

Entrepreneurship Theory and the Poverty of Historicism

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Purpose. The author applies methodological concepts from *The poverty of historicism* to contemporary research in the area of entrepreneurship. The aims are to explain why current theoretic models do not adequately explain entrepreneurial phenomena and to present outlines of a distinct entrepreneurship research paradigm.

Design/methodology/approach. The author examines the essay from the perspective of a historian and then summarizes its concepts. Next, the author reviews the current state of entrepreneurship research and theory and applies concepts from the essay to its contemporary challenges. Finally, the author presents five implications.

Findings. The five implications are that entrepreneurship research should include designs that predict failure, strive to develop theory that is distinct from other areas, emphasize novel arrangements of empirical elements that are also novel, utilize nonparametric statistics and case studies more fully, and push for a paradigmatic shift.

Originality/value. The contribution of this article is useful to entrepreneurship scholars interested in developing and distinguishing their research area in a substantial and lasting way alongside other established research areas in the domain of business studies.

Keywords. entrepreneurship theory; entrepreneurial discovery; opportunities; research methods; Karl Popper; theory development

Classification. Conceptual paper.

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The mainspring of evolution and progress is the variety of material which may become subject to selection. So far as human evolution is concerned it is the "freedom to be odd and unlike one's neighbour" - "to disagree with the majority, and go one's own way."

Popper (1957: 159)

As an area of the social science discipline, management research must parse subjective and objective content in order to promote the validity of its results and implications (Popper, 1957: 15). Like theory in other areas, management theory develops in light of verbalized conceptualizations that embed subjective influences into content and reflect an awareness of external trends. Most statistical approaches to empirical study are instrumental to parsing the

error from true score variance, but they also carry assumptions about sample scores deriving from unobserved populations with a specific distributions. The evolution of theory frustrates these parametric approaches, which ignore the central role of accidental encounters in the ecology of evolution (Campbell, 1974: 414). Thus, when a paradigm shifts in management theory, it tends to break from prior knowledge instead of extending it to approximate the phenomena of interest. When new theories depose existing ones in this manner, it discards certain uniquely valid aspects of previous models.

Enter the value of management history research, which enhances current understanding with contributions from obscured past concepts and domains. Santayana's axiom of the unity of progress and retention is foundational to the area's premier outlets such as the *Journal of Management History* (Lamond, 2006). Concepts from the past, including ones from other content areas, add value to current discourses without the contemporary biases of a jaundiced eye. Examining such concepts and extracting what is meaningful to current challenges enhances our understanding of the laws and linkages that influence present narratives (Munz, 1977).

In this spirit, I examine one of the 20th century's most influential essays on social science research methodology in this article. I articulate its methodological concepts and utilize them to clarify some contemporary challenges facing entrepreneurship theory and research.

Background

Entrepreneurship entails the discovery, evaluation, and utilization of future goods and services (Venkataraman, 1997). The act of entrepreneurship does not require the creation of a new firm. It also does not require a single individual to manage all of a firm's aspects over time (Eckhardt & Shane, 2003). As such, the unreliable linkages between individuals, firms, and environments mean that entrepreneurship begins with opportunities. The ancillary entrepreneurial process entails growth: few individuals participate initially, but a successful venture may serve very many individuals. Yet, no matter how a venture grows, evolves, or dies, it always starts with a recognized opportunity (Murphy & Coombes, in press). Opportunities are an empirical unit of analysis with peculiar aspects. For instance, they have objective qualities that can go beyond the subjective intentions of their discoverers (Murphy & Marvel, 2007). That feature alone is outside the boundaries of theory from economics (Baumol, 1993) or psychology (Low & Macmillan, 1988). The conceptual inadequacies of studies from those areas as explications of opportunities underline the need for change in terms of bolder new directions in entrepreneurship theory (Welsch, 2004).

If explaining opportunities is definitional to entrepreneurship theory, then the phenomenon of discovering them is a distinct part of the area. After all, "to have entrepreneurship, you must first have opportunities" (Shane & Venkataraman, 2000). On these grounds, entrepreneurship theory is currently at an inflection point in the history of its development. The promise of a distinct theoretic paradigm has persisted for at least 20 years despite a morass of contributions from other content areas, which apply non-distinct theoretic models that examine types of individuals and situations to explain distinct entrepreneurial phenomena (Murphy, Liao, Welsch, 2006; Shane & Venkataraman, 2000). Put simply, the predicament is that "the usual theoretic structures do not seem to work well for explaining

entrepreneurship” (Venkataraman, 1997). Approaches from other areas (psychology, strategic management) do not work very well because those approaches were never intended to explain entrepreneurial discovery as a basic part of entrepreneurial events. Building on these notions, one sees that the predicament transcends the boundaries of current entrepreneurship literature. Therefore, I do not draw from contemporary content areas in this paper. To engage the predicament, one must examine epistemological aspects of substance and method in entrepreneurship research. I draw from an influential essay that first articulated these concepts more than half a century ago.

My contribution is rooted in Karl R. Popper’s (1902-1994) *The poverty of historicism*, (Popper, 1957), a logical, critical essay on social science methodology that examines the interface of theory and method. The nature of this interface is a recurring theme in entrepreneurship (Eckhardt & Shane, 2003; Robinson & Hofer, 1997), but no examinations tap the roots of the issues like Popper’s essay. Its doctrines are logical, not empirical, and do not favor particular variables or boundary conditions. Thus, drawing from this historic work is nothing like the current practice of borrowing theoretic content from other areas to explain entrepreneurial events. Indeed, the essay does not imply what is appropriate content. Instead, it addresses questions and assertions of fact, theory, and hypothesis with a view toward the problems they create and resolve.

In what follows, I examine *The poverty of historicism* (hereafter *The poverty*) from the research perspective of a historian. Then I present some of its methodological concepts in detail before exploring their applicability to entrepreneurship theory. Lastly, I offer implications for future entrepreneurship research. The implications of my undertaking promise to be instrumental to the development of scalable entrepreneurship theory that is distinct in the broader domain of management research.

