) as compared to a weighted average of 51%, a 75% improvement in classifying capability (as compared to a 57% improvement in the combined

sample-based classifying capability).

The results of the jackknife classification analysis using the sample containing data on female experts and novices reveal a different classification pattern for women than for men. Table 4-16 reports that the classification capability of the discriminant function using female experts and novices is somewhat diminished. The overall correct classification percentage is approximately 79%, compared to a weighted average prior probability in the sample of 62% (a modest 27% improvement in classifying capability--a full 10 percentage points below the same percentage for the male sample). This results from the relative inability of the NVF component scale-based discriminant function to distinguish female experts from female novices. Despite the 55% improvement in the probability of a correct classification when compared to the prior probability in the sample, the 33% correct classification of female experts appears to be inadequate in practical terms. The 79% overall correct classification percentage occurs due to the effects of the 91% correct classification of female novices, which only improves female novice classification effectiveness by 16%.

Summary

In summary, the findings in study 2 support Hypothesis

1. Differences do exist among the mean vectors of the indicators of NVF component constructs across expert and novice groups. Further, Hypotheses 1_a and 1_b are also supported, indicating that differences also exist among the mean vectors of the indicators of NVF component constructs across both male and female expert and novice groups when analyzed separately. Implications of the differences revealed in the analyses are explored in Chapter 5.

These conclusions also confirm Proposition 2 which asserts that discrimination between NVF experts and novices using the script cue-based indicators of EIPT constructs should be possible, thereby answering research subquestion 2. These results therefore make the main assertion of this dissertation, that the occurrence of new venture formation by individuals is associated with expertise, substantially more credible.

Results of Study 3: The Creation of NVF Expertise

Study 3 is conducted to ascertain whether the script cue recognitions of enhanced novices more closely approximate those of experts in an expertise enhancement experiment that provides to novices, in-depth developmental contact with experts. This objective is accomplished by testing Hypothesis 2 which states: Differences exist among the mean vectors of

the indicators of NVF component constructs across expert, novice and enhanced novice groups.

Results of this analysis are reported in two parts. First, the examination of the data for bias is reported. The data are examined for "contamination" as previously described in connection with Study 2, and for age, education, inequality of group pretest mean and pretest bias. Second, a test is performed on the data to examine Hypothesis 2.

Data examination

Table 4-17 contains demographic comparisons between expert, novice and enhanced novice groups in the SBDC Project sample. The SBDC Project beginning sample for Study 3 contains 134 novices, 31 enhanced novices, and 54 experts for a total of 219 cases. Table 4-18 reports the effects of removing from the sample so called "contaminated novices" identified in Study 2.

With the exception of a 6.4% increase in the relative proportion of experts in the sample, and the virtual elimination of the self assessed success rating difference between novices and enhanced novices (down from a 13.5% difference to 4.4), a comparison of the demographic information in Tables 4-17 and 4-18 reveals little change in its overall complexion as a result of the elimination of so called "contaminated"

novices. Table 4-19 reports by undergraduate and graduate grouping, the results of between groups *t*-tests for age or education bias in the revised sample.

As reported in the table, the null hypothesis that there is no age or education bias between novice and enhanced novice groups in the sample is retained, when undergraduate and graduate novices are compared to undergraduate and graduate enhanced novices respectively.

The randomized Solomon Four-Group experimental design employed in Study 3 usually provides a high level of control over threats to internal validity (Fraenkel & Wallen, 1990).

Table 4-17
Novice, Enhanced Novice, and Expert Group Demographic Comparisons - SBDC Project Sample
Beginning of Study

Description	Groups					
	Novice (Control)		Enhanced (Treatment)		Expert (Entrep.)	
	#	Percent	#	Percent	#	Percent
Group totals	134	100.0	31	100.0	54	100.0
Sample percent		61.2		14.2		24.6
I am or have been an entrepreneur	39	29.1	6	19.4	52	96.3
Male	92	69.2	22	71.0	45	83.3
Female	41	30.8	9	29.0	9	16.7
Caucasian	125	93.3	28	90.3	53	98.1
Mean age	29		26		44	
Yrs. college	4.62		4.75		4.78	
Self-assessed:						
Success	107	79.9	29	93.5	54	100.0
Lack Experience	77	57.5	19	61.3	6	11.1
High enthusiasm	98	73.1	22	71.0	49	90.7
Venture stage:						
Startup	32	23.9	7	22.6	13	24.1
Rapidly growing	26	19.4	3	9.7	22	40.7
Maturing	15	11.2	2	6.5	11	20.4
Declining	-	-	-	-	1	1.9
Not applicable	61	45.5	19	61.2	7	13.0
College senior	67	50.0	20	64.5	-	-
MBA	40	29.9	11	35.5	-	-
Community	27	20.1	-	-	54	100.0

Table 4-18
Novice, Enhanced Novice, and Expert Group Demographic Comparisons - SBDC Project Sample With Contaminated Novices Removed

Description	Groups					
	Novice (Control)		Enhanced (Treatment)		Expert (Entrep.)	
	#	Percent	#	Percent	#	Percent
Group totals	95	100.0	25	100.0	54	100.0
Sample percent		54.6		14.4		31.0
Male	61	64.9	18	72.0	45	83.3
Female	33	35.1	7	28.0	9	16.7
Caucasian	87	91.6	22	91.7	53	98.1
Mean age	29		26		44	
Yrs. college	4.53		4.52		4.78	
Self-assessed:						
Success	71	74.8	19	79.2	54	100.0
Lack Experience	60	63.2	17	70.9	6	11.1
High enthusiasm	65	68.5	19	79.2	49	90.7
Venture stage:						
Startup	19	20.0	5	20.0	13	24.1
Rapidly growing	16	16.8	3	12.0	22	40.7
Maturing	9	9.5	1	4.0	11	20.4
Declining	-	-	-	-	1	1.9
Not applicable	51	53.7	16	64.0	7	13.0
College senior	49	51.6	17	68.0	-	-
MBA	26	27.4	8	32.0	-	-
Community	20	21.0	-	-	54	100.0

Table 4-19
Novice and Enhanced Novice Between Groups t-Tests
For Age or Education Bias

	Novice-Enhanced Undergraduate Comparison		Novice-Enhanced Graduate Comparison	
Variable	t Value	2-Tail Probability	t Value	2-Tail Probability
Age	-0.73_{63df}	.470	0.11_{33df}	.910
Educ.	-1.03_{64df}	.305	1.14_{33df}	.260

The Solomon Four-Group design facilitates tests that examine responses on the expertise indicator scales for (1) pretest bias in the novice group, and (2) inequality of pretest means between pretested novices and pretested enhanced novices. These results are reported in Table 4-20.

Tests for pretest bias

The results reported in Table 4-20 show no pretest bias in either the Arrangements or the Willingness scale data. The significance of the test for pretest bias in the Opport-Abil scale data appears to be attributable to general learning effects of attending classes at a university, since none of these subjects was a member of classes when expertise enhance-

ment exercises were conducted, and the absolute mean difference between the pre- and posttest scores on the Opport-Abil scale is relatively small.

Table 4-20
t-Test of Controls for Pretest Bias

	Pretest/Posttest Comparison		Between Groups Pretest Means	
Variable	t Value	2-Tail Probability	t Value	2-Tail Probability
Arrangements	-1.20_{10df}	.257	-1.19_{10df}	.260
Willingness	0.64_{10df}	.539	2.45_{10df}	.034*
Opport-Abil	-2.39_{10df}	.038*	-0.60_{10df}	.563

* $p < .05$

Hence, when the posttest mean of the novice control group (2.73) is compared to the *pretest* mean of the treatment group (2.50), the means are not significantly different ($p = .747$). Further, the difference between the posttest mean of the control group (2.72) and that of the treatment group (5.50) is in fact significantly different ($p < .001$).

Thus, when the mean difference that resulted in the significance of the pre and post t-test for the novice (control) group (2.73 - 2.00 = .73), is compared with the pre-post mean difference in the scores of the treatment group (5.50 - 2.50 =

3.00), it is clear that the amount of pretest bias, if any, in the Opport-Abil scale is not sufficient to invalidate the use of these data in further analysis. To illustrate, even if the amount of bias (.73) were to be added to the pretest mean of the treatment group (2.50 + .73 = 3.23), a significant difference ($p < .001$) would remain between the hypothetically adjusted pretest mean and the posttest mean of the treatment group (5.50 - 3.23 = 2.27).

Tests for equality of pretest means

The results reported in Table 4-20 also show no bias from inequality in the pretest scores of the novice versus the enhanced novice groups on either the Arrangements scale or the Opport-Abil scale. However, the difference between the novices and enhanced novices in their pretest means on the Willingness scale, is found to be significant--possibly suggesting a difference between the groups in their willingness to venture. However, since the assignment to these groups was random, it is assumed that most of the difference is due to sampling error that would disappear in a larger sample.

Nevertheless, to be viewed conservatively, the possible impact of this potential bias should be assessed. Accordingly, when the MDA reported in the following part of this

section was conducted, the relative impact of between group bias in this scale was evaluated. Since in the analysis, the loading of the Willingness scale on discriminant function II is only .34, and since the Willingness scale accounts for only 29% of the discriminating power in the analysis, the inequality of the pretest means on the Willingness scale was not deemed to invalidate the results of the analysis.

Hypothesis tests

Study 3 tests Hypothesis 2, which states: Differences exist among the mean vectors of the indicators of NVF component constructs across expert, novice, and enhanced novice groups. As discussed in Chapter 3, Hypothesis 2 is supported (1) when pre, post- *t*-tests indicate significant differences in the NVF component indicator scales with subjects acting as their own control, and (2) under the same conditions for significance and classification delineated previously in the reporting of the results of Study 2, in a multiple scale three group MDA to evaluate the effects of the treatment relative to experts and novices as control/comparison groups.

Subjects as their own control group

The results of the pre, post- *t*-tests for treatment effects, with subjects serving as their own control are reported in Table 4-21. This table reports significant

treatment effects of the expertise enhancement method as shown by scores on both the Arrangements and the Opport-Abil scales. It appears from the nonsignificance of pre, posttest differences in scores on the Willingness scale, that willingness to enter the NVF expert script (willingness to venture) may be less susceptible to enhancement than are the other components of expertise. Based on the analysis, however, it appears that Hypothesis 2 accumulates support in a univariate t-test where subjects serve as their own control group.

Table 4-21
Pre, and Posttest Groups Treatment Effects
Paired Sample t-Tests

Variable	Mean Difference	t Value	2-Tail Probability
Arrangements	1.75	2.40_{11df}	.035*
Willingness	0.42	$.67_{11df}$	.516
Opport-Abil	3.00	6.09_{11df}	.000***

* $p < .05$ ** $p < .01$ *** $p < .001$

Experts and novices as control/comparison groups

To fully test Hypothesis 2, however, a multivariate test is required. Hence, a multiple scale three group MDA was conducted. The results of the MDA for the combined male and female sample are reported in Table 4-22. For the male only

and female only subsamples the results are reported in similar tables.

As shown in table 4-22, the test of equality of group mean vectors (based on Wilks' lambda) resulted in a multivariate F = 22.86 with p < .0000. Thus the three groups have significantly different levels of script cue recognition. The three scales were also found to be significant predictors of group membership at p < .0000 for the Arrangements scale, p < .05 for the Willingness scale, and p < .0000 for the Opport-Abil scale.

Two discriminant functions were found to be significant

Table 4-22
Multiple Discriminant Analysis Combined (Male & Female)
Sample Results for Expert, Novice, and Enhanced Novice Groups
n = 173

	Discriminant Axes	
	I	II
Eigenvalues	.6194	.2245
Significance level p =	.0000***	.0000***
Percent of total discrim. power	70.98	29.02
Cumulative percent of discrim. power	70.98	100.00
Rotated loadings:		
Arrangements	.9759*	.2013
Willingness	.1653	.3409*
Opport-Abil	.0940	.9642*
Group means (centroids):		
Expert	1.13	0.10
Novice	-0.56	-0.35
Enhanced Novice	-0.36	1.09

* indicates the grouping together on a discriminant axis of variables with large loadings for that axis (Norusis, 1990)

Related Statistic	Value	p =
Equivalent F statistic	22.856	.0000***
Box's M	14.02	.3330
Univariate F:		
Arrangements	52.25	.0000***
Willingness	4.65	.0108*
Opport-Abil	21.15	.0000***

* p < .05 ** p < .01 *** p < .001

below the .001 level, with discriminant function I accounting for approximately 71% of the discriminating power, and the two functions together accounting for 100%. In addition, the discriminant functions' eigenvalues were found to be significant ($p < .0000$) using an approximate chi-square statistic. This evidence demonstrates support for Hypothesis 2.

The centroids (means) of the three groups are plotted in Figure 4-4 as ordered pairs (coordinates) for each centroid, so that the separation of groups can be visualized. Isodensity ellipses (circles) that are expected to contain 20% of the subjects in each group were plotted with a diameter of each circle computed to be 1.34 units (Watson, 1982). The isodensity circles in Figure 4-4 depict the overlaps among the groups. The groups are appreciably overlapped even though the means are significantly different for these new venture expertise components.

The classification functions derived by MDA were computed using the posttest results of the 174 participants in the study, and the observations were classified as belonging to the group having the highest estimated posterior probability using a jackknife analysis (Lachenbruch, 1967). The classification matrix giving the number of subjects classified into the different groups compared to their actual groups, using proportionate prior probabilities (Eisenbeis,

1977), and the percentages classified correctly are reported in Table 4-23.

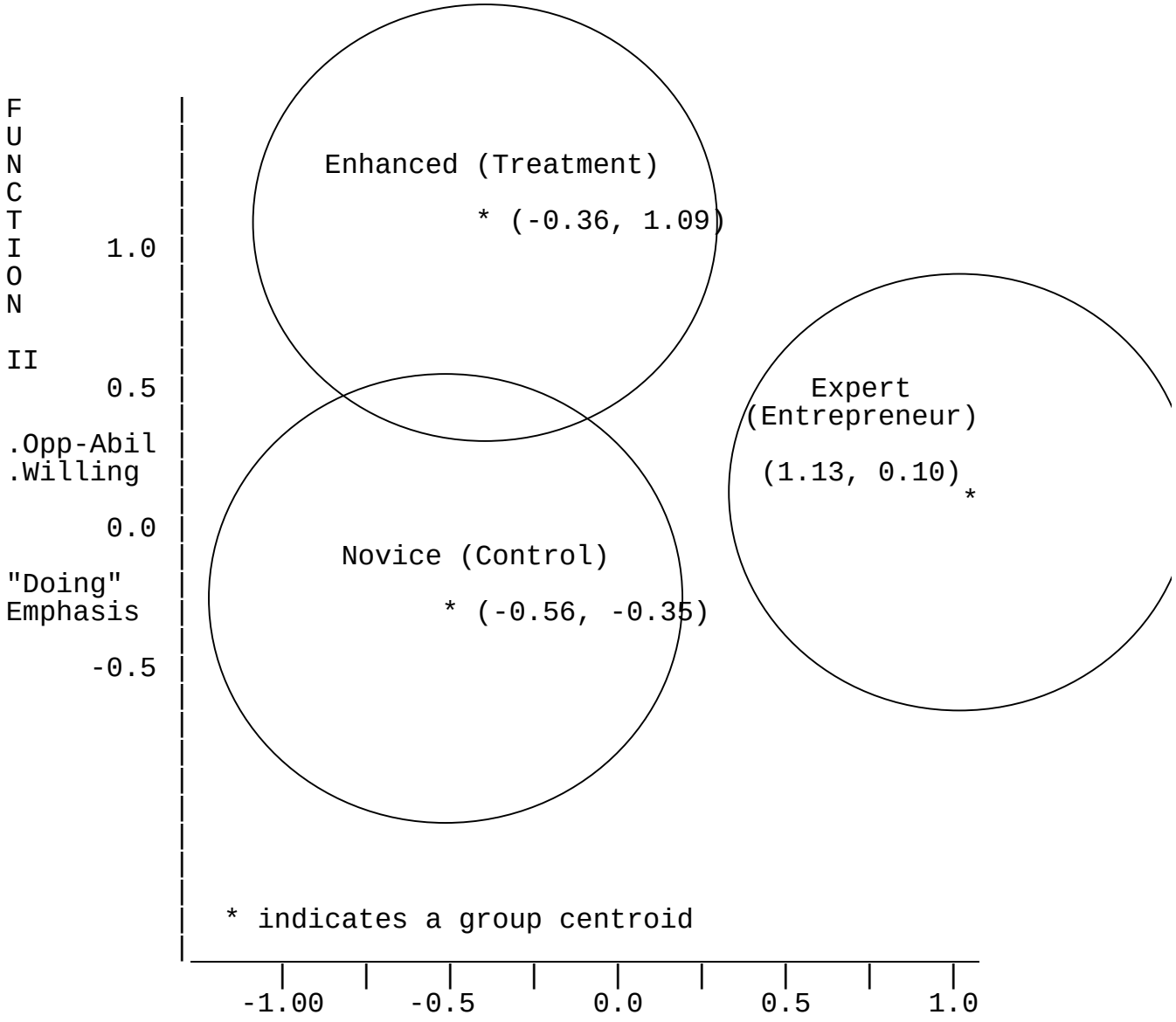


Figure 4-4
Discriminant Function All Group Scatterplot:
20% Isodensity Circles for the Combined
(Male - Female) Sample

Table 4-23
Jackknifed Classification Matrix Combined (Male & Female) Sample Results for Expert, Novice, and Enhanced Novice Groups
n = 173

			Cases classified into group		
Actual Group	Prior Probability	Correct %	Expert	Novice	Enhanced
Expert	0.31214	74.1	40	10	4
Novice	0.54335	81.9	12	77	5
Enhanced	0.14451	40.0	4	11	10
Total	1.00000	73.4	56	98	19

The total correct classification was found to be 74.1% for the expert (entrepreneur) group, 81.9% for the novice (control) group, and 40.0% for the enhanced novices (treatment) group. The two discriminant functions substantially increase classification capability since, based on the proportion of each group in the sample, it would be expected that 31.2%, 54.3%, and 14.5% of the subjects (respectively) would be classified correctly. The lower "enhanced novice" classification percentage (40.0%) shows that the enhanced novices' scale scores fall somewhere between "expert" and "novice," indicating that members of the treatment group are

no longer strictly novices, but are not yet experts.