A Brief History of *The Poverty of Historicism*

The subject of *The poverty* is appropriate methodology in empirical studies of social phenomena. The book evaluates social science research with reference to misapplication of methods that derive from traditions in the natural sciences. Interestingly, although the work examines research methods, the inspiration for its principles was rooted in a formal criticism of Marxist theory based on Popper’s personal experiences as a young Marxist in Vienna. Popper studied and embraced Marxism until the age of 17, which was when he began to perceive inconsistencies in its doctrines regarding the inevitable coming of socialism via class struggle and its espoused knowledge of laws governing historical development as a means to promise a better world. After rejecting communism, Popper remained a socialist. Several years later, in the 1920s, he then rejected socialism once he reasoned that its core premises, although attractive, were deeply flawed. For instance, despite the importance of equality among people emphasized by socialist doctrines, Popper regarded individual freedom as more important because it subsumes equality. His intense reasoning about these complex issues would frequently take on a kind of elegance. For instance, his general conclusion about Marxism was that “freedom is more important than equality; that the attempt to realize equality endangers freedom; and that, if freedom is lost, there will not even be equality among the unfree” (Popper, 1974: 27). Once he explained during a lecture in New Zealand, “We need freedom to make security secure, and

security to make freedom free” (Munz, 2004: 51). For Popper, social or organizational power that does not fully concede the freedom required for anyone to criticize it will rebound upon itself, and diminish freedom in its wake.

It is worth noting that the ideas in *The poverty* are rather anti-socialist on logical grounds. The orientation of the work is not unlike the current view that entrepreneurial action aligns with the logic of a market and is incompatible with the socialist model. Despite some of Schumpeter’s (1942: 170) more fashionable contributions (see Hayek, 1945), most entrepreneurship scholars recognize this incompatibility but overlook how it can generalize into issues of research methodology. This generalization especially applies to entrepreneurship, as the relation between freedom (autonomy) and security (equality) is salient in entrepreneurial events. The nature of Popper’s life experiences during the long period of formulating *The poverty* resulted in an astonishing facility for expressing the intricacies of this generalization. Indeed, few published works delineate issues of empirical methodology with such clarity.

In the winter of 1919-1920, Popper became preoccupied with the classical problem of universals not as the Hellenic philosophical dilemma of “the one and the many” but instead as a practical issue of research methodology. Two influential discussions along these lines that Popper had with Karl Polanyi and Heinrich Gomperz a few years later helped him form the ideas for *The poverty*. Input from Polanyi and Gomperz reinforced his notion that the problem of universals helps demarcate differences between methodologies in the natural and social sciences. (I will examine the problem of universals in detail in a later section.) In short, as stated in the second sentence of this paper, methods in natural science are relatively neutral with regard to verbalism and language. By contrast, verbalism and verbalized shared experiences in social science can influence its empirical results.¹ Popper went on to coin the term “essentialism” in *The poverty* in the course of elaborating the nature of this influence (Popper, 1974: 13-14).

The formal development of essentialism and other concepts and the eventual publication of *The poverty* took over 20 years. Popper did not complete an outline until 1935. One year

¹ This contrast implicates two influential philosophies of science often seen as contradictory to one another. One emphasizes the importance of shared language and assumptions to the growth of knowledge and is associated with Kuhn (1962). The other emphasizes clashes between conjectures and refutations and a context-free logic of evolution and is associated with Popper (1959). Both epistemologies describe revolutions as basic to the growth of knowledge but differ about the function of criticism in such revolutions. An examination of this rich area would run outside the boundaries of this article, but I would recommend a few sources for readers interested in the specific issues. The best primary sources of which I am aware are Lakatos and Musgrave (1970) and Schilpp (1973). The former is volume 4 of the *Proceedings of the International Colloquium in the Philosophy of Science* held at Bedford College in London, July 11-17, 1965. Consisting of papers from a symposium at that colloquium, it begins with Kuhn’s statement of his own philosophy, which is then criticized by seven scholars (including Popper), and it concludes with Kuhn’s reply to each of them. The latter is volume 14 of *The library of living philosophers*. It begins with Popper’s explanation of his own philosophy, which is then criticized by 33 scholars (including Kuhn), and it concludes with Popper’s reply to each of them. The most insightful secondary source of which I am aware is Munz (2004: 120-129), who explains in detail how ideas from Popper and Kuhn (and Wittgenstein) complement one another. Munz, himself a historian, will be of special interest to historians reading the *Journal of Management History*. Munz was the only person in world history to have been a student of both Popper (in Christchurch) and Wittgenstein (at Cambridge), who represent an ontological division similar to the one of Popper and Kuhn, which indeed bears upon empirical research methods in contemporary social science (Cook & Campbell, 1979, p. 23-24).

later, he read an early draft of the essay in German, entitled “The Poverty of Historicism,” at a regular meeting of philosophers at the home of Alfred Brauntal in Brussels. Soon thereafter, Popper presented the same ideas to students in one of Hayek’s seminars at the London School of Economics (LSE). These events in the academic community facilitated development of his ideas, but other concurrent events in society would impede their dissemination.

At this point in history, the build up to World War II was underway in Europe. Popper’s father, Simon Sigmund Carl Popper, was a radical liberal, published political satirist, freemason, and member of the faculty of law at the University of Vienna. Largely due to the intellectual atmosphere his father created, young Popper developed into an astute and passionate lifelong observer of social systems. By the early 1930s, he regarded democracy in central Europe as increasingly hopeless. He believed the social democratic party in Austria would not resist totalitarianism in the case of conflict, and expected annexation should the Nazis continue to gain power and absorb Austria’s German Nationalist party. In interwar Vienna during the 1930s, many faculty members in the universities were Jewish. Popper anticipated the rise of Hitler with dread and awareness of the fact that his parents converted from Judaism to Lutheranism in 1900. By 1936, the Academic Assistance Council (AAC) had begun actively supporting refugee scientists from Germany and Austria. In this context, Popper answered an advertisement for a teaching position at Canterbury University College in New Zealand. Through the AAC, he also received an offer of academic hospitality from Cambridge intended for refugees. When he later received the offer from Canterbury, he requested that Cambridge transfer their offer to Fritz Waisman of the Vienna Circle. Popper and his wife sailed from London to Christchurch, New Zealand in early 1937, where he started work at the present day University of Canterbury (Popper, 1974: 83-87).