An interpretation of the two discriminant functions is possible when the loadings for the variables are examined. The means plotted in Figure 4-4 show that on discriminant function I, the novice group has the lowest combined score, the expert group the highest, and the score of the enhanced (treatment) group is very close to that of the novices. With a rotated loading of 0.976, discriminant function I (shown on the horizontal axis of Figure 4-4) appears to be emphasizing the "entry" dimension of entrepreneurship; i.e., having the arrangements necessary for venturing such as funding, technology, experience and a new venture network in place. The expert group appears to be much farther along in the venturing life cycle in that they have experienced failure episodes in their venturing pasts, have built support and resource networks, and have identified technologies and funding sources for their ventures. All of these characteristics are reflected in the items of the Arrangements scale.

Discriminant function II is notable for the separation of the enhanced novice group on the high side of the vertical axis. The high rotated discriminant loading of Opport-Abil (0.964) and the moderate loading of Willingness (.341) on discriminant function II indicates that this function stresses the "doing" dimension of NVF expertise, i.e., having the

willingness to embark upon a new venture, and the ability necessary to ensure the actual creation of that venture through opportunity identification, capture and protection. Groups located at higher positions on this function tend to have a high degree of "ability to recognize patterns as they develop and the confidence to assume that the missing elements of the pattern will take shape as they foresee" (Stevenson, Roberts, & Grousbeck, 1994, p. 7). Higher groups on Axis II have experience-based knowledge of the scenarios and scripts associated with solving new venture problems, and have the confidence to act. Figure 4-4 indicates that the enhanced novice group is separated somewhat from the other groups along the vertical axis. It is likely that this phenomenon is, in part, due to the effects of the experiential treatment. A discussion of these results and a suggested interpretation follows in Chapter 5.

However, as suggested in the preliminary tests for sex-based gender bias conducted as a part of Study 2, two additional subhypotheses should also be tested:

> Hypothesis 2_a: Differences exist among the mean vectors of the indicators of NVF components constructs across *male* expert, novice and enhanced novice groups.
>
> Hypothesis 2_b: Differences exist among the mean vectors of the indicators of NVF components constructs across *female* expert, novice and enhanced

novice groups.

Table 4-24 reports the MDA results for the test of Hypothesis 2_a, and similar tables report the MDA results for the test of Hypothesis 2_b.

As shown in Table 4-24, the test of equality of group mean vectors for the male only sample resulted in a multivariate $F = 18.84$ with $p < .0000$. Thus the three groups of

Table 4-24
Multiple Discriminant Analysis Male Only Sample Results for Expert, Novice, and Enhanced Novice Groups n = 123

	Discriminant Axes	
	I	II
Eigenvalue	.8624	.1745
Significance level p =	.0000***	.0001***
Percent of total discriminating power	79.07	20.93
Cumulative percent of discriminating power	79.07	100.00
Rotated loadings:		
Arrangements	.9666*	.1297
Willingness	.0526	.3462*
Opport-Abil	.1138	.9712*
Group means (centroids):		
Expert	1.17	0.17
Novice	-0.75	-0.40
Enhanced Novice	-0.44	0.91

* indicates the grouping on a discriminant axis of variables with large loadings for that axis (Noru[is, 1990)

Related Statistic	Value	p =
Equivalent F statistic	18.841	.0000***
Box's M	17.35	.1702
Univariate F:		
Arrangements	48.67	.0000***
Willingness	2.06	.1322
Opport-Abil	15.11	.0000***

* p < .05 ** p < .01 *** p < .001

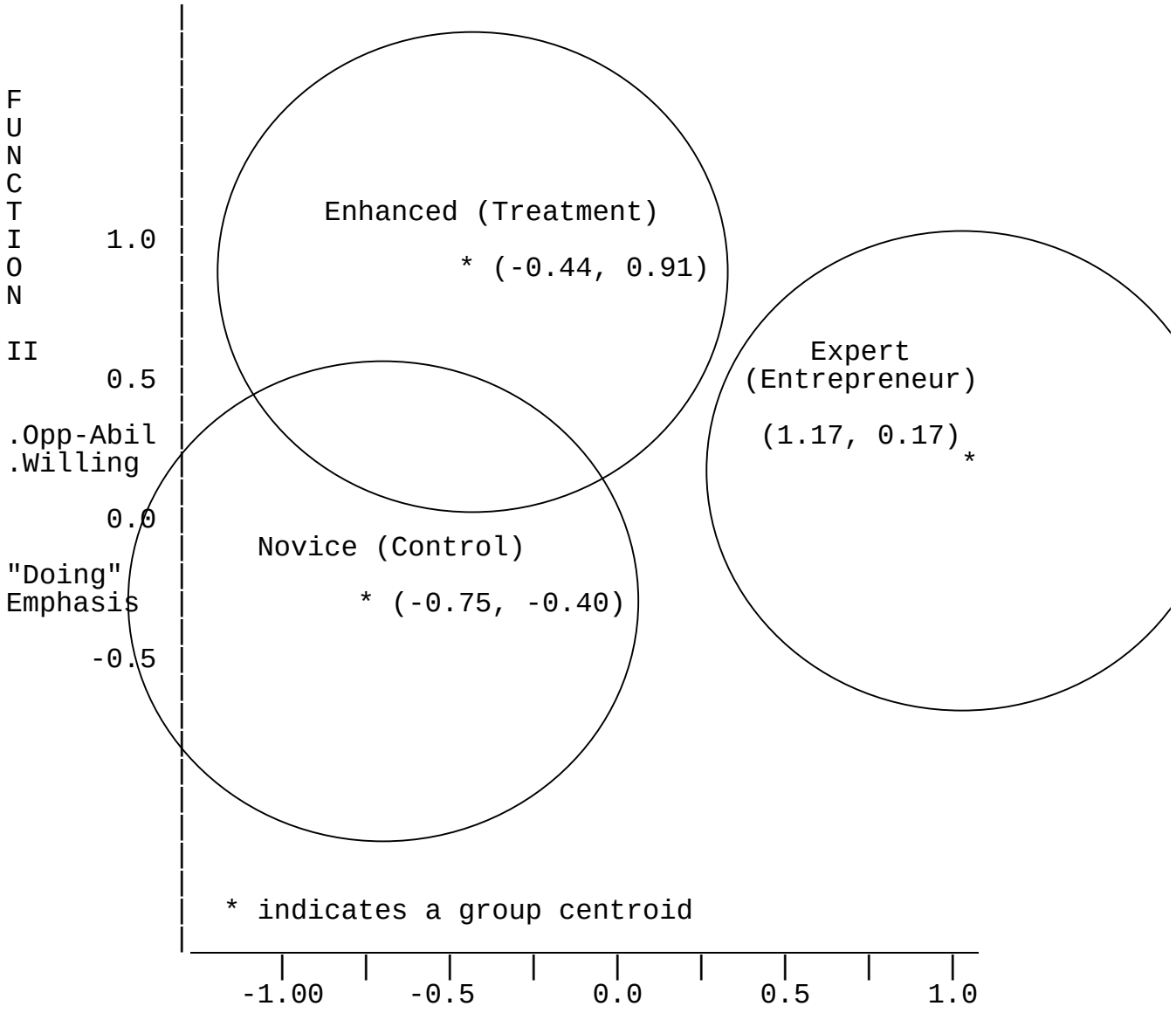
male participants in the study have significantly different levels of script cue recognition. Two of the three scales were also found to be significant predictors of group membership at p < .0000 for both the Arrangements scale the Opport-

Abil scale. The univariate F for the Willingness scale is not significant.

Two discriminant functions were found to be significant below the .001 level, with discriminant function I accounting for approximately 79% of the discriminating power, and the two functions together accounting for 100%. In addition, the discriminant functions' eigenvalues were found to be significant ($p < .0000$) using an approximate chi-square statistic. This evidence demonstrates support for Hypothesis 2_a.

The centroids (means) of the three groups are plotted in Figure 4-5 as ordered pairs (coordinates) for each centroid, so that the separation of groups can be visualized. Isodensity ellipses (circles) that are expected to contain 20% of the subjects in each group were plotted with a diameter of each circle computed to be 1.34 units (Watson, 1982). The isodensity circles in Figure 4-5 depict the overlaps among the groups. Once again, the groups are appreciably overlapped even though the means are significantly different for the new venture expertise components.

The classification functions derived by MDA were computed using the posttest results of the 123 male participants in the study, and the observations were classified as



Arrangements (Script "Entry") Emphasis

Figure 4-5
Discriminant Function All Group Scatterplot:
20% Isodensity Circles
Male Only Sample

belonging to the group having the highest estimated posterior probability using a jackknife analysis (Lachenbruch, 1967). The classification matrix giving the number of subjects classified into the different groups compared to their actual groups, using proportionate prior probabilities (Eisenbeis, 1977), and the percentages classified correctly are reported in Table 4-25.

The interpretation of the classification results shown in Table 4-25 is very similar to that for the combined sample. The overall classification capability of the male only, three group multiple scale discriminant functions increases three percentage points from 73.4% to 76.4%. This change is composed of a 10.3 percentage point increase in the capability of the functions to correctly classify experts, offset by a

Table 4-25
Jackknifed Classification Matrix Male Only Sample
Results for Expert, Novice, and
Enhanced Novice Groups
n = 123

			Cases classified into group		
Actual Group	Prior Probability	Correct %	Expert	Novice	Enhanced
Expert	0.36585	84.4	38	6	1
Novice	0.48780	83.3	6	50	4
Enhanced	0.14634	33.3	6	6	6
Total	1.00000	76.4	50	62	11

6.7% decrease in the capability of the functions to correctly classify enhanced novices. However, this similarity does not continue when the separate multiple discriminant analysis of the female only sample is conducted. As shown in Table 4-26, although the analysis produces two significant discriminant functions using the three NVF component scales, the loadings and therefore the emphasis of the functions, is altered dramatically.

Table 4-26 reports that the test of equality of group mean vectors for the female only sample resulted in a multivariate $F = 5.797$ with $p < .0000$. Thus the three groups of

female participants in the study have significantly different levels of script cue recognition. Three scales were also found to be significant predictors of group membership at $p < .0000$ for the Arrangements scale, $p < .05$ for the Willingness scale, and $p < .001$ for the Opport-Abil scale.

Two discriminant functions were found to be significant below the .001 level, with discriminant function I accounting for approximately 60% of the discriminating power, and the two functions together accounting for 100%. In addition, the discriminant functions' eigenvalues were found to be significant using an approximate chi-square statistic, at $p < .0000$, and $p < .01$ respectively. This evidence demonstrates support for Hypothesis 2_b.

The centroids (means) of the three groups are plotted in in the form of ordered pairs (coordinates) for each centroid,

Table 4-26
Multiple Discriminant Analysis Female Only Sample
Results for Expert, Novice, and
Enhanced Novice Groups
n = 49

	Discriminant Axes	
	I	II
Eigenvalue	.5200	.2808
Significance level p =	.0000***	.0038***
Percent of total discrim. power	60.48	39.52
Cumulative percent of discriminating power	60.48	100.0
Rotated loadings:		
Arrangements	.1239	.8963*
Willingness	.2120	.6826*
Opport-Abil	.9323*	.1956
Group means (centroids):		
Expert	-0.56	1.13
Novice	-0.19	-0.30
Enhanced Novice	1.62	-0.02

Related Statistic	Value	p =
Equivalent F statistic	5.797	.0000***
Box's M	5.48	.9713
Univariate F:		
Arrangements	5.58	.0068**
Willingness	3.33	.0448*
Opport-Abil	9.25	.0004***

* p < .05 ** p < .01 *** p < .001

so that the separation of groups can be visualized as shown in Figure 4-6. Isodensity ellipses (circles) that are expected to contain 20% of the subjects in each group were plotted with

a diameter of each circle computed to be 1.34 units (Watson, 1982). The isodensity circles in Figure 4-6 depict the overlaps among the groups. The groups are appreciably overlapped even though the means are significantly different for these new venture expertise components.

The classification functions derived by MDA were computed using the posttest results of the 49 female participants in the study, and the observations were classified as belonging to the group having the highest estimated posterior probability using a jackknife analysis (Lachenbruch, 1967). The classification matrix giving the number of subjects classified into the different groups compared to their actual groups, using proportionate prior probabilities (Eisenbeis, 1977), and the percentages classified correctly are reported in Table 4-27.

The total correct classification was found to be 33.3% for the expert (entrepreneur) group, 84.8% for the novice (control) group, 42.9% for the enhanced novices (treatment) group. The two discriminant functions substantially increase classification capability since, based on the proportion of each group in the sample, it would be expected that 18.4%, 67.3%, and 14.3% of the subjects (respectively) would be

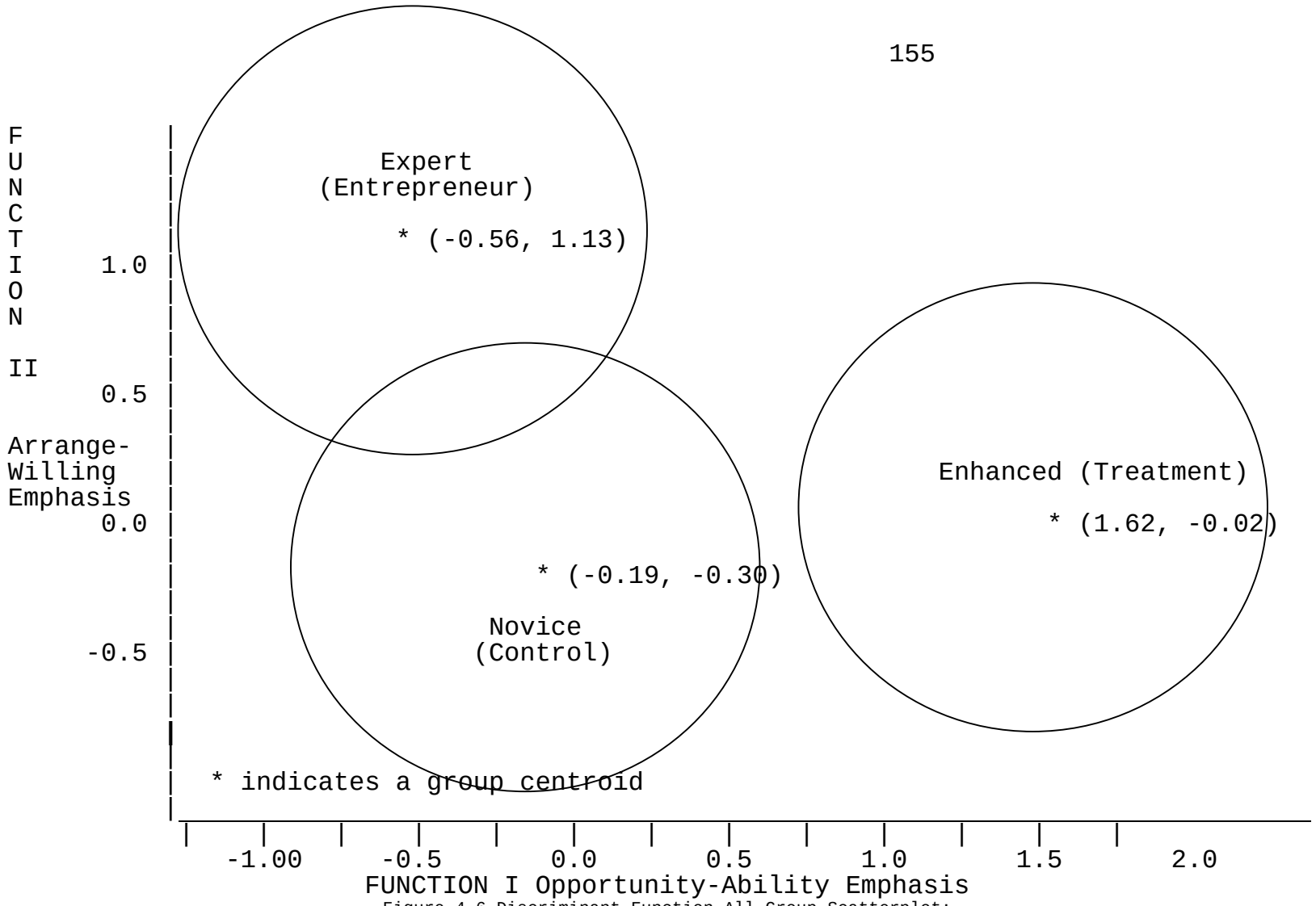


Figure 4-6 Discriminant Function All Group Scatterplot:
20% Isodensity Circles Female Only Sample

Table 4-27
Jackknifed Classification Matrix Female Only Sample
Results for Expert, Novice, and
Enhanced Novice Groups
n = 49

			Cases classified into group		
Actual Group	Prior Probability	Correct %	Expert	Novice	Enhanced
Expert	0.18367	33.3	3	6	0
Novice	0.67347	84.8	2	28	3
Enhanced	0.14286	42.9	0	4	3
Total	1.00000	69.4	5	38	6

classified correctly. The lower "enhanced novice" classification percentage (42.9%) shows that the enhanced novices' scale scores fall somewhere between "expert" and "novice," indicating that members of the treatment group are no longer strictly novices, but are not yet experts.

An interpretation of the two discriminant functions is possible when the loadings for the variables are examined, and in the case of the female only sample they differ markedly from the previous analyses. The means plotted in Figure 4-6 show that on discriminant function I, the expert group has the lowest combined score, the enhanced novice (treatment) group

the highest, and the score of the novice group is somewhat close to that of the experts. On discriminant function II, the experts have the highest combined score, the novices the lowest, and the enhanced novices a score much closer to the novices than to the experts.

With a rotated loading of 0.932, discriminant function I (shown on the horizontal axis of Figure 4-4) appears to be emphasizing the opportunity-ability portion of the "doing" dimension of NVF expertise, i.e., having the ability necessary to ensure the actual creation of that venture through opportunity identification, capture and protection, the ability to recognize patterns as they develop and the confidence to assume that the missing elements of the pattern will take shape as they foresee, and experience-based knowledge of the scenarios and scripts associated with solving new venture problems. It is noteworthy that the willingness or action oriented element, which was previously combined with opportunity-ability no longer figures heavily in the interpretation of this function (loading = .212).

Oddly, the expert group is lowest on discriminant function I, suggesting very different findings than those reported for the male only subsample or for the sample when combined. Also noteworthy is the observation that the enhanced novice group scores are the highest on this axis. It

is likely that this phenomenon is, in part, due to the effects of the experiential treatment.

Discriminant function II is notable for the separation of the expert group on the high side of the vertical axis. The high rotated discriminant loading of Arrangements (.896) and the fairly high loading of Willingness (.683) on discriminant function II indicates that this function stresses a unique combination of the "entry" *and* "doing" dimension of entrepreneurship; i.e., having the willingness to embark upon a new venture, and the infrastructure necessary to ensure the actual creation of a venture. Groups located at higher positions on discriminant function II in this analysis tend to have a NVF arrangements in place: a network of contacts, funds available, and the confidence to combine people, material, and products into viable new venture.

These findings suggest that the developing literature on women in entrepreneurship should be consulted to assist in the interpretation of these results. Insights from this literature and the resulting clarifications offered are provided in Chapter 5.

Summary

In summary, the findings in Study 3 support Hypothesis 2. Differences do exist among the mean vectors of the

indicators of NVF component constructs across expert, novice, and enhanced novice groups. Further, Hypotheses 2_a and 2_b are also supported, indicating that differences also exist among the mean vectors of the indicators of NVF component constructs across both male and female expert, novice, and enhanced novice groups when analyzed separately. The implications of these differences are explored in Chapter 5.

These results also confirm Proposition 3, which asserts that an expertise enhancement method that provides novices in-depth developmental contact with experts, should result in enhanced novice script cue recognitions that more closely approximate those of experts, thereby answering research subquestion 3. By virtue of these results the main assertion of this dissertation, that the occurrence of new venture formation by individuals is associated with expertise, is made much more credible.

Summary

This chapter set out to describe the results obtained through the implementation of a methodology created to test a literature-based but previously untested research model. The methodology consists of three successive studies intended to provide a multiple test of EIPT in the new venture setting to answer the research question: Is the occurrence of new venture

formation by individuals, associated with expertise?

This chapter reports the results of the three studies conducted under the research methodology, each of which provides evidence that may be applied to answering the research question. Study 1 supplies evidence that the components of new venture formation expertise may be delineated using script cue recognition-based indicators of new venture formation constructs. Study 2 supplies evidence that script cue recognition-based indicators of NVF component constructs may be used to discriminate between NVF experts and novices. Study 3 supplies evidence that an expertise enhancement method that provides novices in-depth contact with experts enhances novice expertise such that their script cue recognitions more closely approximate those of experts.

When three "different" implications of a theory are tested and confirmed, that theory is deemed to be much more credible (Stinchcombe, 1968). The theory proposed in this dissertation is that the occurrence of new venture formation by individuals is associated with expertise. The results reported in this chapter clearly support this assertion. The remainder of this dissertation, Chapter 5, is devoted to evaluating the implications of this finding, and to interpreting the import of the evidence gathered to support it.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

In this chapter the results presented in Chapter 4 are discussed. The first three sections of the chapter evaluate, respectively, the implications, limitations, and suggested extensions of this research. The fourth and final section concludes the dissertation with an assessment of the overall contribution of the dissertation to theory and to practice.

Implications

Stinchcombe (1968) claims that a theory is deemed to be much more credible when three "different" implications of a theory are tested and confirmed. The theory proposed in this dissertation is that the occurrence of new venture formation **(NVF)** is associated with individual expertise. The three different implications of this theory that are tested and confirmed are:

1. The implication that expert script recognitions[2] should reveal the components of individual expertise, tested and confirmed in Study 1;
2. The implication that expert script recognitions should classify experts and novices, tested and confirmed in Study 2; and

3. The implication that the expert script recognitions of novices whose expertise is "enhanced" through developmental contact with experts should more closely approximate those of experts, tested and confirmed in Study 3.

The assertion that a given theory is highly credible enables, but also requires, an exploration of the theoretical and practical implications of the findings. The assertion of credible findings also requires the interpretation of the evidence gathered to support them. This section therefore consists of two parts. In the first, the theoretical implications of the findings are discussed. In the second, the implications for practice are examined.

Theoretical implications

Presently, theoretical development in the field of entrepreneurship stands at the confluence of three literature streams: economic, characteristics, and new venture performance **(NVP)**. Each of these streams has its shortcomings, and consequently key questions remain unanswered.

The most crucial unanswered questions deal with when and why NVF might be expected (Bull & Willard, 1993), and why some Founder-CEO firms perform well, whereas others stagnate, falter, or fail (Willard et al., 1992, p. 189). The research

question posed in this dissertation addresses the first of these two issues, by inquiring whether the occurrence of NVF is associated with individual expertise. Propositions are submitted suggesting testable implications of the assertion that the occurrence of new venture formation is associated with individual expertise. The research conducted in this dissertation (1) investigates three key literature streams in entrepreneurship research and specific theories within those streams, (2) suggests the in-depth exploration of expert information processing theory **(EIPT)**, and (3) encourages the integration of these two fields to propose a theory of new venture formation expertise.

Accordingly, an evaluation of the possible impacts that the findings in this research have on the general theoretical framework in the field of entrepreneurship within which the findings are set, is called for. Also, the impact of these findings on the specific theories that support and justify this research should be assessed. These two objectives are accomplished in the two subparts of this section: the first, dealing with the implications of this research for general entrepreneurship theory, and the second, dealing with the implications of the research for the specific theories featured in this dissertation.

Implications for general entrepreneurship theory

The basic problem in entrepreneurship research at present is specified by Bull and Willard (1993) as follows:

> [In] over 200 years of the study of entrepreneurship . . . no theory of entrepreneurship has been developed that would explain or predict when an entrepreneur . . . might appear or engage in entrepreneurship. (1993, p. 183)

As discussed in Chapter 2, neither the economic, characteristics, nor NVP theories of entrepreneurship have fully solved this problem. Consequently, some of the foremost scholars concerned with advancing the field, continue to explore the domain of entrepreneurship in an attempt to build a theory of new venture formation. For example, in addition to the work of Bull and Willard (1993) summarized in detail in Chapter 2, Baumol (1993) explores the existence and bounds of formal entrepreneurship theory in economics; Van de Ven (1993) investigates the development of an infrastructure for entrepreneurship; Gartner (1993, p. 231) attempts to define an "organizational emergence vocabulary"; Cooper (1993) examines the challenges in predicting new firm performance; Bygrave (1993) explores the potential impact of "chaos" theory on the field; and Herron and Robinson (1993) extend Herron (1990) by modelling the structural effects of entrepreneurial character-

istics on NVP. The scope of these efforts attests to the energy and intensity that continue to be invested in trying to understand the phenomenon of new venture formation, but also admits to the need for added insight.

Added insight is offered by the models of information processing theory. Lord and Maher (1990, p. 9) suggest that a cross-disciplinary application of information processing models could improve the quality of theory and research in a multitude of substantive domains. Lord and Maher further suggest that *expert* information processing models, in particular, are underexplored in the management realm.

This dissertation demonstrates that expert information processing theory (EIPT) provides concepts that in part explain; and, in a discriminant analysis model predict "when individual entrepreneurs might appear or engage in" the new venture formation portion of entrepreneurship. The application of EIPT in this dissertation shows (1) that NVF expertise has three components consistent with Leddo and Abelson (1986) (Study 1), (2) that experts can be distinguished from novices using script cue recognition items that serve as indicators of these component-constructs (Study 2), and (3) that NVF expertise can be enhanced through use of the type of expertise enhancement method described in

Appendix E (Study 3). The general theoretical implications of these findings are discussed below.

Study 1: Composition. Through the application of EIPT to the field of entrepreneurship, NVF expertise is suggested to include the three components: (1) Arrangements, (2) Willingness, and (3) Opportunity-Ability. In Chapter 4 these components are defined using the notions of script "entry" and script "doing" as the conceptual foundation (Leddo & Abelson, 1986)[3].

The Arrangements component is the expert script "entry" prerequisite. As discussed in Chapters 2 and 4, experts understand the list of arrangements necessary for them to act in an expert manner, and require that they be in place *before* "entering" their script (beginning to act within their areas of expertise). Individuals in this study who have formed new ventures indicate that such arrangements as funding, a trend of performance increases, valuable technology, and prior venture experience are more often in place when a new venture is formed.

The Willingness component is the first of the script "doing" prerequisites. Without the impetus to action, expertise cannot occur--because nothing happens. This study demonstrates that when NVF occurs, NVF experts are willing to

act versus miss opportunity, to invest, to take risks, to venture versus recreate, to want a piece of the "big money," and to want a "say" in a business.

The second of the script "doing" prerequisites is "ability" in the general sense of EIPT, and Opportunity-Ability in the case of NVF specifically. This study reports that NVF experts, particularly male NVF experts, capture and protect opportunities by utilizing the competitive strategy tools of private information and other barriers to entry (Rumelt, 1987), possess knowledge of specific industry scripts and success scenarios, and know the ways to solve new venture problems with specialized new venture knowledge. In Chapter 4, the label developed for this ability is Opportunity-Ability.

With this delineation of the composition of NVF expertise, a typology that identifies possible degrees of NVF expertise may be formulated. The degrees of expertise in the typology depend upon the various possible combinations of the three NVF expertise components, which in turn depend upon the level of script cue recognition of an individual. The theoretical implication, that NVF experts will be "high" on each of the three construct indicator scales, while those who are less expert will be lower in varying degrees on one or

more of the scales, appears to have import[1] that is practical as well as theoretical.

As a theoretical contribution, this notion responds to the basic problem of entrepreneurship research by suggesting "when" an entrepreneur might appear or engage in entrepreneurship. That response is: when "arrangements," "willingness," and "opportunity-ability" are all present in an individual circumstance. It is striking to note the similarity between these three notions and those proposed by Baudeau [1767](1910), wherein he suggests that resource support, a "great desire," and specialized knowledge, are the essentials of NVF (1910, p. 51).

The identification of three fundamental components of NVF expertise suggests a path for further exploration. In the past, theories from the economics stream (Chapter 2) have lacked operationalization. However, with the application of EIPT to the NVF setting, the scaffolding for an economic stream-based research framework is provided. Through documenting an association between NVF and expertise, elements of NVF that were previously disparate because they lacked common

[1] The practical contribution, that the general typology notion may be used as a tool for preliminary diagnostic purposes such as screening potential entrepreneurs for expertise, is more fully elaborated later in this chapter under the heading "Implications for practice."

theoretical linkage, may now be combined and tested as part of a unified framework.

This is not to say, however, that the EIPT framework is fully developed. Rather, this is a call to other researchers to further investigate the applicability of EIPT to the domain of NVF as an integrating notion--one that offers a means to explain the role of the entrepreneur in NVF *without* the necessity of applying the confused and confusing "characteristics" (Chapter 2) literature, except as the basis for assisting in the operationalization of EIPT constructs in the NVF setting.

In addition to providing a framework for a general typology of NVF expertise that can serve as a possible foundation for further research and understanding of NVF, the three-component framework may also contribute to research that addresses other new questions and extends previous work. For example, Bull and Willard (1993) suggest investigations into how formal expertise (1) affects the recognition and pursuit of opportunities, and (2) accounts for the geographic clustering of new ventures (1993, p. 193). Also, since Herron (1990) contributed a vital link between two characteristics of entrepreneurs and NVP, the identification of the "arrangements," willingness," and "opportunity-ability" components of

NVF expertise constitutes a natural extension of Herron's work, and provides a solid foundation for future research that utilizes expertise as a major feature in theoretical development.

Study 2: Classification. By using the three components of NVF expertise in a multiple discriminant analysis, this research makes the classification of individuals into more finely discriminated categories between expert and novice possible. Chapter 4 reports discriminant function derivations (using the three NVF component scales) that are capable of improving the probability of correct classification of experts and novices as an absolute percentage, and as a ratio of the correct classification percentage to the prior probability (see Tables 4-12, 4-14, and 4-16) as shown in Table 5-1. The effectiveness ratios reported in Table 5-1 show that in every case, the discriminant functions derived in Study 2 contribute to improved discrimination between experts and novices.

Table 5-1
Summary Classification Effectiveness Ratios for
Jackknifed Classification Matrices
Study 2: Expert - Novice Groups

Sample/Subsample	Experts		Novices	
	% Correct	Ratio	% Correct	Ratio
Combined *n* = 148	79.6	2.15	86.2	1.36
Men Only *n* = 105	86.7	2.02	90.0	1.58
Women Only *n* = 42	33.3	1.57	90.9	1.16

Proposition 2 asserts that discrimination between NVF experts and novices should be possible using the script cue-based indicators of EIPT. Our making this distinction as a research community is important, because when made, it can provide theoretical and empirical assistance in resolving dilemmas surrounding the definition of entrepreneurship. Bull and Willard (1993) call for the origination and testing of a reasonable theory of entrepreneurship to eliminate much of the "misdirected research that has been conducted to invent a better definition of entrepreneurship," which has returned little for the vast research effort expended over the years (1993, p. 185).

The results reported in this dissertation take a firm step in this direction. On the basis of the classification results of Study 2, entrepreneurs no longer must be thought of stereotypically, and identified one-dimensionally as "born risk-takers" (Coulton & Udell, 1976), as having a high need for achievement (McClelland (1965), as the product of an "enterprising childhood," (Litvak & Maule, 1971; Smith, 1985), or as masters of strategy and industry structure (Sandberg, 1986). Building on the notion of entrepreneurial skill advanced in Herron (1990), this dissertation finds that the occurrence of NVF is associated with expertise; and that on

the basis of expert script cue recognitions, experts in NVF will consistently recognize excerpts from NVF scripts (Glaser, 1984; Read, 1987) better than will novices.

Thus, the classification results of this dissertation provide a theoretically sound, but operationally simple means to capture the "individual" element in the NVF portion of entrepreneurship. With ease of operationalization, comes the likelihood of increased research activity. The contribution of individual entrepreneurs to NVF may thus be further examined, since practitioners and venture capitalists continue to consider the individual who forms the venture to be critical to its success (Hall & Hofer, 1993; Herron, 1990; Sandberg, 1986; Stuart & Abetti, 1990). The classification results of Study 2 provide the possibility to further illuminate the dynamics of individuals' role in entrepreneurship, fulfilling a major objective of this study.

Further, as discussed in Chapter 1, for at least the past decade scholars in the field have been advancing typologies that categorize entrepreneurs into fairly fine gradations (Bird, 1989; Derr, 1984; Vesper, 1980; Wortman, 1987), often in a theory-building sense, unaccompanied by empirical testing. An additional contribution that the research reported in this dissertation makes toward advancing

theory, is to provide distinctions that are more fine-grained than is the simple expert-novice dichotomy.

Although not anticipated in the original design of this study, the results of the univariate F tests and the scale loadings reported in Study 2 (Tables 4-13 and 4-15) suggest two unique NVF typologies (male and female) that differentiate experts and novices using empirically determined two-function subsets of the general three-scale typology. Figure 5-1 represents the likely status of individuals in the male subsample who score high and low on the two significant, high-loading scales: "Arrangements," and "Opport-Abil."

As Figure 5-1 illustrates, finer distinctions between male experts and male novices are possible using information from the analyses reported in Chapter 4. Of particular theoretical interest are the two "partial expert" categories. Based upon this typology, the likely "danger zones" for male "partial experts," relate (1) to starting ventures when infrastructure (e.g., capital) may be insufficient, or (2) to the waste of NV resources where ventures are initiated without sufficient ability relative to the opportunity (e.g., a trial and error approach to NVF). Such distinctions are of interest to scholars who may wish to study the causes of new venture success and failure by male entrepreneurs.