After a year of work in Christchurch, he intended to develop *The poverty* into a publishable four-chapter essay in English, but he struggled to produce clear exposition. When his peers informed him that the tenth section (on essentialism) of chapter one was puzzling when written in English, he undertook especially concentrated efforts to elaborate its ideas with the intent of clarification. Those iterations unexpectedly evolved into an extended dissertation on the totalitarianism principles that he perceived in Plato’s *Republic*, but his peers still saw these efforts as confusing and vague. Popper continued to work until the unexpected turn produced an objective material form, which he then extracted wholly from the *The poverty* manuscript. That extracted material was the beginning of *The open society and its enemies* (Popper, 1945), a two-volume landmark work of nearly 800 pages that Bertrand Russell would describe as a contribution of “first-class importance” and “masterful criticism.” Though Popper had already completed three of *The poverty*’s four chapters, he worked intensely on *The open society and its enemies* until he finished a draft of its first volume, entitled “the spell of Plato.” He then returned his attention to *The poverty* and wrote its fourth chapter of 56 pages to complete the work and prepare it for submission to a journal. The original source of *The open society and its enemies*, section 10 in chapter one of *The poverty*, was mostly reverted to its original form (Popper, 1974: 90-92).

In late 1942, the philosophical journal *Mind* rejected a manuscript of *The poverty* that Popper had submitted for publication. Popper then turned his attention back to *The open society and its enemies* and completed volume two, entitled “the high tide of prophecy,” in early 1943

before attempting to find a book publisher. After a period of several months, an academic authority in America offered the peculiar view that the work was unpublishable because of its “irreverence toward Aristotle” (who, unlike Plato, received little attention in the book). Turning to Europe with assistance from Ernst Gombrich and Hayek, the manuscript met with twenty rejections before they found an agreeable publisher in England. In the meantime, *The poverty* was accepted for publication as a series of three articles in 1944 in *Economica* 11(42, 43) and in 1945 in 12(46).

Around this time, Popper’s ardent orientation for research and publishing began to clash with authorities in his university, who advised him to focus more on pedagogy. In fact, most of the faculty members at Canterbury were unaware of his research activity. They had hired him to teach, not develop a research program (Munz, 2004: 49). The University of Sydney indicated an interest in appointing Popper to its faculty in early 1945, which drew attention from the Australian press and comments in parliament regarding the hiring of an Austrian émigré. Shortly afterwards, on holiday but in dark spirits, Popper received a letter from Hayek in 1945 thanking him for publishing *The poverty* in *Economica*, where Hayek was acting editor. The letter also offered Popper a readership at the LSE. Popper and his wife soon left New Zealand in November 1945. Their ship, the *New Zealand Star*, received orders to take the alternate rougher course around Cape Horn and arrived in England in January 1946. Popper started work immediately at the LSE (Popper, 1974: 95-96). He would be appointed as professor in 1949 and remain at the LSE until he retired in 1969. Among various other achievements, Popper’s work led to knighthood bestowed by Queen Elizabeth II in 1965, election as a Fellow of London’s Royal Society in 1976, and his being made a Companion of Honour in 1982.

The poverty was first published as a book in England in 1957. Reviews of the 161-page essay appearing in *The Times*, *Daily Telegraph*, *Listener*, and *New Statesman* and described it as “one of the most important books on social science methodology ever published” (Routledge, 2002). *The Sunday Times* hailed it as “probably the only book published this year which will outlive this century.” *The poverty* is not only significant in terms of historic presence, but its tenets underlie basic modern principles of social science methodology. For example, they are an ostensible influence on Cook and Campbell’s (1979: 20-25) methodological treatise. In what follows, I examine some of its concepts and bring them to bear on entrepreneurship theory and method, especially regarding entrepreneurial opportunities.

Examination of Concepts

Popper used the term “historicism” in an evolved sense (Munz, 2004: 17). Earlier historical research in Germany introduced the term “historism” to indicate a view that historic subjects are understood better in their original terminologies, instead of external or modern-retroactive terminologies. Popper built on this conceptualization, but his term refers to the search for developmental laws. Its definition is the belief in a kind of plot underlying human affairs that, if understood, sheds light upon the future (Popper, 1963: 338). Its methodological doctrine is the search for underlying patterns in data that allow future predictions. The approach is deterministic and comes in many forms, which include natural laws, religious canons, as well as principles of economic progress. In social contexts, historicism can drive collectivist tendencies that can be dangerous because its evaluations seem valid only within the boundaries

of the collective and are difficult to refute rationally, which leads to irrational discrimination of anything outside those boundaries. Thus, in severe forms, historicism leads to stereotyping, racism or nationalism.

In milder forms, historicism creates tacit assumptions about the predictability of uncertain outcomes in empirical research contexts. Originally limited to macro-level views of social systems, what *The poverty* calls historicism began to influence micro-level research in the 19th century. *The poverty* specifies that the influence began with Mill (1843) and Wundt (1874), who adopted methods from physics to search for recurring regularities in dynamic social and psychological phenomena. The tacit generalization of historicism has led to specific empirical challenges in modern social science research, and especially in the area of entrepreneurship, where studies seek to explain volatile phenomena.