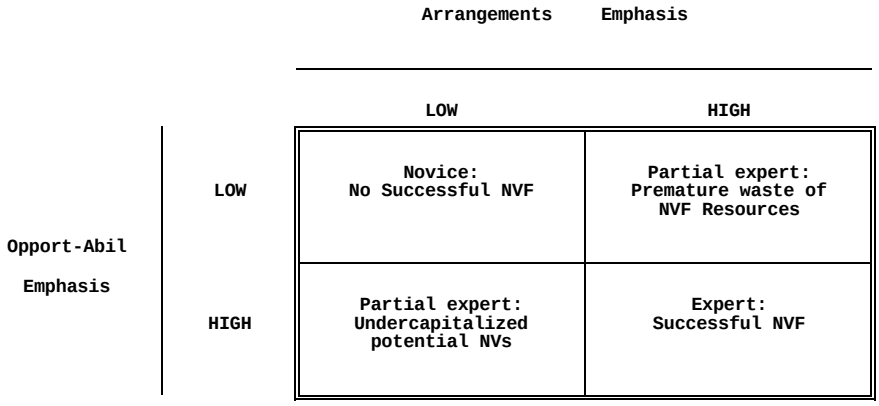


Figure 5-1
NVF Expert-Novice Typology
Male Subsample

In Figure 5-2, a quite different picture emerges for female new venturers. The cause of the differences is the replacement of the "Opport-Abil" scale that figures heavily in distinguishing male experts from novices (but has a negligible effect when applied to distinguishing female experts from novices) with the "Willingness" scale, which is both significant on a univariate basis, and has double the loading on the female-sample discriminant function axis than does the "Opport-Abil" scale on the male sample axis.

As Figure 5-2 illustrates, finer distinctions between female experts and female novices are possible using information from the analyses reported in Chapter 4. Once again, theoretical interest in this figure centers on the two "partial expert" categories. Based upon the "females only"

sample typology, the likely "danger zones" for female "partial

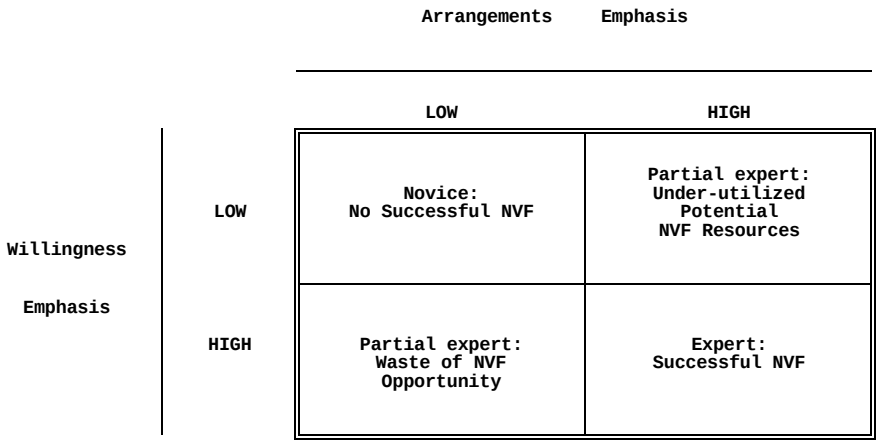


Figure 5-2
NVF Expert-Novice Typology
Female Subsample

experts," relate to (1) not starting ventures when the arrangements infrastructure (e.g., capital, contacts, technology) is available, or (2) the waste of NV opportunity where ventures are not initiated due to lack of resources. As compared to the male "danger zones," the deficiencies due to "partial expertise" in women appear to be errors of "omission" versus the errors of "commission" featured in Figure 5-1 for male venturers. It would appear that the "danger" for female potential entrepreneurs may be not to start at all, whereas the "danger" for male potential entrepreneurs may be to start, but to make errors in the process. Such distinctions are of interest to scholars who may wish to study the causes of new

venture initiation failure by female entrepreneurs.

Research on women entrepreneurs that can help to place these findings in context, is at a very early stage of development (Moore, Buttner, & Rosen, 1992). Although research on sex-based gender differences (Bristor & Fischer, 1993) in entrepreneurial characteristics and performance receives a considerable amount of attention, the empirical findings and recommendations that have been reported are diverse and often contradictory (Chrisman, Carsrud, DeCastro, & Herron, 1990; Sexton & Bowman-Upton, 1990; and others). Accordingly, the findings reported in this dissertation may prove useful, since they confirm some of the more recent findings in the women in entrepreneurship literature.

Buttner and Rosen (1989) find that acquisition of start-up capital is the critical factor in female venture initiation. Fischer, Reuber, and Dyke (1991) find that women differ from men in that they have greater financial motivation, and less access to experiences that permit development of the abilities necessary for opportunity actualization. Thus it is not surprising that the key features that distinguish female expert and novice entrepreneurs would emphasize "arrangements" and "willingness," and would de-emphasize "opportunity-ability."

Social feminist theory provides background for this explanation. Social feminism holds that there are differences between males' and females' experiences that originate from the very earliest moments of life. These experience differences result in ways of viewing the world that are fundamentally different, but are equally valid as a basis for developing knowledge and acting within society (Calas & Smirchich, 1989). Social feminism explains, for example, the greater financial motivation of women entrepreneurs. Fischer et al. (1991, p. 17) argue that:

> . . . women entrepreneurs exhibit stronger financial motivations because having greater financial success is important to their ability to take care of their dependents.

Table 5-2 reports the results of a cross-tabulation analysis of male-female response patterns on the Willingness scale within the sample group of 54 entrepreneurs. The analysis reveals large differences between men and women on five of the eight items that make up the scale.

Table 5-2
Item Response Comparison: Willingness Scale
Male v. Female Entrepreneurs

Item	Percent	
	Males	Females
Worse to wait & miss opportunity	24.4	55.6
Have enormous drive	66.7	88.9
Am attracted to action takers	60.0	77.8
Am looking to invest my resources	40.0	66.7
Want a say with NV investments	73.3	88.9

It is also not surprising, in view of the social feminist perspective, that access to a venturing infrastructure is also a key component in female entrepreneurial success. Because socialization processes for women tend to emphasize the building of and reliance upon relationships (versus "competition" in the male model) (Bristor & Fischer, 1993; Chordorow, 1978) it is likely that female new venture initiators would be highly capable in building a venturing infrastructure--though not necessarily the same infrastructure as that which men might build. Both male and female entrepreneurs might then be expected to evidence the

importance of the "arrangements" element in NVF through script cue recognitions. Not surprisingly, an item analysis of male-female entrepreneur response patterns on the Arrangements scale revealed no appreciable differences.

The most striking difference that may be observed between the results from the male subsample, and the results from the female subsample occurs with respect to the Opport-Abil scale. In the results from analyzing the female subsample, the "opportunity-ability" component figures only slightly in the discriminant function (loading = -0.0404).

For an explanation of the exclusion in the data, of the "opportunity-ability" dimension in making expert-novice distinctions in the females-only sample, the researcher speculates that "opportunity-ability" may be deemphasized by female entrepreneurs because the competition-based model that is implied in several of the items used to form the Opport-Abil scale may be rejected by female entrepreneurs. This speculation is partially supported by the suggestion of Smith and Miner (1983) that women might be lees opportunistic due to differences in early socialization. Table 5-3 reports the results of a cross-tabulation analysis of male-female response patterns on the Opport-Abil scale within the sample group of 54 entrepreneurs. The analysis reveals large differences

between men and women on five of the eight items that make up the scale.

In interpreting these differences, the arguments of liberal feminism are also helpful. Liberal feminism, rooted in liberal political philosophy, asserts that women have less frequently realized their full capabilities only because they

Table 5-3
Item Response Comparison: Opport-Abil Scale
Male v. Female Entrepreneurs

	Percent	
Item	Males	Females
Will protect my NV with knowledge	46.7	33.3
Will protect my NV with entry barriers	22.2	11.1
NV v. general knowledge is better	33.3	11.1
I am confident in my NV knowledge	26.7	0.0
Know details of NV problems/solutions	62.2	44.4

have been systematically excluded from essential opportunities (Fischer et al., 1991). Kent (1988) argues that the lack of female role models plays a part in womens' lack of experience in owning and managing businesses. Women also have less experience in managing employees, in working in firms similar

to the ventures that they would like to start, or in helping start up new businesses (Fischer et al., 1991). The arguments of liberal feminism could explain, in part, why the "opportunity-ability" component of NVF expertise does not figure heavily in distinguishing female experts from novices, and why large differences exist between men and women on a majority of the items in the scale. Under this reasoning, women have simply had unequal access to the experiences and training that the Opport-Abil scale measures.

A visual inspection of Figure 4-6 lends support to this interpretation. Noteworthy in the figure is the relative position of the centroid for female enhanced novices. This centroid is shown to be dramatically higher on discriminant function I, which emphasizes the Opport-Abil scale. Clearly, once women have the opportunity to have certain experiences and training, there appears to be no obstacle to their acquisition of the portion of NVF expertise that the Opport-Abil scale measures.

In Chapter 4, the classification model developed in this dissertation is shown to have significant discriminating power. Further interpretation and analysis reveals finer-grained distinctions among experts, and between experts and novices, that contributes an element of stability to the

underlying notions of entrepreneurship typologies--especially those in which sex-based gender differences figure heavily. Hopefully, through the foundation established in this dissertation, empirical testing of entrepreneurial typologies will be made more practical and the expert-novice model may serve as a foundation for future research that seeks to explain the relationships between NVF or NVP, and particular types of entrepreneurs.

Study 3: Creation. The need for successfully identifying feasible methods for "creating" entrepreneurs, first intimated by Baudeau (1767) and suggested more recently by current entrepreneurship researchers (Brockhaus & Horowitz, 1986; Hopkins & Feldman, 1986; Katz, 1991; Solomon & Fernauld, 1991), has been as an issue, long-recognized; but as a goal, elusive. The application in this dissertation, of EIPT to the domain of NVF, results in the suggestion that NVF expertise can be developed in novices through in-depth contact with experts. The results reported in Chapter 4 confirm Proposition 3, which states that an expertise enhancement method that provides novices in-depth developmental contact with experts should result in enhanced novice script cue recognitions that more closely parallel those of experts.

As specifically discussed in Chapter 2, Brockhaus and

Horowitz (1986) maintain that " . . . one of the major concerns of those interested in the continued growth of new business is the issue of whether entrepreneurs are born, or whether they can be created through training" (1986, p. 37). The findings reported in this dissertation document a relationship between the in-depth contact-based training techniques advocated in EIPT and enhanced NVF expertise, adding weight to the notion that entrepreneurial expertise can be enhanced through training.

In particular, this dissertation proposes that expertise can be acquired through an individual's participation in specific processes, such as significant study, experience, and the exposure to schemata through contact with experts. The activities of the script-based experiential expertise enhancement method were specifically tailored to boost novices' readiness to venture by enhancing their entrepreneurial expertise. A unique feature of the expertise enhancement method is that it is a synthesis of the theoretical developments from the entrepreneurship, simulation and gaming, and the expert theory literature streams (Appendix E).

As a direct derivative and application of expert information theory to the acquisition of entrepreneurial scripts, the experiential treatment appears to improve stu-

dents' level of entrepreneurial expertise as measured by script cue recognition scales. Leddo and Abelson (1986) argue that expert failure occurs either at the time of script "entry," or as individuals engage in "doing" the things that the script requires. These two thresholds are parallel to the start-up and operation of a new enterprise, and serve as theoretical points of reference for assessing the practical implications of the findings. Possible applications of the results of Study 3 are more fully elaborated later in this chapter in the section entitled "Implications for practice."

Implications for specific entrepreneurship theories

In addition to the EIPT-based theory of NVF proposed in this dissertation, two specific entrepreneurship theories have been discussed in detail in the literature review. The first, is the two-construct theory (Herron, 1990). The second is the four-construct theory (Bull & Willard, 1993). The theoretical implications for each, of the findings in this dissertation, are next discussed.

Two-construct theory. Herron (1990) found that skill and skill propensity are related to NVP. In the literature review of Chapter 2, skill was held to be analogous to Bull and Willard's notion of expertise, and to the EIPT notion of

ability. With the refinements in factor labels made possible by the analyses reported in Chapter 4, it becomes clear that Herron's notion of skill, though still somewhat close to Bull and Willard's notion of expertise, is now somewhat distant from the "opportunity-ability" notion connected with NVF expertise as defined in EIPT.

Most of the items included on Herron's list of skills appear to be operational or managerial in nature, including such items as skill in detailed product design, evaluating various organizational functions, understanding an industry, motivating and influencing the behavior of employees, and planning and administering business activities. Only the skill items of creating relations with and influencing important people outside an organization, understanding an industry, and discovering opportunities appear to be related to NVF, with the first corresponding somewhat to one item in the "arrangements" construct scale, and the second two relating more to the "opportunity-ability" notion.

As noted previously (Chapter 4) Herron's concept of skill propensity consists of a descriptive interpretation of propensity (the percentage of time spent at a given skill) versus a motivational type of propensity (the intention to venture per se). Accordingly, the skill propensity notion,

initially somewhat distant from Bull and Willard's notion of motivation, when compared to the EIPT-based construct of "willingness," also appears to differ markedly.

Thus, the theoretical implications of this study for Herron (1990) appear not to be contradictory or disconfirming. Rather, they appear to be complementary to Herron (1990) in a theory-building sense. The results of the research reported in this dissertation offer future researchers the opportunity to examine the role of skill and expertise along a wider front--one that encompasses both the managerial-operational skills found by Herron to be associated with NVP, as well as the skills found in this research to be more directly associated with NVF. An approach that combines this research with that of Herron (1990) would also benefit from including notions of both "willingness" from this research, and allocational propensity from Herron (1990). In short, this dissertation appears to build momentum in a theory stream that has promise for the future.

Four-construct theory. Unlike Herron (1990), the four-construct theory of Bull and Willard (1993) has yet to be fully tested. As noted in Chapter 4, the script cue recognitions employed in this study do not provide sufficient evidence to fully test the four-construct theory of Bull and

Willard. Despite the assignment of script cue items to the four constructs of Bull and Willard in an a priori relationship, it is appropriate to note that the items were not specifically designed to reflect fully the Bull and Willard constructs.

This qualification notwithstanding, the psychometric results of Study 1, in which the measurement model was tested, do reveal one interesting phenomenon. In the exploratory factor analysis, three of the four constructs did load on distinct factors as predicted. Only the Bull and Willard "gain" construct failed to show any clear loading pattern in a four-factor solution. This finding suggests that the Bull and Willard model has merit. It further indicates that, with a different conceptualization of items relating to the "gain" notion, either (1) the confirmation of the "gain" construct may be accomplished, or (2) the notion that "gain" is a necessary condition for NVF may be in error. A resolution of this issue is not possible with the present data, but provides a likely hypothesis for future research.

Once again, a literature-building approach to the interpretation of results appears to be appropriate. With their theory of NVF, Bull and Willard make substantial progress in the definition of the components of NVF. The parallels be-

tween (EIPT and B&W respectively) "arrangements" and "environmental resources," "willingness" and "motivation," and "opportunity-ability" and "expertise" remain strong. That the components of NVF *expertise* are so remarkably close, adds credibility to both theories (Stinchcombe, 1968). These implications suggest that a foundation for NVF research has begun to develop. Further tests of these notions are thus encouraged.

Implications for practice

The practical implications of this research relate primarily to the results of Studies 2 and 3 (classification and creation) since these studies test hypotheses of practical import using the theoretical developments (component-constructs) of Study 1. The first part of this section is devoted to an exploration of the practical application of the expertise classification methodology developed in Study 2. The second part discusses the implications of results from the expertise enhancement experiment of Study 3.

Classification: Implications of Study 2 for practice

As noted in the theoretical implications section, many

scholars have proposed entrepreneurial typologies. Of most value are those that are supported empirically. With the identification of three components of NVF expertise in Study 1, the possibility for constructing a general typology of NVF expertise is suggested, and is illustrated in Figure 5-3.

The construction assumptions of this general typology imply that various combinations of the three NVF components should result in differing NVF outcomes, depending upon the level of expertise possessed by a given individual. Further,

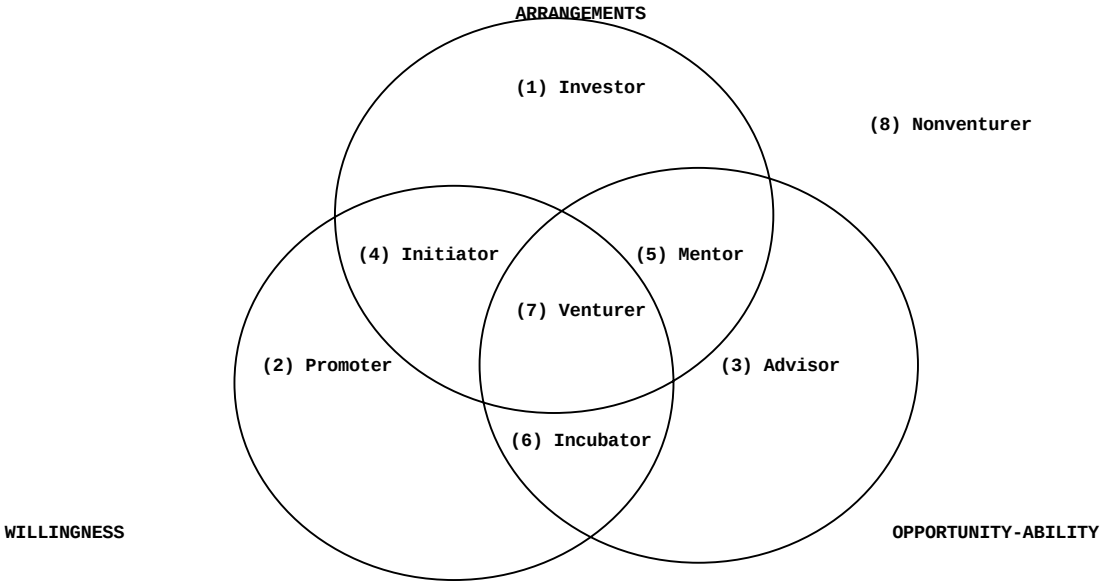


Figure 5-3
A General NVF Typology

given the existence of the script cue questionnaire used in this research, the testing of prospective new venturers using

this typology as a map for plotting expertise levels and generating feedback, may help to prevent new venture failure, and encourage new venture formation.