Reliability and Essentialism

Attempted delineation of recurring regularities in large samples of cases can lead to a mild form of historicism. In these research settings, the linkage between measurement reliability and validity is logical when the meaning of study outcomes is not intertwined with social dynamics (e.g., the physical height of people). However, the linkage is not logical when social dynamics are germane to outcomes of interest, such as venture competition in a market. In the latter case, outlier scores that are extreme, significant, and unforeseen occur in the score distribution, destroying the equilibrium parameters of regularity assumptions. Popper and the contemporary scholar Nassim Taleb (2007) refer to such events using the long-established English metaphor of the “black swan.” Assumptions about recurring patterns in stochastic data can lead to black swan events. Such assumptions are common in management and other social science research, and parametric statistical methods even require them (Nunally, 1978, p. 193). For instance, they underlie the bell-curve or Gaussian distribution of score frequencies. Regularity assumptions are also germane to coefficient α as an index of the statistical reliability of an empirical item scale. These instances are historicist when they drive extrapolation of future outcomes using the logic of a trend, even though they indicate laws that only explain present conditions.

Lawful interrelations exist among variables in dynamic contexts such as markets. However, it is specious to regard those laws as indicative of trends that dictate future circumstances. In market-driven contexts, lawful interrelations are tentative. Thus, it is important to understand that historicism is not about cases in which human actions bring about recurring regularities. Rather, it emerges when social scientists reverse the causal arrow with assumptions that strip away accidental features of the data and emphasize recurring regularities as drivers of future human actions. Although such forecasting is possible when the same initial conditions can be realized recurrently (e.g., experiments on chemical interactions), it does not work very well in social science contexts (e.g., studies of venture emergence) where purposeful behaviors of an actor create data germane to the purposes of other actors (Hempel & Oppenheim, 1965; Rosenthal & Rosnow, 1991: 21). In explaining essentialism, *The poverty* illustrates the logic of a classical problem of philosophy.

The Problem of Universals

A universal is an underlying pattern or class in which many objects participate despite their novelty. The concept of universals likely began with the pre-Socratic philosopher Heraclitus, an originator of epistemological inquiry into the underlying nature of phenomena. Plato later elaborated the concept in a theory of ideas in books VI and VII of the *Republic*. Plato's theory held that all imperfect human perceptions of a given object reflect its imperceptible and perfect form. For instance, many people can observe imperfect examples of circles and any particular circle is imperfect in some way. Yet, the same people understand the essential ideal of a perfect circle, despite never having observed one. The universal is the essential idea of a circle and particulars are the observable examples. Another illustration is that nouns such as skyscraper, lake, or city; adjectives such as tall, big, or cold; and verbs such as build, swim, or reside all indicate universals (Russell, 1959: 93-94). By contrast, proper nouns indicate particulars that imperfectly reflect such universals, as with Sears Tower (skyscraper; tall; build), Lake Michigan (lake; big; swim), and Chicago (city; cold; reside). Conditional exemplars participate in the unconditional essence of universals. Defining the relation between universal and particular is the problem of universals. It is germane to empirical research because it concerns our knowledge of the external world. Indeed, almost any meaningful statement must include universal and particular elements. The problem can emerge in research settings, as theoretic models and empirical conditions are universal and particular, respectively.

The essential nature of some social science constructs invites the problem of universals. For instance, the human trait of creativity is observable through many different human behaviors; each behavioral exemplar is an imperfect instance of the construct of creativity. The ideal concept of creativity encompasses all the cases despite their idiosyncratic differences in expression and form. What the cases have in common constitutes what is essential to the creativity construct. The problem emerges when researchers reify the essence and regard it as objectively preceding the action. In empirical research, tacitly regarding the essence of creativity as a driver of regularity treats irregular but meaningful behaviors as accidental. This is precisely when essentialism leads to historicism: use of the universal as a forecaster of future cases despite merely circumstantial lawfulness. Essentialism thus drives subjectivity about the universal, which begins to join the data. A tautology occurs because the data become part of the theory.

Prophecy and Prediction

Examinations of essentialism and the problem of universals lead to the threat of circular reasoning in empirical research. Munz (2004: 28) describes the threat in terms of theory driving selection of only certain data and discounting other data. The bias then favors evidence of the theory in question within and across studies, which casts reliability as if it were validity. The self-reference occurs because expectations predetermine lawful variable interrelations as well as the initial conditions. Counterevidence seems accidental instead of serving as a means for adjustment or refutation. *The poverty* regards such expectations as prophecies because they are unconditional and based on trends instead of laws.

Prophecies can derive from only a few cases and apply to many cases. Unlike predictions, they disallow critical discussion and encourage facile slogans (e.g., "past behavior is the best

predictor of future behavior”) because findings are neither scalable nor easily refutable. Prophecies describe dynamic events based on absolute trends instead of tentative laws. They are unconditional with respect to future outcomes because they do not specify relevant variables, interrelationships, or boundaries. Perhaps the first example is in Plato’s *Republic*, which describes societal evolution in the Hellenic context as the rule of kings moving into oligarchy, next into democracy, and finally into tyranny. Expansion of the Roman Empire is another observed trend that has facilitated prophecy among social scientists: indigenous tribal chiefs became feudal lords; feudal kingdoms of the late middle ages evolved into national monarchies, which led to bourgeois and capitalist societies (White, 1973). One example related to economics is Marx’s (1867) *Das kapital*, which explains the evolution of dynamic social systems as beginning in primitive communism, which evolves into feudalism, and then turns into capitalism before achieving socialism. As I will show later, entrepreneurship research applies a similar small-scale logic to dynamic circumstances (with the same error) in the form of entrepreneurial process models.

The poverty holds that prediction is more appropriate than prophecy for theory development based on evidence because its logic is deductive. Unlike prophecies, predictions are provisional because they acknowledge initial conditions and then use them to qualify or refute laws governing the phenomena of interest. Unfortunately, however, many social science problem situations feature trends that are more amenable to prophecies. To clarify the difference, *The poverty* explains the logic of prediction in taxonomic form.

Prediction Taxonomy

Popper (1957: 36) asks, “If it is possible for astronomy to predict eclipses, why should it not be possible for sociology to predict revolutions?” The rhetoric illustrates the difference between predictions (based on initial conditions and laws) and prophecies (based on unconditional trends). Social science research moves away from prediction and toward prophecy when theoretic constructs lend themselves to the essentialist approach of historicism. In this section, I distinguish prediction from prophecy.

Designing empirical social science studies for prediction bolsters theory development because studies yield findings that are cumulative when predictions are formulated in alignment with characteristics of the data. *The poverty* explains that predictions vary meaningfully in terms of time, scope, and function. These three categories subsume six prediction types. The temporal category includes long-term and short-term types. The scope category includes large-scale and small-scale types. The functional category includes prophetic and technological types. Let us briefly explore each prediction category.

Temporal. A prediction can be long-term or short-term with respect to the time that passes before arrival of the expected outcome. *The poverty* classifies predictions that extend over periods of months or years as long-term. Such prediction is possible when initial conditions are known and the relevant laws do not change materially. These predictions apply to outcomes such as solar eclipses and planetary motion, which are routine in cosmology and astronomy, even though the predicted phenomena are complex. Most oceanic, tidal, or astronomical studies also provide examples of such instances. Predictions of the positions of planets can reach as far as 20

years into the future with precision (*Planetary and lunar coordinates*, 2003). Such predictions are not possible in social science settings because capturing the full set of initial conditions is not empirically feasible. Moreover, the relevant laws usually derive from stereotypical assumptions about the essence of a construct or a whole population, not the dynamic reality of particular circumstances.

Short-term predictions of phenomena not only span a shorter period than long-term ones, they also pertain to outcomes that are less complex. *The poverty* classifies predictions that extend over days, hours, or minutes as short-term. For example, physical science research entailing laboratory work involving the behavior of sound or light engages in short-term prediction. Because this kind of prediction confines itself to brief periods, empirical studies that make short-term predictions tend to examine specific outcomes and tolerate only small amounts of extraneous variance from factors outside the theoretic model.

Scope. A prediction can be large-scale or small-scale with respect to the scope of the events germane to the prediction. Large-scale prediction concerns study outcomes of considerable range and impact. The methods tend to be statistical owing to complexity of content. *The poverty* explains that such events are predictable via long-term prediction if, and only if, the laws governing relationships among elements are not highly tentative. For example, using research methods identical to those of contemporary social science, studies can predict sunspot activity and its effect on climate across annual periodic cycles (Ramesh, 2000). Such research can also predict ionization in the atmosphere and its effects on wireless communication (DeVorkin, 2002). If an event is well defined and inconsequential to an extended nomological network, then its prediction is small-scale. An example of small-scale prediction is performance of a human subject on a memory recall task. Large-scale predictions are different in that predicted events are not so well defined.

Functional. The functional category includes the prophetic and technological prediction types and concerns the practical use of research findings. Prophetic prediction refers to predicted events that will happen entirely autonomously. Such predictions are different from the prophecies described above, despite the similar name. Rather than being based on a trend like a prophecy, these predictions are *prophetic* in that they anticipate events that are wholly independent of the researchers. In other words, no one could effect or prevent the event by manipulating antecedents or covariates, even if they understood the initial conditions and lawful interrelations very well. Most studies in the areas of meteorology and astronomy offer examples of prophetic prediction. By contrast, *The poverty* explains that technological prediction entails factors and models that form the bases for most types of engineering activity. In these contexts, a researcher is able to preempt the structures and mechanisms that lead to the outcome of interest. As a result, researchers can take certain options for different kinds of results. Much of physics and chemistry research provides examples of technological prediction. If it is possible to minimize certain classes of variance, or isolate, control, and analyze variables systematically and reliably, technological prediction is feasible.

Conceptualizing the categories and types of prediction in relation to the difference between observational field study and controlled experiment helps clarify the taxonomy of prediction. The prophetic and technological types coincide with the same difference, as do the

large-scale and small-scale prediction types. The distinction balances nature and error with the artificial and manipulation. It is germane to modern empirical methods. For instance, Cook and Campbell (1979: 297) examine the distinction in terms of predictive versus structural regression, with a similar emphasis on the need to design research with respect to the empirical nature of the data.

A multi-category multi-type prediction taxonomy matrix offers a more systematic consideration. Table 1 elucidates the taxonomy of prediction by relating its elements to one another in terms of practical congruence in empirical study contexts. In the context of a single study design, practical congruence is the degree to which an effort to achieve one type of prediction does not hinder an effort to achieve another type of prediction. It can range from low to medium to high. For instance, the small-scale and short-term types are highly congruent in the context of a single prediction, as when predicting a human subject's reaction time to varying kinds of visual cues in human factors psychology research. Large-scale predictions are more amenable to long-term prediction. The practical congruence of the functional category and the temporal category is moderate overall. To illustrate, technological prediction can be long-term (e.g., the lifetime of an engine) or short-term (e.g., physics laboratory experiments). Prophetic prediction can also be long-term (e.g., the return of Halley's Comet) or short-term (e.g., tomorrow's weather conditions).

 Insert Table 1 about here

On the Prediction of Entrepreneurial Discoveries

Theory-driven predictions vary in their assumptions about the data, and if these assumptions are misplaced, it can mitigate a study's contribution. According to *The poverty*, social science research contributes to theory development most effectively when it formulates predictions that not only fit the empirical nature of the data but also maximize practical congruence among prediction categories. Similar to entrepreneurship's borrowing of theoretic content directly from other areas, it is also important not to borrow research designs. Instead, entrepreneurship studies should be crafted to fit the peculiar nature of the entrepreneurship data (Carragher, Carragher, & Whitely, 2003). Most of the peculiarities of entrepreneurship data stem from the nature of opportunities (Shane & Venkataraman, 2000).