Definitions of each outcome in terms of the components that figure in each combination, and their practical implications are as follows:

(1) Investor: By demonstrating a high score on the "Arrangements" scale, this type of individual reveals possession of a strong venturing infrastructure, in the absence of the willingness and opportunity-ability necessary to be a venturer. If interested in NVF, this type of individual would need to team up with other individuals who have the willingness and training to actualize a venture. The role of investor or backer is often appropriate in this circumstance. In terms of EIPT, this type of individual is able to accomplish NVF script "entry," but not script "doing."

(2) Promoter: With a high score on the "Willingness" scale, this type of individual shows high NVF motivation in the absence of a NVF infrastructure and the specialized knowledge represented the "Opport-Abil" scale. If interested in NVF, this highly motivated individual would likely be able to contribute by emphasizing their action orientation. This is often accomplished in the role of NVF promoter (Stevenson et al., 1994). In terms of EIPT, this type of individual is partially able to actualize the "doing" portion of a NVF script, but not necessarily "entry."

(3) Advisor: A high score on the "Opport-Abil" scale in the absence of high scores on the "Arrangements" or "Willingness" scales demonstrates that this type individual has a high level if NVF knowledge, unaccompanied by either the NVF infrastructure, or the motivation to actualize a new venture. Accordingly, this type of individual could capably serve as an advisor to a venture without having to commit resources, or sustain venture motivation. Once again, in terms of

EIPT, this type of individual is partially able to actualize the "doing" portion of a NVF script, but not "entry."

(4) Initiator: An individual who scores high on both the "Arrangements" scale and the "Willingness" scale, but low on the "Opport-Abil" scale demonstrates a high NVF infrastructure and motivation. Thus, venture initiation by such individuals is likely to occur. It is possible, however, that without the deep NVF knowledge (indicated by the "Opport-Abil" score), venture initiation may be somewhat premature, with the possible waste of NVF resources as the result. If this type of individual is intent upon venturing, it would appear to be wise to undertake expertise enhancement activities. In terms of EIPT, this type of individual can likely accomplish script "entry," and can begin but not necessarily complete the "doing" requirements of a NVF expert script.

(5) Mentor: An individual who scores high on both the "Arrangements" scale and the "Opport-Abil" scale, but low on the "Willingness" scale demonstrates a high NVF infrastructure and knowledge, without necessarily possessing the motivation to sustain involvement in a new venture. As a result, this type of individual can make an invaluable contribution to NV initiation as a mentor--helping with capital, contacts and sometimes technology, as well as with NV knowledge-based advice. When this type of individual initiates a venture, it may be more conceptually and resource driven. At times this type of venture may be found to lack staying power, because of the missing motivational component (indicated by a low score on the Willingness scale). In terms of EIPT, this type of individual can likely accomplish script "entry," and can begin but not necessarily complete the "doing" requirements of a NVF expert script.

(6) Incubator: An individual who scores high on both the "Willingness" scale and the "Opport-Abil" scale, but low on the "Arrangements" scale demonstrates a high NVF motivation and knowledge unaccompanied by the resource infrastructure necessary to ensure NV actualization. Such an individual will have knowledge, ideas and motivation, but will often lack the resources necessary

to bring about the formation of a new venture. Thus, for this type of individual, venture opportunities are "incubated" or put on hold until the resources are located--but while in incubation, intense effort to make the "arrangements" can be expected to be underway. In terms of EIPT, this type of individual can accomplish the "doing" requirements of a NVF expert script, but will be held up due to lack of the necessary "entry" arrangements.

(7) Venturer: An individual who scores high on all three NVF component scales can be expected to form new ventures. This type of individual has the arrangements or NV infrastructure in place, the willingness to venture, and the ability to recognize, capture, and protect NV opportunities. In terms of EIPT, a lack of expertise indicated by script failure (Leddo & Abelson, 1986) is unlikely, since both script "entry" and script "doing" are possible for this type of individual. Although not every successful venture initiator will fit this type, it is expected that a significant proportion of NVF experts will fall into this category.

(8) Nonventurer: When neither a NV infrastructure, NV willingness, nor NV knowledge are present in an individual, the likelihood that such a person will successfully initiate a venture is slim. However, some new ventures that succeed are started by individuals in this novice group. In these cases, however, the "learning-curve" can be daunting, and many times NV failure is unavoidable. Individuals in this group have many options to improve their expertise *before* venturing. Most often, the motivation to venture occurs first--often initiated by an acquaintance or family member who possesses and transfers the willingness to consider venturing. In such cases, the time and attention that is invested in building a

venturing infrastructure, and in gaining new venture knowledge are well spent, since the validity of such motivational information may be questionable. In terms of EIPT, individuals in this group are novices--generally not prepared to either "enter" or to "do" the things required by NV expert scripts.

Creation: Implications of Study 3 for practice

As discussed in Chapter 4, the scale scores that were used as independent variables in this dissertation represent an individual's ability to recognize script-based cues related to venture "entry" or venture "doing." The scales were used to examine the effectiveness of the experiential treatment in mentally preparing novices to venture. After the activities of the experiential treatment were completed, the scores of the enhanced novice group indicated significant improvements in pre, post- t-tests, and produced a significant discriminant function ($p < .0000$) with a unique position for the enhanced novice group in discriminant space.

For the combined male-female sample, the enhanced novices showed more readiness to "enter" *and* to "do" (accomplish) than did the novice group (Figure 4-5). Although the expert group was located significantly higher on the axis of function I ("entry" dimension), the enhanced novice group is located substantially above the expert group on function II ("doing" dimension) primarily due to high scores on the Opport-Abil scale (loading = .9712). The foregoing observations raise five issues for instructional practice with respect to the combined sample results.

First, the results suggest that venture expertise can be

effectively improved *within* an instructional setting through the use of the planned series of experiential activities involving contact with experts. However, by revealing something about the *nature* of the stimulus through its effects (the location of the centroids, and the relative size and discriminant axis grouping of the rotated loadings) potential problems with the unilateral application of the expertise enhancement portion of this instructional method are also revealed. The demonstrated effects of the experiential treatment indicate that although the "entry" dimension is enhanced somewhat, the "doing" propensity may be overly sensitive to the treatment.

It is conceivable that this could lead to situations whereby the original instructional objective (that "enhanced subjects" will be able and amenable to draw upon the valuable insights and experiences of expert entrepreneurs to make optimal decisions about new venture activities) is undermined. Although the evidence implies that some degree of overlearning in the doing dimension may result from the treatment, that effect may not be a negative one bearing in mind that the enhanced novices are not yet influenced and cautioned by past venture failures, especially where care is taken to advise enhanced novices *against* "doing" *before* the arrangements are

made for a suitable entry into a venture.

Second, the expertise enhancement method provides a framework that will allow potential venturers who wish to enhance their expertise, to identify beginning points and worthwhile directions. As noted in the preceding discussion, the relative score level on the NVF component scales can permit the placement of individuals into finely graded categories in a typology of expertise, indicating the degree of both strengths and the weaknesses of potential venturers.

Third, a useful feature offered by this instructional method is that it permits the individualization of instruction. An instructor can compare the scripts of mentors and students through the use of the scales at the beginning of a course and subsequently match individual students with the most appropriate mentors.

For example, in circumstances when students score low on the Arrangements scale (function I) indicating the inability to enter, or the inadvisability of entering a venture script, a mentor whose scripts foster resource acquisition and network-building skills might be optimal. When the scores on the Willingness or Opport-Abil scales (function II) identify a lack of preparation to actualize a venture script, an ideal entrepreneur mentor may be one whose scripts foster risk

tolerance, an action orientation, and a thorough understanding of the principles of competitive strategy such as how to increase the strength and quality of isolating mechanisms while maintaining low appropriability (Rumelt, 1987).

Fourth, the analysis of the combined sample results of Study 3 confirms that the functional relationship between the level of NVF expertise of an individual and that person's ability to recognize cues from entrepreneurial expert scripts, may be used to evaluate the efficacy of an experiential instructional method designed to enhance expertise. Furthermore, an experiential instructional method in which novice entrepreneurs are systematically placed in contact with experts has a significant impact upon novices' script cue recognitions. Thus, a logical link between entrepreneurship research, experiential teaching methods, and EIPT is established. It may also be concluded that entrepreneurial expertise can be enhanced through the application of specific experiential techniques.

Fifth, the analyses of the males-only and females-only results of Study 3 have implications for instruction. The results of this study indicate striking differences in the script cue recognition-based emphasis of male versus female entrepreneur-experts. Consequently, it cannot be assumed that

the methods of expertise enhancement that are successful for men will necessarily be successful or appropriate for women, or vice versa. Care in the design of NVF expertise enhancement exercises and activities is therefore suggested.

Limitations

For the implications of this research to be considered in context, a discussion of study limitations is required. In Chapter 3, the general limitations that arise consequent to the nature of the sample are discussed. Accordingly, care has been exercised in the inferences that are drawn from these data. In the following three parts of this section, the specific limitations of each study in this dissertation are considered.

Limitations: Study 1

The objective of Study 1 was to establish the measurement model. To accomplish this objective, exploratory and confirmatory factor analyses were conducted along with reliability analyses using coefficient alpha. The limitations encountered as these three procedures were applied are discussed in the paragraphs that follow a brief discussion of the general limitations of Study 1.

One general limitation in Study 1 that is not specific to a particular analysis, is the nature of the questionnaire. The attempt to capture script cue recognitions appears to be only partially successful due to an omission in the design of the items, which could have added to the amount of explained variance, had it been included in the instrument. Omitted, is a means to capture the *strength* of a given script cue recognition. Future researchers using script cue recognition as a method for measuring levels of expertise, are advised to attempt to obtain from respondents an indication of their *level* of recognition of given script cues.

More specifically, the analytical methods used in Study 1 each revealed limitations that, if overcome in future research, would improve future testing of EIPT in the NVF setting. These limitations are now discussed.

Exploratory factor analysis

Generally, few problems were encountered in conducting the exploratory factor analysis. However, it should be acknowledged that the procedures for conducting the exploratory factor analysis (Hair, 1992) are not universally accepted. Schwab (1980) for example, proposes that larger sample sizes are required for exploratory factor analysis, suggesting 10 responses per item versus the 5 per item advocated by Hair,

and used in this research. Nunnally (1978) holds that for psychometric stability, repeated large-sample research is warranted, which suggests that further investigations are appropriate. Lastly, the factor loading cutoff point for the inclusion of items in the results was chosen conservatively at .30, according to Hair (1992). The researcher is aware that other scholars are more comfortable using higher factor loading cutoff points.

In defense of the judgements made by the researcher in connection with the exploratory factor analysis, the reader is invited to note that the analysis did produce a reasonable factor structure that provides relatively clear factor-structure distinctions among three competing theoretical models. More importantly, the scales constructed from this analysis appear to have been highly serviceable in subsequent analyses--particularly the multiple discriminant analyses of Studies 2 and 3.

Confirmatory factor analysis

Confirmatory factor analysis in a LISREL model is used in this dissertation to assess the fit of the items to the constructs in the research model. As noted in Table 4-5, although the goodness of fit indices fall within an acceptable range (Bagozzi & Yi, 1988; Olsen & Granzin, 1993), the P^2

values are high and are significant. As also reported in Chapter 4, the reliability of each item represented by the squared multiple correlation of each item with its construct, are low--indicating the presence of higher error variance in the relationship than is commonly accepted in the literature.

The researcher believes that these limitations may not invalidate the results of Study 1, since the exploratory nature of this research (introducing the concept of EIPT into the NVF domain) calls for a beginning point. Since an expert script covers such a broad range of concepts (Read, 1987), it is possible that the script cues that actually represent a domain of expertise may not in fact have high correlations with the constructs of that domain--while still representing concepts that are vital to that expert script. There appears to be a tradeoff between range and precision that warrants further analysis. Once again, since the scales developed in Study 1 successfully serve in subsequent analyses, the researcher considers them to be acceptable for use in accomplishing the research objectives of this dissertation.

Coefficient alpha analysis

Reliability analysis using coefficient alpha is an indication of the internal consistency of a scale (Fraenkel &

Wallen, 1990). The acceptable range for this measure is .60 or above (Eisenhardt, 1988; Finkelstein, 1992; Van de Ven & Ferry, 1980). As reported in Table 4-5, the scales of the three-factor model each have a coefficient alpha score near this lower boundary (Arrangements.70, Willingness .58, and Opport-Abil .64), indicating a lower level of internal consistency that might be considered to be a limitation of Study 1.

Given, however, that the scales developed in Study 1 are intended according to theory to encompass a wide range of concepts, it is not surprising that the alpha scores are low. In fact, it may be somewhat more surprising that they are as high as they are, since though broad--they are not exhaustive.

As a beginning point, the reliability of the scales measured using coefficient alpha appears to be acceptable. Further research should attempt to determine the type of script cue recognition items that might yield a higher level of internal consistency, while still remaining compatible with EIPT.

Limitations: Study 2

Study 2 was conducted to ascertain whether discrimination between NVF experts and novices is possible using the

script cue-based NVF component indicator scales developed in Study 1. This objective was accomplished by testing Hypothesis 1 which states: Differences exist among the mean vectors of the indicators of NVF component constructs across expert and novice groups.

The limitations of Study 2 revolve primarily around specific features of the sample and the research design. As noted previously, the sample is somewhat parochial--although no reason exists to question its similarity to the population of interest: U.S. individuals who are likely to come into contact with NVF opportunities. Also, the sample has relatively few female entrepreneurs. Given the unique findings in analyses using the females-only sample as compared to results using the males-only sample, the underrepresentation of female entrepreneurs must be acknowledged as a significant limitation of this portion of the study, despite the call by Stevenson and Harmeling (1990) for small n research that contributes to the extension of theory. Thus, before final conclusions are reached regarding male-female differences with respect to NVF expertise, the responses of a larger group of female entrepreneurs to the script cue recognition items should be obtained.

Limitations that arise from the research design are to be expected, but are nevertheless worthy of note. As cross-

sectional research, Study 2 is limited by its inability to address longitudinal questions regarding NVF expertise; specifically, how the scores on the NVF component scales relate to NVP over longer periods. Longitudinal research appears to be the only means to redress this limitation.

Another aspect of research design that appears to be a limitation is the necessity for the examination of alternative explanations for the findings of Study 2. For example, self-efficacy theory (Bandura, 1986, p. 390) asserts that self-referent thought mediates the relationship between thought and action. Additional research to explore the impact of potentially mediating constructs such as self-efficacy, to more fully dimensionalize the relationship between expertise and NVF, is certainly warranted.

Limitations: Study 3

Study 3 was conducted to ascertain whether the script cue recognitions of enhanced novices more closely approximate those of experts in an expertise enhancement experiment that provides to novices, in-depth developmental contact with experts. This objective was accomplished by testing Hypothesis 2 which states: Differences exist among the mean vectors of the indicators of NVF component constructs across expert,

novice and enhanced novice groups.

Study 3 is limited mainly by sample size and research design, and in the case of this experiment they are inter-related. Use of the Solomon Four-Group experimental design provided a high level of internal control, but it was very expensive in terms of the number of responses from "enhanced" subjects available for analysis. In support of using the Solomon Four-Group design is its utility in helping to assess pre and posttest bias. Given the lack of bias shown in the *t*-tests reported in Chapter 4 (Table 4-20) it does not appear that the elimination of approximately one-half the sample from the treatment as required by the Solomon Four-Group design, would be warranted in future research.

The other limitation in Study 3 is also an artifact of the cross-sectional aspects of the research design. The results reported in Chapter 4 indicate that the enhanced novice group is higher on particular axes (depending upon the gender of the sample group). No data are available that speak to the level of persistence of the treatment effects. Once again longitudinal research is necessary to examine this phenomenon.

Suggested Extensions

One of the most useful features of exploratory research is its potential for identifying a future research program. Each of the studies conducted as a part of this dissertation has produced opportunities to extend the research.

Study 1 identified several weaknesses in the script cue recognition items used to measure EIPT constructs, particularly in the area of item and scale reliability. Future research should examine the items from the present questionnaire to ascertain those that have reasonably high squared multiple correlations in a LISREL model. These ought to be used as exemplars for the construction of new questionnaire items. Also, given what is now known about the common constructs of NVF expertise, it appears possible to select script cues that may more clearly be identified by respondents as relating to particular conceptual domains, thus "tightening up" the correlation between item and construct, and enhancing the overall internal consistency of the scale. A means whereby this instrument could capture the *strength* of script cue recognitions would also be helpful.

Study 2 provides a beginning point in using EIPT to distinguish NVF experts from novices. Although this study was conducted using data obtained from respondents who function in

the U.S. economy, that is not to suppose that NVF expertise is limited to this country alone. Accordingly, cross-cultural application of the instrument used in this research should provide indications of variations that might be expected as NVF expertise is applied in other economic settings.

Also, an underlying assumption of this research is that script cues extracted from the entrepreneurship literature apply on a cross-gender basis. Since the results of Study 2 indicate that this may not be so, further research that uses the women in entrepreneurship literature as the basis for script cue generation (Appendix F) should be considered.

Study 3 begins a new dialogue regarding the nature of expertise enhancement. Questions that must now be addressed include determining the scope of enhancement interventions that are and are not effective. Should extensive scripting activities be used more? Will mentor-novice pairing based upon pretesting script cue recognitions be effective?

A corollary to Study 3, is the comparison of responses on script cue recognition-based instruments, and upon trait-based instruments. Ginn and Sexton (1990), for example, identify five Meyers-Briggs types that are found significantly more often in founders of *Inc.* 500 companies. Will these "traits" be stable while expertise is enhanced? An evaluation

of the nature versus nurture questions that surround expertise enhancement should be an interesting and fruitful extension of the research reported in this dissertation.

Conclusion

In this dissertation, two heretofore disparate fields, entrepreneurship theory and expert information processing theory (EIPT), have been combined to answer the research question: Is the occurrence of new venture formation associated with individual expertise? In a Schumpeterian sense, this is a fitting undertaking, since this "new combination" (1) offers a new theoretical approach to a field in which theory development is presently a primary objective (Bull & Willard, 1993), (2) implies new methods for operationalizing the investigation of NVF, and (3) opens new opportunities for the enhancement of entrepreneurial capability.

This dissertation demonstrates that the suggestion that NVF is associated with individual expertise is not trivial. Though at the very early stages of development, the link between expertise and NVF promises to be very useful in helping entrepreneurship researchers illuminate the underlying dynamics of NVF so that the productive-destructive aspects of starting businesses can be better managed.

In particular, this dissertation suggests possibilities for making real progress in addressing the lamentable success-failure dichotomy outlined in Chapter 1. If experts can be discriminated from novices using script cue recognition-based scales, and if novices' expertise can be enhanced, it seems possible to envision a NVF environment where unequaled failure rates (Cooper, Dunkelberg, & Woo, 1988; McMullan & Long, 1990; Shapero & Giglierano, 1982) no longer need be accepted as the necessary casualties of unrivaled formation rates.

In this environment, individuals' readiness to venture could be assessed and corrective action taken *before* precious venturing resources are prematurely expended. In this environment the NVF stakeholders: bankers, customers, governments, investors, suppliers, individual venturers, their families, venture capitalists, and Small Business Development Centers to name but a few, could reduce the risks incident to involvement in flawed new ventures. And, in this environment, any appreciable NVF failure rate could and should be deemed unacceptable, because the "creative destruction" of flawed new ventures (Timmons, 1986) could occur *before* the inception of a venture that lacks the arrangements, willingness, and opportunity-ability prerequisites for NVF that are identified in this study.

This dissertation offers a deeper understanding of the influence of individual entrepreneurs and their expertise, on NVF. Such an understanding is of critical importance at this point in time, because (as explained in Chapter 1) new ventures create jobs, foster innovation, and help keep the economy of a country competitive. Accordingly, the scholarly community, the business community, and society as a whole stand to benefit greatly if "entrepreneurship as expertise" lives up to its potential as an integrating and explanatory notion.

In conclusion, it appears appropriate to state that the objective of this study has been achieved: the research question has been answered. Based upon the results of the research reported in this dissertation, the occurrence of new venture formation is found to be associated with individual expertise.

It is hoped that this dissertation has also contributed some direction that may be useful at the present crossroads in entrepreneurship research. Although the steps taken are but a beginning, the possibilities for additional insight that portend are heartening. That script is yet to be written.

APPENDIX A

GLOSSARY

Ability (EIPT construct): Possessing the rudimentary techniques and skills necessary to a specialized domain (e.g., closing the deal may depend upon one's persuasive ability).

Bull and Willard Constructs: motivation; expertise; expectation of gain for self; and supportive environment.

Dimensions of NVF Expertise: to be defined in answer to Research subquestion 1 from among the possible options described in Chapter 2. Under the assumptions of EIPT these dimensions are hypothesized to be Ability, Willingness, and Resources.

Doing (EIPT summary construct): Accomplishing the main action or purpose for being in the script. Hypothesized under EIPT to include the constructs Ability and Willingness.

EIPT Constructs: Doing (ability, willingness); Entry (resources).

EIPT: Expert information processing theory

Enhanced Novices: NVF novices who received the expertise enhancement course materials and experiential exercises, including one-on-one contact with practicing entrepreneurs through in-depth interviews about their careers, success rules, failures etc.

Entry (EIPT summary construct): Enablement, not blocked from proceeding with the script. Hypothesized under EIPT to depend upon having the right resources as a necessary condition.

Environmental Support (Bull & Willard construct): available role information from predecessors; existing know how with proven value in the marketplace; existing support networks; existing linkage between aspiring entrepreneurs, resources, and opportunities; an infrastructure that supports entrepreneurship; and opportunistic and collective efforts of independent actors in common pursuit of a technological innovation.

Expertise (Bull & Willard construct [Note: more narrowly defined than EIPT definition of expertise]): knowledge from previous work experience (e.g., incubator organization) or related to a particular technology of use to the venture; the perception of outsiders that he/she has been investigated by them and has been determined to have potential; knowing the essentials of operating a successful business; and linkages between entrepreneurs and opportunities.

Expert Script: highly developed, sequentially ordered knowledge in a specific field.

Gain Expectation For Self (Bull & Willard construct): conditions that indicate the capability to resist the appropriation of entrepreneurial rents by powerful outsiders (e.g., isolating mechanisms and first mover advantages); the speculative ability to see into and enhance one's position in the future; and interactions between social, cultural and personal factors that precipitate the entrepreneurial event. (Note: Bull and Willard relate this closely to motivation.)

Herron Constructs: skill; skill propensity.

Motivation (Bull & Willard construct): reasons for carrying out new venture formation including: the determination not to work for someone else; the desire to accept responsibility for solving problems; setting goals and reaching those goals through one's own efforts; a desire to know the outcomes of decisions; a dedication to the values embodied in some core task or to achieving a utility embodied in a core task; and a desire to experience entrepreneurial highs such as enthusiasm, excitement, a sense of having fun, and experiencing the fulfillment of a vision.

Nonlifestyle Business: The opposite of a business that exists primarily to support the owners and usually has little opportunity for significant growth and expansion Hisrich & Peters, 1992, p. 13).

NVF Script Cues: Small "bits" of NVF situational context (Abelson & Black, 1986, p. 1) excerpted from the NVF expert script.

NVF Experts: Individuals who have: (1) started three or

more businesses, at least one of which is a profitable ongoing entity; (2) started a (nonlifestyle) business that has been in existence for at least two years; (3) experience in a combination of (1) and (2) that indicates a high level NVF knowledge; or (4) career experience indicating high levels of familiarity with new venture formation.

NVF Expert Script: The specific knowledge (Glaser, 1984; Leddo & Abelson, 1986; Lord & Maher, 1990; Read, 1987) possessed by the community of individuals who are experienced in the NVF domain.

NVF Novices: Individuals who do not meet the criteria to be considered a NVF expert (please see NVF Experts).

NVF: New venture formation

NVP: New venture performance

Resources (EIPT construct): Having the objects in question, the necessary arrangements made, or a favorable attitude of outsiders toward the individual actor in an expertise-specific circumstance.

Scripts: Commonly recognized sequences and events that permit rapid comprehension of expertise-specific information by experts.

Script Cues: Bits of situational context that apply specifically to a domain of expertise; context laden bits of information expected to be recognized by experts but not novices, in an area of expertise.

Script Cue Recognitions: Attributions by individuals that NVF script cues apply to them.

Skill (Herron construct): Possessing the capability for detailed design of products/services; evaluating various functions in an organization; understanding his/her industry and the implications of its trends and changes; motivating and influencing the behavior of employees; creating relations with and influencing important people outside his/her organization; planning and administering business activities; and discovering opportunities to profitably change the business.

Skill Propensity (Herron construct): age of time spent performing a given skill.

Willingness (EIPT construct): Possessing the readiness, disposition or inclination to use individual volition.

APPENDIX B

STANDARD INSTRUCTIONS

INSTRUCTIONS

The attached questionnaire helps you to identify your personal approach to getting involved with a new business. Please <u>CIRCLE THE ANSWER WHICH DESCRIBES YOU MOST CLOSELY</u>. Based on your choices, you will be able to obtain a description of your own individual venturing profile. *Thank you*.

APPENDIX C

QUESTIONNAIRE

1. I am rarely surprised by:

   (a) developments in a new business
   (b) human nature

2. Are you more attracted to people who are:

   (a) ready to take action
   (b) thoroughly informed

3. I have more highly developed contacts in the:

   (a) new venture area specifically
   (b) community generally

4. If asked to give my time to a new business I would decide based on how this venture fits:

   (a) into my past experience
   (b) my values

5. There are:

   (a) times when after I finish a job I wish that I had done it better, or worked harder at it
   (b) never any jobs or tasks I complete which need more work

6. My knowledge about new businesses:

   (a) is fairly elaborate, due to the many variations I have observed
   (b) comes from my intuition; each new business has a "personality" which can be sensed

7. When investing in a new venture, I think it is worse to:

   (a) wait too long, and miss a great opportunity
   (b) plunge in without enough information to know the real risks

8. I own assets such as:

(a) proprietary technology, patents, or an operating business
(b) mutual funds, real estate, or savings accounts

9. When confronted with a new venture problem I can:

(a) recall quite vividly the details of similar situations I know about
(b) usually figure out what to do, even if it is by trial and error

10. I have:

(a) occasionally divulged a confidence when I shouldn't have
(b) never gossiped or told embarrassing things I know about other people

11. When someone describes a problem with a new business I:

(a) recognize key features of the problem quickly, and can suggest alternatives from examples I can cite
(b) use my instincts to suggest questions which should be asked to solve the problem

12. Is it worse to:

(a) waste your time thinking over an opportunity
(b) commit time and money to a cause that may not succeed

13. I have personally:

(a) earned 150% compounded return per year on at least 3 ventures over 3 years, in cash
(b) <u>not</u> earned 150% compounded return per year on at least 3 ventures over 3 years, in cash

14. My new venture is/will be:

(a) protected from competition by patent, secret technology or knowledge
(b) based on a product or service with no "barriers to entry"

15. I have:

(a) sometimes said mean, spiteful or hateful things to people close to me
(b) never spoken in anger to close associates, friends or people I love

16. It is more important to know about:

(a) creating new ventures
(b) business in general - staying diversified

17. I want to get:

(a) a piece of the big money
(b) through life financially in one piece

18. I presently:

(a) control acquisition or expansion funds in an ongoing business, or have my own funds available for venturing
(b) will need to raise financing for my venture from third parties

19. New ventures, small business, and entrepreneurship:

(a) are distinctly different disciplines
(b) have much in common, especially the need for sharp guesswork

20. In the last 3 years:

(a) the size of the pool of people and assets I control has grown
(b) I have not extended my business control over people or assets

21. I have:

(a) occasionally felt envious enough of the possessions of other people to think about stealing
(b) never thought about committing a dishonest act

22. I like to read:

(a) periodicals which deal specifically with new ventures and start-up businesses
(b) a wide variety of periodicals which keep me up to

date on potential business or investment opportunities

23. Imagine you have just funded a new venture: Would you be worried about:

    (a) not investing enough
    (b) the strength of the competition

24. I have:

    (a) started at least 3 successful new ventures
    (b) not started at least 3 successful new ventures

25. I value:

    (a) high payoffs; intelligent craftsmanship; being one-up; well-organized projects; dependability
    (b) action; optimism; generosity; responsibility; feedback; pleasing people

26. During the last 3 years, it is the general consensus that my performance as an entrepreneur:

    (a) has increased
    (b) has stayed about the same or decreased

27. I am more:

    (a) aware of many new venture situations; some which succeeded, and others which failed, and why
    (b) familiar with my own affairs, but keep up on business in general

28. If you had additional money to put to work, would you put it into a venture:

    (a) where you have a "say," even if there is no track record
    (b) managed by those you trust, who have a proven track record

29. New venture success:

    (a) follows a particular script
    (b) depends heavily on the pluses and minuses in a given situation

30. If I try to assess the condition of a new business:

    (a) a few questions lead to the relevant information
    (b) total immersion in the business most effectively leads to relevant information

31. I don't mind:

    (a) being committed to meet a regular payroll if it means that I can have a chance at greater financial success
    (b) giving a little of the value I create to the company that hired me

32. I am looking for a:

    (a) place to invest my resources
    (b) better way to manage my resources

33. Would you say you are more:

    (a) action oriented
    (b) accuracy oriented

34. I have:

    (a) failed in at least 1 new venture
    (b) never failed in a new venture

35. My new venture is/will be:

    (a) protected from competition by franchise or other territory restrictions
    (b) based on a product or service which may experience a lot of competition within a territory

36. I could:

    (a) raise money for a venture if I didn't have enough
    (b) provide an investor with a lot of very good ideas for a new venture

37. Do you want things:

    (a) open to the possibilities
    (b) settled and decided

38. I have:

    (a) enormous drive, but sometimes need others' help to complete projects
    (b) a high respect for service, generosity, and harmony

39. I understand how to:

    (a) buy low and sell high
    (b) build a terrific team

40. The new venture stories I recall:

    (a) illustrate principles necessary for success
    (b) are a telling commentary on the foibles of human nature which can rarely be predicted

41. Are you more comfortable in:

    (a) new situations
    (b) familiar territory

42. I feel more confident:

    (a) that I know a lot about creating new ventures
    (b) in my overall business sense

43. I like:

    (a) getting buyers and sellers together
    (b) dealing with the surprises which come as a part of everyday operations

44. When I see a business opportunity I decide to invest based upon:

    (a) how closely it fits my "success scenario"
    (b) whether I sense that it is a good investment

45. I: (a) can often see opportunities for my plans to fit with those of other people
    (b) rarely find that results match what I expect

46. If you have a lot of free time available, is it more desirable to:

(a) find a new venture to put your time and expertise into
(b) take the opportunity for some well deserved recreation or travel

47. I am very:

(a) good at a specialty that is in high demand
(b) well-rounded, with broad expertise in a variety of areas

48. I often:

(a) see ways in which a new combination of people, materials, or products can be of value
(b) find differences between how I see situations and others' perspective

APPENDIX D

DEMOGRAPHIC QUESTIONNAIRE

HOW TO OBTAIN YOUR RESULTS:

A. COMPLETE THIS SECTION:

1. (a) Name or identification number: _____

   (b) Mailing Address: _____

   _____

   _____

2. Sex: (1) _____ Male (2) _____ Female

3. Age: _____

4. Education:

   (1) _____ Did not complete high school
   (2) _____ Completed high school
   (3) _____ Some college
   (4) _____ Associate degree
   (5) _____ Bachelor's degree
   (6) _____ Some graduate study
   (7) _____ Graduate degree

5. Ethnicity:

   (1) _____ African American
   (2) _____ Asian
   (3) _____ Caucasian
   (4) _____ Hispanic
   (5) _____ Other: _____

6. In new business venturing I consider myself to be (Place an X on the line to show your rating):

   A Novice _____ An Expert

7. I rate my chances at being a success in a new business venture as (Place an X on the line to show your rating):

   Poor _____ Excellent

8. I rate my past business experience as (Place an X on the line to show your rating):

   Limited _____ Extensive

9. I rate my attitude toward starting a new business as (Place an X on the line to show your rating):

   Reserved _____ Enthusiastic

10. The stage of development of my venture is (Place an X on the line to show your rating):

    Starting up _____ Declining N/A ___
    Growing Maturing

B. MAIL YOUR COMPLETED QUESTIONNAIRE ALONG WITH THIS FORM TO:

Center for Emerging Business Studies
The University of Utah
Box # 69 Kendall Garff Building
Salt Lake City, Utah 84112

Rev 9/16/92

APPENDIX E
ENHANCEMENT PEDAGOGY

Recent research shows that it is " . . . not the amount of education that makes a difference" in entrepreneurial success, " . . . but the type of education" (Chandler & Jansen, 1992: 233). While the acquisition of expertise has been attributed to intensive study and substantial experience (Lord & Maher, 1990) and both can be offered effectively in an experiential learning situation, rarely has an experiential pedagogy been applied in business courses that emphasize enhancing new venture expertise.

For two, quarter-long business school courses designed to optimize students' capability to apply the principles and practices of entrepreneurship, an instructional strategy that incorporated new venture expert scripts was formulated. The strategy was implemented by utilizing "participating, writing, and debriefing" activities to enhance expertise consistent with the script comparison method suggested by Glaser (1984), and Lord and Kernan (1987).

The courses were fashioned to incorporate an active approach, whereby concepts generally regarded as essential for success in generating new business ventures were applied in a variety of practical settings. Pedagogical aspects of the courses encompassed four components of instruction which were integrated to form the basis of the experiential learning context. These included knowing, thinking, doing and participating, all of which are active rather than passive nature.