As data are theory laden, predictions must follow from theory while taking the nature of the data into account (Cook & Campbell, 1979, p. 24). One way to promote robust linkages between theory and method is careful formulation of predictions in light of the taxonomy in the preceding section. If not carefully formulated in light of such considerations, predictions can admit historicist aspects into the research. Thus, entrepreneurship researchers should consider formal prediction taxonomy when designing studies. Here I offer some basic considerations.

Short-term and long-term. Short-term prediction of most entrepreneurial phenomena seems impracticable. Moreover, forecasting outcomes over timeframes less than a few days seems irrelevant because entrepreneurship takes significant lengths of time to run its course.

Even an entrepreneurial failure can take years to play out (Hills, Lumpkin, & Singh, 1997). As well, research seeking short-term prediction only tolerates minute degrees of error, but entrepreneurship data are complex and dynamic. Small-scale prediction is possible when composite factors are identified and their interrelations are understood, yet the idiosyncrasy of entrepreneurial opportunities does not lend itself to such understanding. Long-term prediction of entrepreneurial discovery would thus have to be large-scale.

Large-scale and small-scale. Large-scale prediction of entrepreneurial discovery is not wholly appropriate because discovery events are small-scale by nature. A discovery is a specific event that may not be searchable (Kirzner, 1979). A discovery can develop and give rise to ancillary events that are wide reaching, but the initial phenomenon itself is relatively small-scale. An entrepreneurship research effort entailing long-term, small-scale prediction might predict the emergence of an entrepreneurial opportunity in two months. However, for reasons illustrated above, such predictions always entail the random possibility that eventual outcomes will differ categorically from predicted outcomes.

Prophetic and technological. Entrepreneurship research that assumes technological prediction seems implausible because the complexity, dynamism, and holism of discovery events vis-à-vis the requirements of analysis, isolation, and control forbid the required analysis. Yet, the high failure rate of entrepreneurial ideas and ventures, even ones developed and controlled by the most highly experienced entrepreneurs, goes against prophetic prediction (Aldrich & Martinez, 2001; McGrath, 1999).

In terms of *The poverty's* prediction taxonomy, research intending to predict entrepreneurial discoveries would be (a) more *long-term*, because the phenomenon has high error, and short-term prediction handles details and only low amounts of error. The prediction would also be (b) more *small-scale*, as opportunities are definite events, not vague ones as described by large-scale predictions. Finally, the prediction would likely be (c) more *prophetic*, as the analysis, isolation, and control of technological prediction is impracticable.

According to the foundations put forth in *The poverty*, as also reflected in Cook and Campbell (1979), empirical prediction of entrepreneurial discovery outcomes in traditional research is impossible. Of course, most entrepreneurship scholars would agree. However, the problem here is that the parametric statistical methods (regression, ANOVA, correlation) commonly used by those scholars are logically geared to achieve such prediction. When an outcome is the result of a fleeting constellation of dynamic forces, the balance observed at time of prediction will change compositionally before arrival of that outcome. Despite knowing all measurable business or economic elements, indicators, factors, and realities, and with evaluation by expert judgment, the possibility that the outcome will be at considerable variance with expectations remains large. *The poverty* contributes some strategies and orientations for empirical research to deal with this conundrum. Along similar lines, Cook and Campbell (1979: 297) describe a deductive forecasting method to which I will return later.

I have examined methodological issues addressed by *The poverty*. They included historicism, reliability and essentialism, the problem of universals, prediction and prophecy, and

the taxonomy of prediction. Now I narrow the examination to focus on contemporary challenges in entrepreneurship research that stem from these issues.

Entrepreneurship Research Challenges

The knowledge possessed by entrepreneurs usually has the character of expectations about the future, which gives studies of entrepreneurial activity a longitudinal nature (Hayek, 1948; Popper, 1990: 32). As entrepreneurial cases evolve over time, they follow a corridor principle in which opportunities lead to ancillary ones (Ronstadt, 1988). Because of this evolutionary nature, the data are hostile to static research approaches (Eckhardt & Shane, 2003). The specific challenges emerge in the form of unobservable effects and unsystematic trends (Jacobson, 1990).

Unobservable Effects

Untraceable but important factors impinge on entrepreneurial events more frequently than events studied in other research areas because of entrepreneurial action's future orientation. As the events of interest have not happened yet, and will be unlike outcomes that have happened before, entrepreneurs utilize second-order probability distributions for sensemaking amidst the uncertainty (Yates, 2000). The outcomes are patently speculative. Research efforts, accordingly, must target proxies for the outcomes (Sarasvathy, 2003). Some examples of proxies include prior or episodic knowledge (Shane, 2001), alertness (Kirzner, 1973; 1997), related past experience (Shane, 2000), information acquisition (Glazer, 1991), skill-based education (Aronsson, 2004), personality type (Gaglio & Katz, 2001) and entrepreneurial orientation (Lumpkin & Dess, 1996).

These unobservable factors are critical to entrepreneurship because their effects lead to future venture assembly, growth, and opportunity recognition (Alvarez & Barney, 2005; Gaglio, 1997; Glazer, 1991). However, variance attributable to them can derive from outside the sample space because of entrepreneurial action's dynamic nature (Jacobson, 1990). They are difficult to proxy in conventional ways and can emerge after the time of prediction but before the arrival of the predicted outcome (Griliches, 1974). Therefore, the effects are unsystematic, which renders an essentialist approach ineffective for extracting error from variance associated with them.

Unsystematic Effects

The factors contributing to an opportunity do not yield the same effects over time because the laws governing them evolve (Carroll & Mosakowski, 1987). As such, accident and error are as central to entrepreneurial outcomes as purpose and reliability. Research in other areas places boundaries around accident and error based on the reliability of measurement scales with multiple items. Opportunities are too idiosyncratic for such methods. From the perspective of the problem of universals, they are particular constructs that are not amenable to essentialism. I posit that, because of the central role of unsystematic effects, the development of acceptably reliable measurement scales is very unlikely in entrepreneurship. Such scales require an empirical reliability in order to achieve validity that is not compatible with entrepreneurial events.

The poverty explains such challenges as arising from novel, complex, and dynamic data. I now consider these data and challenges in the context of entrepreneurial discovery.

Conceptualizing Entrepreneurial Discovery

Even if variance stems from unobservable and unsystematic effects, it does not preclude a study from using it as evidence to test a theory. It is perfectly possible to hypothesize certain outcomes under certain conditions. However, for purposes of theory development, these effects do rule out methods designed to delineate regularities because the growth of knowledge influences itself. It is impossible to achieve reliable prediction of a phenomenon (entrepreneurial discovery) using data (episodic knowledge) that are not reliable themselves. Models of the entrepreneurial process are thus specious if they do not explicitly account for novelty, complexity, and dynamism.

Every opportunity consists of a novel combination of elements that are also novel. Such compounded novelty frustrates Schumpeter's (1971) traditional view of entrepreneurial events as novel combinations of existing elements that are not novel. With this view, the same technologies, production processes, or markets are situated differently to create a new opportunity. That the elements already exist creates a foundation for predicting outcomes statistically based on large samples. Yet, this approach assumes the matter of study is not intrinsically new. I posit that an extension of that traditional view, which acknowledges that opportunities can be inherently novel, requires different kinds of methods. In the extended view, analysis of one opportunity can detect what brought it about and delineate its own unique set of causes and effects. That constellation of factors account for that opportunity alone and may never again emerge in concomitance. Such novelty renders the traditional analysis of large samples misguided, because that approach ignores the very newness that makes each case a valuable opportunity. This novelty is part of what makes entrepreneurship data peculiar. As Murphy and Marvel (2007) show, Figure 1 is useful for illustrating the notion.

 Insert Figure 1 about here

Figure 1 is a stylized conceptualization of an entrepreneurial discovery. It is not a process model (e.g., Ardichvili, Cardozo, & Ray, 2003). Instead, it reflects the logic of converging factors (Drucker, 1985: 111). These factors can be new themselves (e.g., new technologies, private information) and define an opportunity as inherently novel. The center of the construct is the nexus, n , of a convergence of four elements (x , y , p , & q). Absent any factor, n no longer exists in the same way. The convergence of two factors (x and y or p and q) constitutes a unique area such as a or b , whereas that of three factors (x , y , and q) constitutes another unique area, such as c . The elements can reflect any level of analysis. The model is not limited by those levels; the opportunity is the unit of analysis because an individual or firm cannot bear all the relevant factors, such as required knowledge (Low & Macmillan, 1988). Moreover, studies of entrepreneurial discovery are interested in explaining n , rather than the individuals or firms participating in an opportunity. The model helps studies engage empirical problems stemming from unobserved and unsystematic variance.

A Logic for Unobserved Effects

Consideration of a , b , and c in Figure 1 gives a sense of the complexity of unobserved effects on n . Research approaches emphasizing people or firms would find these elements empirically complementary because of asymmetry across levels of analysis (Sarasvathy, 2003). Thus, in the illustration, those studies could only capture a small part of the event and are limited to describing small features. For instance, observing two factors in one design allows examination of what is defined by those factors alone (a or b). Which factors are operationalized depends on what the theoretic lens allows. Following the same logic, studies able to incorporate three factors can approximate n more closely (c is a better approximation than a or b). Yet, only studies incorporating all four factors effectively address n . This empirical requirement is a considerable one for studies emphasizing individuals and environments. After all, individual-level factors (alertness) do not covary directly with system-level ones (market saturation, alliances), but they do follow from other individual-level ones (skills, education).

The complexity is far greater than a stylized illustration allows, to be sure, but the logic is clear. Additional unsystematic effects emerge because elements unobserved by the research design will influence the outcome. The observed variance is thus unsystematic. What *The poverty* refers to as historicist methods, and what I am referring to here as traditional methods, are inappropriate. Those methods use static models to analyze evolving forces. Because of the nature of the data, these approaches lead to an infinite regress into additional empirical factors without commensurate increases in reliability or validity.

It is worth noting here that theoretic models are depictions; they are not supposed to incorporate all of the factors germane to the phenomenon they intend to explain. It may seem that unobserved effects are not an issue, therefore, because researchers frequently explain complex outcomes based on incomplete observations. However, entrepreneurship research faces a different kind of challenge. The factors that traditional research discounts are accidental, but because of the centrality of errors and accidents to an entrepreneurial discovery, unsystematic effects confound true score variance even when discounted.

A Logic for Unsystematic Effects

Unsystematic effects frustrate entrepreneurship research because the rules governing phenomena of interest are not standard. Despite the lawfulness of observed data and the lawfulness of a theoretic model, the application of methods assuming lawfulness creates unlawfulness. Here I can use a mathematical argument derived from Miller (1975) to illustrate how unsystematic effects can frustrate an analytical approach that seeks recurring regularities. As illustrated by Popper (1979: 373), the argument shows that, between two theoretic models of a phenomenon, the model regarded as demonstrably more valid based on an analytic approach may in fact yield poorer metrical approximations based on a holistic approach.

Analytic research seeking recurring regularities can easily produce misguided findings about entrepreneurial discovery when it mistakes reliability for accuracy. As Murphy and Marvel (2007) delineate, Proof 1 is another way to convey the stylized illustration of

entrepreneurial discovery in Figure 1. Let n represent the same entrepreneurial discovery nexus, and let x , y , p , and q represent the same convergent elements. Let us say, for purposes of illustration, that the equations in the proof reflect laws that govern how the convergent elements relate to one another as underpinnings of the emergent phenomenon n .

$$\left. \begin{array}{l} \text{(a) } x = q - 2p \\ \quad y = 2q - 3p \\ \\ \text{(b) } p = y - 2x \\ \quad q = 2y - 3x \end{array} \right\} n \quad (1)$$