"Knowing" was stimulated through the lectures, readings, discussions, and unscheduled quizzes which were a part of theory-based seminars conducted throughout the quarter. Textual materials consisted of lectures and cases drawn from the Kao (1991) series texts for undergraduates, and from the Stevenson, Roberts, and Grousbeck (1989) text for masters' students. "Thinking" was encouraged through integrative assignments such as writing and publishing an article in a metropolitan newspaper, and impromptu case analysis. "Doing" was engendered through site visits, group interaction in assigned-case workshops, and dialogues with practicing new business venturers during class sessions. "Participating" was accomplished through one of two activities. Students were randomly assigned to either a treatment group (enhanced novices) or a control group.

The treatment group participated in an experiential activity where novices compare their entrepreneurial scripts to those of experts (Mitchell & Chesteen, 1993). The "participating" activity performed by these enhanced NVF novices was an experiential project where student novices were divided into groups and assigned an "entrepreneur mentor"--someone who

had successfully created new enterprise (Low & MacMillan, 1988). Each group conducted a "depth interview" that covered at least the questions shown in Table E-1 which follows.

Table E-1
Depth Interview Questions:
Enhanced NVF Novice Group

---

1. Try to assess your mentor's level of consciousness of an entrepreneurial script in the following way:

   . Find our how elaborate his or her knowledge is about new business venturing:

     - Have they had experience in a lot of new businesses?
     - Have they had "first hand" (deep) experience?
     - What surprises him/her?

   . Assess problem solving approach:

     - Can they simplify problems, or does a new business look like chaos?
     - Can your mentor identify relevant facts more quickly than you can, or than the others who work with him/her?

   . Evaluate his or her information processing capability:

     - Does your mentor organize his/her knowledge around literal objects and surface features or does s/he use "principles" or "new venture laws" to explain events?

   . Determine his or her approach to error correction:

     - Does your mentor have cross-checks and balances for decisions to minimize error?
     - Are decisions tied to their script?
     - How do they explain failures (random events versus they know better (i.e., a correct pattern or script was nor followed)).

Table E-1 (continued)

. Assess the context:

  - Do the "rules" differ by situation? (i.e., depending upon goals, plans, scripts, and themes?)

2. Try to assess your mentor's willingness to venture using the following questions:

   . How action oriented are they?
   . Have they missed more or taken more opportunities?
   . How valuable is time? (worry about wasting?)
   . How driven are they to meet a huge/almost unreachable goal?
   . Do they like control or willingly give it up?
   . Are they open to new ideas/opportunities?
   . Are they risk takers?

3. Attempt to assess your mentor's ability to venture by asking at least these questions:

   . Have they failed before? What did they learn? Have they succeeded before? How? Why?
   . Do they have venture-type assets (money to invest, a surplus of ideas, extra time)?
   . Do they understand aspects of entrepreneurial strategy discussed in class (innovation, value, sustainability, non-appropriability etc.)?

4. Ask these questions to assess your mentor's depth of new venture knowledge?

   . How much experience with new ventures does your mentor have? How many past new ventures?
   . Ask your mentor to give you examples/stories of situations where realizing the similarity of one tough situation got him/her out of another?
   . Does your mentor understand how to gain a small numbers bargaining advantage and keep it?
   . Does your mentor "stick to his/her knitting"?
   . Can your mentor readily distinguish between new business problems and ongoing business problems?
   . Can your mentor cut quickly to the heart of a

problem? How?

Individual students were then asked to produce a three part report that included: (1) a description of that individual student's "rules for succeeding in entrepreneurship" (the student's script), (2) a summary of the rules for successful venturing as provided by the entrepreneur mentor (the mentor's script), and (3) a critical assessment of the similarities and differences between the two. Upon completion of the reports, student novices engaged in a debriefing session in which each group reported their experience and key points from the mentor interview, compared the entrepreneur mentor's script to theirs, and discussed strengths and weaknesses of their mentor's script. This pedagogy integrates the Petranek, Corey and Black (1992) and Glaser (1984) frameworks as shown in Table E-2.

Table E-2
Expertise Enhancement Activities

Petranek Corey & Black	Glaser: Interrogation	Glaser: Instantiation	Glaser: Falsification
Participating	Depth interview with entrepreneur mentor	Hearing the results of other depth interviews	Comparing & contrasting within-group views after mentor interview
Writing	Written description of entrepreneur mentor script: Part II of assigned report	Written description of student novice script based upon individual prior experiences, case studies & lectures from classes: Part I of assigned report	Written comparison analyzing similarities and differences between student novice and entrepreneur mentor scripts
Debriefing	Responding to class questions following group report on depth interviews	Listening to other groups debrief their depth interviews in class	Verbally evaluating the information experienced in class debriefing session

APPENDIX F

APPLICATION OF EIPT SCRIPT CONSTRUCTION CRITERIA

TO THE ENTREPRENEURSHIP LITERATURE

The application of EIPT script construction criteria to the entrepreneurship literature necessitates a literature review and analysis. The literature review is required to identify examples of entrepreneurship-specific knowledge that scripts in the field might be expected to contain. The analysis is required to organize and present these examples according to criteria in the EIPT literature.

The objective of this research is to demonstrate that script cue recognition statements used as items in a questionnaire comply with the standards set by previous research in EIPT. This literature review and analysis therefore consists of:

1. The division of the entrepreneurship literature into content areas consistent with the definition of knowledge structure (script) content as specified by EIPT;

2. The specification of script content guidelines that stipulate the conditions under which examples of entrepreneurship-specific knowledge constitute "context" in addition to content. This requires the subdivision of the knowledge examples into those that primarily deal with the *sequence* of expert actions, and those that deal with the *norms* that guide those actions;

3. The identification of examples of entrepreneurship-specific knowledge, and their classification into a framework that is consistent with the script content guidelines;

4. The specification of the EIPT criteria for expert script construction; and

5. The application of EIPT criteria to the entrepreneurship-specific knowledge examples to demonstrate that script cue recognition statements to be used as items in a questionnaire comply with the standards set by previous research in EIPT.

Accordingly, this appendix consists of five sections that follow the preceding five points.

Subdivision of the Literature

According to EIPT, knowledge structures are influenced by individual traits (IT) (Carbonnell, 1979; Chi, Glaser, & Farr, 1988; Miller & Read, [in press]), individual experiences (IE) (Abelson & Black, 1986; Glaser, 1984), individual resources (IR) (Chi, Glaser, & Farr, 1988), venture characteristics (VC) which make the knowledge structure context-specific (Lord & Maher, 1990), and prior training (PT) (Lord & Maher, 1990). Each of these factors contributes to a NVF knowledge structure (Gartner, 1985a; Glaser, 1988; Perkins, 1985). Thus, the foregoing five content areas are utilized as subdivisions of the entrepreneurship literature.

This division of the entrepreneurship literature into five content areas consistent with the definition of knowledge structure (script) content as specified by EIPT makes possible a parallelism between the entrepreneurship and EIPT literatures. This parallelism facilitates a further division within each content area. In addition to the five areas of substantive (entrepreneurship) content, the EIPT literature can provide five matching areas of operational content: how knowledge is used by experts.

Accordingly, the content areas include: (1) individual traits **(IT)**, (2) individual experiences **(IE)**, (3) individual resources **(IR)**, (4) venture characteristics **(VC)**, and (5) prior training **(PT)**, each divided into substantive and operational content respectively.

Script Content Guidelines

Based upon the foregoing subdivisions of the literature, the following guidelines are suggested. These guidelines stipulate the conditions under which examples of entrepreneurship-specific knowledge would qualify according to EIPT criteria, as "context" in addition to content, as shown in Table F-1.

Table F-1. Script Content Guidelines by Knowledge Area:Entrepreneurship (Substantive) and EIPT (Operational) Literatures

AREA	SEQUENCE	NORMS
IT	**Substance** Scripts encompass the ways in which individual traits as identified in the entrepreneurship and strategic literature affect new venture processes e.g., career choice, opportunity search, response to stage contingent venture problems	**Substance** Scripts should reflect the normative trait-based behaviors shown by prior research to be associated with new venture acumen e.g., initiative level, risk posture etc.
	Operation Scripts include individual traits which demonstrate the series of steps which lead toward becoming an expert	**Operation** Scripts reflect trait-based norms observed in experts
IE	**Substance** Scripts reflect the kinds of experiences which lead step by step to successful venturing e.g., previous experience as an entrepreneur	**Substance** Scripts contain expectations of the new venture behaviors of "seasoned" entrepreneurs e.g., low need for conformity
	Operation Scripts elicit recognition that experts possess experience-based advantages when operating within the domain of expertise	**Operation** Scripts engender recognition that experience and expertise are expected to be strongly linked
IR	**Substance** Scripts contain cues that recognize the relevance of strategic acquisition of resources in venture success	**Substance** Scripts evidence expectations which link to resource acquisition standards for successful new ventures
	Operation Scripts reflect resource necessity for successful entry and execution of the script	**Operation** Scripts reflect standard operating procedures for resource acquisition by experts in the new venture domain
VC	**Substance** Scripts contain clear indications of venture process characteristics linked to successful ventures e.g., movement from start-up to operating status	**Substance** Scripts should articulate the recognized standards which successful new venture must meet e.g., an innovative product-market combination
	Operation Scripts demonstrate setting related connections to expertise	**Operation** Scripts exhibit the rapid translation of situational information into problem solutions
PT	**Substance** Scripts describe knowledge acquisition characteristics linked to successful new venturers	**Substance** Scripts recognize the new venture domain as distinct, and reveal unique differences in the prior training of successful new venturers
	Operation Scripts emphasize domain specific differences between the training of experts and that of novices	**Operation** Scripts contain attribution-based cues that emphasize key organizing principles acquired through intensive domain specific training

Classification of Content Examples

A fairly large sampling of literature that describes individual traits, experiences, resources, and prior training possessed by successful new venturers, and characteristics of successful new ventures themselves is available. The literature review was undertaken by reviewing recent issues of The Journal of Business Venturing (1990 through 1992), the bibliographies of several prominent entrepreneurship texts, and the reading lists for various doctoral seminars in strategy and entrepreneurship. From the hundreds of titles reviewed (more thoroughly where the topic had direct bearing on this research), 27 citations were selected.

These citations represent a sampling of the knowledge from which new venture scripts derive. The citations are included both in the references section of this paper, and in Table F-2 which follows. The citations are organized under the headings "Sequence" and "Norms," and are subdivided under these headings into references dealing with "Substance" (Entrepreneurship), and those dealing with "Operation" (EIPT).

EIPT Criteria for Expert Script Construction

EIPT contains criteria that specify the structure and content of viable scripts. The identification of such criteria is important, since the criteria specified within a script definition framework will form a "template" of sorts that can then be applied to accomplish the objective of this analysis: to demonstrate that script cue recognition statements used as items in a questionnaire comply with the standards set by previous research in EIPT.

Read (1987) provides a model for script construction that is based upon extant theory in the expert literature. It applies five principles or "metarules" of story comprehension (1987, p. 294) identified in EIPT (Granger, 1980; Kay, 1982; Marr, 1977; Wilensky, 1983) that affect an individual's understanding of social interaction. The model itself consists of a six step construction process (Read, 1987). Further, it employs six rules of causal syntax which govern how various elements in a script can be causally linked (Schank & Abelson, 1977).

Although not explicitly recognized by Read (1987), Glaser (1984) adds that scripts should be constructed such that they provide literal cues in the problem statement that trigger inference on the part of the subject, since the "... inability to infer further knowledge from the literal cues in the problem statement" is argued to be the reason for the "... problem solving difficulty of novices" (Glaser, 1984, p. 99),

Table F-2
Script Content by Knowledge Area: Entrepreneurship (Substantive) and EIPT (Operational) Literatures

AREA	SEQUENCE	NORMS
IT	**Substance** More risk averse individuals become workers, while less risk averse individuals become entrepreneurs (Khilstrom & Laffont, 1979); the search for an opportunity-resource match is a key feature of the entrepreneurial opportunity structure (Glade, 1967); project completion tied to Meyers-Briggs profile type (Ginn & Sexton, 1990); entrepreneurs have high tolerance for the ambiguity characteristics of new, unfolding situations (Schere, 1982)	**Substance** Entrepreneurs have the qualities of assertiveness and initiative (McClelland, 1968); are moderate risk-takers who can tolerate ambiguity (Sexton & Bowman, 1985); are creators of new enterprise/combinations (Low & MacMillan, 1988, Schumpeter, 1934); use lock-in type strategic commitment to attain sustained competitive advantage (Ghemawat, 1991); have significant differences in traits as identified by the Meyers-Briggs instrument (Ginn & Sexton, 1990)
	Operation Experts acquire a greater knowledge base in a specific domain (Glaser, 1984)	**Operation** Expert action presupposes willingness even though mistakes might be made (Leddo & Abelson, 1986)
IE	**Substance** Entrepreneurs engage in a deliberate process of network-building (MacMillan, 1983); knowledge lies waiting to be discovered -- entrepreneurs simply recognize changes which have already happened and exploit them (Loasby, 1983); previous venture experience is significant to venture performance (Stuart & Abetti, 1990); failure episodes cited as related to level of experience (Vesper, 1980)	**Substance** Observed entrepreneurial traits are the product of experience (Low & MacMillan, 1988); entrepreneurs' low need for support and conformity and high need for dominance and autonomy affects the nature of their experiences (Sexton & Bowman, 1985); entrepreneurs usually start firms related to their previous work (Cooper & Dunkelberg, 1987)
	Operation Experts possess a more elaborate schema which comes from more extensive experience (Chi, Glaser & Rees, 1982); have better and less biased recall of relevant information (Fiske, Kinder, & Lartner, 1983; McKeithen et al., 1981)	**Operation** Becoming an expert takes extensive past experience (Lord & Maher, 1990); experts have better and less biased recall of relevant information (Fiske, et al., 1983, McKeithen et al., 1981)
IR	**Substance** Sustained competitive advantage is a result of having and engaging strategic resources (Barney, 1991); the number of previous venture involvements is by far the most significant individual resource in early performance (Stuart & Abetti, 1990)	**Substance** Entrepreneurs who raised their own venture funds had higher proportionate success (Vesper, 1980)
	Operation Script entry depends upon having the objects required (Leddo & Abelson, 1986); novices do not have the resources (Perkins, 1985)	**Operation** Proper script entry depends upon having the objects required (Leddo & Abelson, 1986)
VC	**Substance** The venture incubation process is fostered by contact with other entrepreneurs (Smilor & Gill, 1986); the process of internalizing commercial information implies increasing control of assets in a firm i.e., entrepreneurship (Casson, 1982); establishing barriers to entry linked to strategic position (Porter, 1980); the steps of entrepreneurial decision making occur within a specific organizational setting (Glade, 1967); new ventures develop in stages (Churchill & Lewis, 1983)	**Substance** Ventures where isolating mechanisms are high and appropriability is low have good entrepreneurial strategy (Rumelt, 1987); the entrepreneurial locus of control holds promise for distinguishing successful from unsuccessful ventures (Brockhaus, 1982); experienced venture capitalists have one or two major areas of emphasis which predominate in their thinking e.g., management, unique opportunity, appropriate return (Hisrich & Jankowicz, 1990)
	Operation	**Operation**

Table F-2 (continued)

	Experts' mental structures play an integral part in comprehending familiar events in a setting (Read, 1987); experts efficiently translate problem information in a situation into problem solutions (Glaser, 1988)	Experts efficiently translate problem information in a situation into problem solutions (Glaser, 1988)
PT	**Substance** Entrepreneurs expose themselves to information differently (Kaish & Gilad, 1991); Understanding how value is built is a precondition for sustained competitive advantage (Ghemawat, 1991, Porter, 1985)	**Substance** Entrepreneurship is a distinctly new discipline which should be studied (McMullan & Long, 1990); entrepreneurs tend to be better educated (Cooper & Dunkelberg, 1987); more successful entrepreneurs had or acquired key skills (Vesper, 1980)
	Operation Experts acquire a greater knowledge base in a specific domain (Glaser, 1984); experts explain failure in terms of script knowledge (Leddo & Abelson, 1986)	**Operation** An expert's schema is organized around key principles (Lord & Maher, 1990); story understanding affects attributions (Read, 1987)

and thus becomes a primary attribute to be used in distinguishing between experts and novices.

The metarules, construction steps and rules of causal syntax, along with the nature of the information used in script cue development, combine to form script structure criteria that may be used to judge the conformance of proposed script recognition cues to EIPT.

Script metarules

The script metarules include:

(1) the principle of coherence, which requires the use of sufficient knowledge to produce the most intelligible interpretation,

(2) the principle of concretion, which constrains interpretation to the use of the most concrete knowledge possible,

(3) the principle of least commitment, which suggests that people make no more than the minimum assumptions necessary to produce a coherent interpretation,

(4) the principle of exhaustion, which requires that an interpretation account for all the data, and

(5) the principle of parsimony which instructs people to produce an interpretation that maximizes the connections among inputs (Read, 1987).

Use of these metarules is subject to both information processing and emphasis limitations. Thus, story understanding (script interpretation) is constrained by these metarules subject to their weakening by differentials in individual information processing capability and in emphasis as to which of these rules has priority in cases where they conflict.

Steps in script construction

Read's (1987) model specifies six steps in script construction that include:

(1) making categorizations about people (gender, race, or role) and situations (based upon our observations)

which activates a given "... set of knowledge structures" (1987, p. 293),

(2) connection of subsequently observed actions with the initial scenario (which is why an expert can simplify complexity effectively, but only within a given domain [Lord & Maher, 1990]),

(3) evaluation of congruence between actions so connected and an underlying plan, and where incongruent, the consideration of any other plans which might be connected to the scenario under consideration,
(4) identification of "... the goal of the plan if it is not already known,"

(5) evaluation of "... whether that goal is merely part of a larger plan or whether it is an end in itself," and

(6) identification of the "... source for that goal, such as a theme or some occurrence that instigated it" (Read, 1987, p. 293).

According to Read (1987), "... knowledge about people's goals often comes from knowing the roles they fill and their interpersonal relationships, ... expected characteristics of people in particular roles, ... (anticipation of people having) particular goals and performing the associated plans because they function in a particular role, and (the operation of) ... life themes (which) color everything that an individual does" (1987, p. 292).

Rules of causal syntax

Schank and Abelson (1977) provide six rules of causal syntax that govern the potential for causal linkage among scripts. They include (emphasis in original):

(1) actions and events can *result* in state changes,

(2) states can *enable* actions and events,

(3) states can *disable* actions,

(4) states can *initiate* mental states,

(5) acts, also, can *initiate* mental states , and

(6) mental states can be *reasons* for actions (Read, 1987, p. 292).

Read argues that "in the actual understanding of behavior this syntax is followed rigidly" (1987, p. 292), although in actual attributions of behavior some of the steps may be implicit (ibid.).

Summary

Thus, for a script to operate according to the predictions of the EIPT literature it should be structured according to the applicable criteria specified (1) in the metarules, (2) in the steps of script construction, or (3) in the rules for causal syntax, as well as in compliance with the previously noted criteria for inferential cuing specified by Glaser (1984). These script construction criteria have implications for script cue construction. For convenience, these criteria are summarized in Table F-3.

Table F-3
Summary of Script Structure Criteria

A. Metarules:

1. Coherence
2. Concretion
3. Least commitment
4. Exhaustion
5. Parsimony

B. Steps:

1. Categorization
2. Connection of subsequently observed actions
3. Evaluation of congruence
4. Identification of the goal behind a plan
5. Explicit evaluation of embedding in larger plans
6. Identification of source for goal

C. Syntax Rules:

1. Actions/events result in state changes
2. State changes enable actions and events
3. States can disable action
4. States can initiate mental states
5. Acts can initiate mental states
6. Mental states can be reasons for actions

Adherence to this theoretically specified structure in drafting script cue recognition statements demonstrates compliance with previous research in EIPT. The implications of script structure theory for the construction of script cue recognition statements are outlined in Table F-4. Examples of the evaluation of compliance with these structural criteria are illustrated in the section which follows.

Application of EIPT Criteria to NVF Script Cues

Structure and content criteria for evaluating the appropriateness of scripts according to expert theory have been summarized in the previous section of this appendix. This section evaluates the structural and content veracity of sample script cues employed in this research, for compliance with EIPT criteria.

For the sake of simplicity, the researcher has adopted a set of decision rules that follow from EIPT along with the abbreviations used to identify these elements in the table as follows:

1. A script recognition cue should comply with either a "metarule," a script construction "step," or a causal "syntax" rule;

2. A script recognition cue should derive from one of the content areas, i.e., individual traits (IT), experiences (IE), resources (IR) or prior training (PT) and/or venture characteristics (VC);

3. The script recognition cue should describe either new venture sequences (SQ), norms (N), or both (SQ/N);

4. The script recognition cue should contain either substantive (SB) or operational (OP) content; and

5. A citation (Cite) from the entrepreneurship or expert theory literature should support, respectively, substantive or operational content.

Table F-4
The Script Cue Construction Implications of
EIPT Script Structure Theory

Theory Criteria	Script Cue Construction Implications
A. Metarules:	Knowledge Areas
1. Coherence	Individual Traits:
2. Concretion	A. Metarule: Least commitment Y time use priority cue
3. Least commitment	B. Steps: ID goals behind plans Y goal orientation cue
4. Exhaustion	C. Syntax: Acts enable mental states Y better-worse/stop-go cue
5. Parsimony	Individual Experiences:
B. Steps:	A. Metarule: Concretion Y experience fit cue
1. Categorization	B. Steps: Connection to subsequent action Y familiarity cue
2. Connection of subsequently observed actions	C. Syntax: Causal syntax Y problem solving cue
3. Evaluation of congruence	Individual Resources:
4. Identification of the goal behind a plan	A. Metarule: Coherence Y risk-taking/confidence cue
5. Explicit evaluation of embedding in larger plans	B. Steps: Connection to subsequent action Y funding capability cue
6. Identification of source for goal	C. Syntax: States enable events Y level of resource control cue
C. Syntax Rules:	Venture Characteristics:
1. Actions/events result in state changes	A. Metarule: Parsimony Y venture fit with self-assessed knowledge cue
2. State changes enable actions and events	B. Steps: Evaluation of congruence Y success attribution cue
3. States can disable action	C. Syntax: States can enable/disable action Y scarcity or appropriability cue
4. States can initiate mental states	Training:
5. Acts can initiate mental states	A. Metarule: Concretion Y reading preferences cue
6. Mental states can be reasons for actions	B. Steps: Explicit embedding Y knowledge self-description cue
	C. Syntax: States initiate mental states Y fit between trained specialty and demand cue

Table F-5: Script Recognition Cue Compliance Evaluation

Script Cue:	Script Structure Criterion	Area	SQ/N	SB/OP	Cite
My knowledge about new businesses is fairly elaborate, due to the many variations I have observed.	Step: Explicit embedding	IE	SQ	OP	Chi, Glaser, & Rees (1982): Experts possess a more elaborate schema
When someone describes a problem with a new business I recognize key features of the problem quickly, and can suggest alternatives from examples I can cite.	Syntax: Mental states reason for action	VC	SQ/N	OP	Glaser (1988): Experts efficiently translate problem information into problem solutions
I like to read periodicals which deal specifically with new ventures and start-up businesses.	Metarule: Concretion	PT	SQ/N	OP	Glaser (1984): Experts acquire a greater knowledge base in a specific domain
When investing in a new venture, I think it is worse to wait too long, and miss a great opportunity.	Syntax: Acts enable mental states	IT	N	OP	Leddo & Abelson (1986): Doing presupposes willingness even though mistakes might be made
Are you more attracted to people who are ready to take action.	Syntax: Mental states can be reasons for actions	IE	N	SB	McClelland (1986): Initiative and assertiveness are characteristic of entrepreneurs
If you have a lot of free time available, is it more desirable to find a new venture to put your time and expertise into.	Metarule: Principle of least commitment	IR	N	SB	Glade (1967): Opportunity search by entrepreneurs v. nonventure use of resources
I have more highly developed contacts in the new venture area specifically.	Steps: Connection to subsequent action	IE	SQ	SB	MacMillan (1983): Entrepreneurs use a deliberate process of network building
I own proprietary technology, patents, an operating business.	Steps: Evaluation of congruence	VC	SQ/N	OP	Leddo & Abelson (1986): Script entry depends upon having the objects required
I am very good at a specialty that is in high demand.	Syntax: States can disable action	PT	SQ/N	SB	Vesper (1980): More successful entrepreneurs had or acquired key skills
My new venture is/will be protected from competition by patent, secret technology or knowledge.	Syntax: States can disable action	VC	SQ/N	SB	Rumelt (1987): Isolating mechanisms imply good new business strategy
When confronted with a new venture problem I can recall quite vividly the details of similar situations I know about.	Steps: Connection of subsequently observed actions	IE	SQ/N	OP	McKeithen (1981): Experts have better recall of relevant information & it is less biased
New ventures, small business, and entrepreneurship are distinctly different disciplines.	Metarule: concretion	PT	N	SB	McMullan & Long (1990): Entrepreneurship is a distinct discipline

Table F-5 provides results of this analysis. For each major set of theory criteria (metarules, script construction steps, and syntax rules), each of the major content areas is analyzed and construction implication exemplars suggested. This analysis offers evidence that the script recognition cues used in this research comply with EIPT.

The analysis in Table F-5 contains examples of the evaluation of script recognition cues for compliance withEIPT. This analysis demonstrates how "expert scripts" from a literature can be transformed into script cue recognition statements that are consistent with EIPT.

APPENDIX G

FULL FACTOR LOADING MATRICES FOR EXPLORATORY FACTOR ANALYSES

Table G-1
Rotated Factor Matrix for Two-Factor Solution
n = 219

	FACTOR 1	FACTOR 2
M33	.65084	-.08315
R26	.56655	.15515
M2	.48339	-.21168
M37	.47991	-.07886
R34	.45785	.02614
R18	.43831	-.04152
R27	.43694	.36931
M38	.43186	.17546
M28	.42978	.02144
R20	.41208	.10755
R41	.40042	.05011
M46	.35998	.16410
G48	.35056	.23008
R8	.33266	.03896
M7	.33218	.12055
M12	.33196	-.11626
R45	.32092	.11227
G17	.30671	.10431
M31	.30642	.17199
R11	.29963	.24857
G23	.28381	-.17733
R36	.24091	.15124
M32	.22403	.11482
R3	.20255	.17395
R1	.19662	.15391
G21	.18724	.09102
E47	-.02407	.02163

Table G-1 (continued)

	FACTOR 1	FACTOR 2
G14	.04769	.64060
E29	.05423	.57980
E44	.17284	.49646
E16	.07060	.47814
G35	-.07686	.45947
E42	.03897	.45223
E9	.18367	.37270
R6	.30300	.37023
E40	-.06192	.35957
E30	.16378	.34236
E43	.04390	.28900
E4	.08632	.27271
G25	.14726	.26312
G39	.06698	-.19895

Factor Transformation Matrix:

	FACTOR 1	FACTOR 2
FACTOR 1	.83872	.54457
FACTOR 2	-.54457	.83872

Table G-2
Rotated Factor Matrix for Three-Factor Solution
n = 219

	FACTOR 1	FACTOR 2	FACTOR 3
R18	.57734	-.02759	-.12590
R26	.50973	.29550	.07524
R8	.50062	-.08319	-.03200
R6	.48454	-.04360	.30433
R41	.48057	.04975	-.02091
R34	.47588	.14069	-.04658
R11	.41304	.01419	.19045
R27	.39065	.28096	.30953
M37	.36736	.28693	-.14028
G48	.36641	.14733	.17547
R1	.36595	-.10862	.10454
R3	.35878	-.08654	.12533
R20	.35271	.23593	.05152
R45	.29646	.16281	.06625
M31	.25154	.20701	.13217
R36	.21817	.14101	.11763
E47	-.03522	.00970	.02680
M12	-.08333	.59883	-.11939
M7	-.01360	.56136	.11068
G17	-.02312	.52983	.09639
M33	.43834	.46713	-.15924
M38	.20575	.46028	.13643
M2	.21689	.44980	-.25633
E30	-.05159	.38839	.34455
G21	-.04300	.36427	.08976
M32	.03351	.33311	.10335
M28	.29247	.32008	-.02868
M46	.23772	.30626	.12388
G14	.16187	.00516	.62377
E29	.12437	.04909	.56677
E16	.05922	.13405	.47155
E44	.18500	.14410	.47141
G35	-.04862	.03112	.47089
E42	.05791	.08090	.44680
E40	-.06461	.05406	.37170
E9	.29478	.00199	.33355
E43	.16437	-.07432	.26983
E4	.08247	.08907	.26153
G25	.02359	.25466	.25656
G23	.19287	.17331	-.21159
G39	.04139	.01445	-.20753

Factor Transformation Matrix:

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	.71797	.54536	.43255
FACTOR 2	-.29341	-.32640	.89854
FACTOR 3	-.63121	.77204	.07433

Table G-3
Rotated Factor Matrix for Four-Factor Solution
n = 219

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
R18	.52859	-.04089	-.24029	.33745
R8	.51061	-.05454	-.03840	-.04838
R6	.49058	-.05932	.26600	.12052
R41	.48272	.07203	-.02467	-.00613
R26	.47999	.28207	.03125	.23588
R34	.46423	.15473	-.06335	.07058
R11	.41925	.01151	.17353	.05760
G48	.40083	.17579	.23919	-.17731
M37	.39391	.34967	-.04459	-.27697
R1	.38829	-.08975	.11269	-.08307
R27	.38633	.25941	.29943	.14728
R3	.36324	-.08737	.09804	.05348
R20	.31869	.21435	-.00218	.25704
R45	.30750	.17973	.09604	-.05944
M12	-.10245	.60682	-.05905	-.00182
M7	-.02493	.55040	.15872	.05033
G17	-.05141	.50292	.10638	.17243
M2	.21953	.50225	-.17094	-.18355
M33	.41776	.49305	-.13604	.03830
M38	.20369	.46020	.17894	.01979
M46	.25782	.32659	.19006	-.12439
M28	.25817	.30804	-.06154	.20899
M32	-.00105	.29624	.06936	.25254
G14	.20010	-.02777	.64220	-.00068
G35	-.00859	.01202	.51798	-.09545
E29	.12063	-.01810	.51105	.27385
E16	.08375	.10599	.49745	.00954
E44	.19195	.10342	.45786	.14365
E42	.04878	.02158	.39758	.25303
E40	-.04396	.02813	.39139	-.00071
E30	-.04474	.36109	.38579	.04158
E9	.30270	-.02078	.30989	.10273
G39	-.01002	-.00874	-.29488	.28667
G23	.18045	.19785	-.20037	-.01545

Table G-3 (continued)

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
M31	.17221	.12715	-.02312	.62303
E43	.11989	-.14689	.13701	.46301
E47	-.08767	-.04578	-.08157	.39291
E4	.04494	.02560	.17033	.38070
G21	-.09382	.31133	.03054	.35725
G25	-.01086	.19693	.19816	.32914
R36	.19643	.11642	.07461	.20212

Factor Transformation Matrix:

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
FACTOR 1	.70014	.51341	.40984	.27973
FACTOR 2	-.25652	-.41793	.85820	.15175
FACTOR 3	-.65371	.73880	.15500	.05310
FACTOR 4	-.12911	-.12618	-.26741	.94652

APPENDIX H

DETAILED INFORMATION ON PATTERN COEFFICIENTS

FROM CONFIRMATORY FACTOR ANALYSIS

Table H-1
Pattern Coefficients, Z Values, and Squared Multiple Correlations from Confirmatory Factor Analysis

Variables	Lambda X (Pattern Coefficients)			Z Values[1] for Pattern Coefficients			Squared Mult. Correlations		
	Arrange	Willing	Opp-Abil	Arrange	Willing	Opp-Abil	Arrange	Willing	Opp-Abil
R18	.361			4.790			.130		
R26	.563			7.812			.316		
R8	.298			3.913			.089		
R6	.440			5.933			.194		
R41	.341			4.516			.117		
R34	.420			5.633			.176		
R11	.402			5.379			.162		
R27	.565			7.855			.320		
R1	.239			3.118			.057		
R3	.296			3.889			.088		
R20	.390			5.212			.152		
G48	.383			5.103			.147		
M12		.391			4.781			.153	
M7		.452			5.552			.204	
M38		.457			5.618			.209	
M2		.374			4.564			.140	
M32		.226			2.724			.051	
M28		.373			4.543			.139	
M46		.419			5.132			.176	
G17		.368			4.481			.135	
G14			.532			6.849			.283
G35			.339			4.255			.115
E29			.548			7.075			.301
E16			.397			5.021			.158
E44			.527			6.784			.278
E42			.372			4.693			.139
E40			.220			2.724			.048
E9			.338			4.247			.115

[1] Values greater than 1.645 are significant

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[1.] According to Bristor and Fischer, gender is a socially-based distinction that is based upon biologically-based differences.

[2.] Expert script recognitions, more fully defined in Chapter 2, are attributions by individuals that bits of situational context that apply to an expert knowledge domain, apply to them personally. Experts are known to store and retrieve specialized knowledge by utilizing a knowledge structure or "script" (Glaser, 1984; Leddo & Abelson, 1986; Read, 1987), which distinguishes them from novices.

[3.] Prior to conducting Study 1, a preliminary investigation was conducted in which a panel of NVF experts (as defined herein) was asked to separate the items in the questionnaire into "entry" and "doing" scales, on the basis of the definition provided by Leddo and Abelson (1986). A coefficient alpha analysis for these two scales showed acceptable values (.67 and .61 respectively). These scales are employed in the journal article "Enhancing entrepreneurial expertise: Experiential pedagogy and the new venture expert script," forthcoming in the special edition of *Simulation & Gaming* that deals with entrepreneurship education.

Subsequent to the acceptance and final submission of this journal article, the exploratory and confirmatory factor analyses of Study 1 were conducted. As reported in Chapter 4, these analyses provide a more rigorous definition of the scales and thereby of the "entry" and "doing" notions as they apply to NVF expertise. Since it is likely that this dissertation will be published *before* the journal article, the author wishes to "reconcile" differences between the two interpretations of the "entry" and "doing" notions.

Upon re-analysis of the work of the expert panel, it appears that the panel mistook "willingness" as it is defined herein, for "entry." To avoid possible confusion due to mislabeling, the reader should, in interpreting the journal article, substitute the term "Arrangements" for "Doing," and the term "Willing" for "Entry." Thus Figure 4-5 in this dissertation, and Figure 1 in the article report similar and consistent results.