As in Figure 1, the functional form of n holds if, and only if, factors x , y , p , and q are present and interact based on the given laws. Let the values of $x = 0$, $y = 1$, $p = 1$, and $q = 2$. All four equations are solvable by these values. The two equations in subset (a) combine to yield $x + y = 3q - 5p$ and the two in (b) combine to yield $p + q = 3y - 5x$, which are both also solvable by the same values. Removing any factor renders the proof unsolvable and substitution shows subsets (a) and (b) to be mutually deducible, as

$$\begin{aligned} x &= q - 2p \\ x &= q - 2(y - 2x) \\ x &= q - 2y + 4x \\ x &= (2y - 3x) - 2y + 4x \\ x &= x \end{aligned}$$

and

$$\begin{aligned} y &= 2q - 3p \\ y &= 2(2y - 3x) - 3p \\ y &= 4y - 6x - 3(y - 2x) \\ y &= 4y - 6x - 3y + 6x \\ y &= y \end{aligned}$$

The same solutions apply to p and q as they entail the same function. The proof idealizes phenomenon n holistically as long as all four factors are included. Absent any given factor, the proof requires an imaginary solution analogous to areas a , b or c in Figure 1. Thus, similar to the convergence of factors in an entrepreneurial discovery, n emerges only when all factors are present based on the laws of the equations in the proof.

Consider a research effort seeking to explain n . The researchers are interested in knowing the values of the convergent factors. As explained in the preceding section, such efforts capture subsets of the factors because of the limitations of research design. Let us say that studies can observe x and y in subset (a) but that p and q in subset (b) are unobservable. Based on observation, this research effort concludes that $x = .10$ and $y = 1.0$. Owing to their observations of the laws of the phenomenon, say the research effort can infer $p = .80$ and $q = 1.70$ and, by extension, offer a model of n . The researchers acknowledge that their conclusion derives from incomplete observations of n (because p and q are unobservable). They do not

know the degree to which their inferred values reflect the actual values. Yet, the results show recurring regularity. A precedent of inquiry is set. Other efforts from the same perspective, measuring the same factors, begin produce similar findings. As noted in Murphy and Marvel (2007), I call this movement RE_1 .

Now consider another research effort (RE_2) that proposes different values of $x = .15$ and $y = 1.225$. Initially RE_2 appears less valid than RE_1 because its values are further from the consensus of the existing research. It also appears less valid to us (not the researchers in the example) because it is further from the actual values. However, if the researchers could observe the whole phenomenon n and know the actual values, they would realize a surprising result: RE_2 yields $p = .925$ and $q = 2.0$. This finding of RE_2 is indeed more valid than that of RE_1 , which yields $p = .80$ and $q = 1.70$. Moreover, RE_2 is a better approximation of the phenomenon n overall, with an total deviation of .45 from the true values versus a deviation of .60 for RE_1 .

What Proof 1 shows, on logical grounds, is how unobserved and unsystematic effects influence empirical research on novel, complex, and dynamic data. Again, despite the lawfulness of observed data, and despite the lawfulness of theoretic models, entrepreneurial discovery research faces a similar challenge. Cook and Campbell (1979: 296-297) make the same point in a discussion on issues associated with inferring causality from passive observation when researching dynamic events (Wold, 1956).

Implications for Entrepreneurship Research

Having concluded my examination of concepts and application to entrepreneurship research, I now conclude with five implications. These implications, which are not exhaustive, derive from my examination of *The poverty* and review of current entrepreneurial discovery theory. Each implication could be useful for promoting a distinct entrepreneurship research paradigm that is defensible and robust.

Predicting Failure

Almost all research in the domain of business studies is designed to predict success. In entrepreneurship, especially when studying opportunities, success is exceptional. Erroneous discoveries, in many forms, are more common than successful ones. My examination illustrates that the underpinnings of entrepreneurial discovery are volatile in an empirical study contexts. Yet, like other business research, most entrepreneurship studies seek to predict success outcomes. Indeed, using parametric methods such as multiple regression and MANOVA, studies seek to delineate prediction functions that define successful cases (Tukey, 1954). However, as actual entrepreneurial discoveries are novel affairs outside the middle-range of frequency distributions, conventional prediction functions are hard-pressed. Here I argue for the positive value of a deductive approach seeking recurring regularities in failure outcomes, and not just in success outcomes.

In research, theories that attempt to be more precise than the problem situation requires usually only reduce clarity. This effect in entrepreneurship derives from the inductive logic of popular methods (Eckhardt & Shane, 2003). I posit that a deductive orientation that excludes

possible outcomes and intends to predict failure would add unique value. Because failure is not the outcome of highest interest, I will call this approach forecasting, not prediction. Though forecasting failure does not always provide the most interesting story, large-scale research that delineates failure in entrepreneurship is more logically suitable for theory building because it is likely that its underpinnings are more reliable than the underpinnings of success. Case study and small sample research is perfectly suitable for analyzing fascinating success stories in detail. Yet, when it comes to the development of theory, a broader approach must include a wider range of realistic outcomes. Such research embraces what Cook and Campbell (1979: 297) refer to as forecasting, which they also distinguish from prediction. It is worth noting that this implication also reflects Popper's (1959, p. 40-43) doctrine of falsifiability.

Implication 1. Empirical research cannot predict entrepreneurial success outcomes. However, large sample empirical research can identify the possibility of certain outcomes that are certain to fail and forecast those events to help narrow the range of potential outcomes and add heuristic value.

Distinctive Theory

As long as large-scale entrepreneurship research continues to emphasize individuals or firms as the empirical units of analysis, logical and empirical puzzles will continue to frustrate it. Although entrepreneurial activity by individuals is purposeful, performance is not always a matter of deliberate learning because the actions of other actors are unpredictable and they become data. Therefore, from the point of view of an individual entrepreneur or firm, amassing more knowledge does not update a probability distribution with respect to success (Yates, 2000). Instead, knowledge comes from multiple angles and sources. It converges around opportunities in ways that transcend entrepreneurs and firms.

Serendipity, an alternative to the assumption that entrepreneurs search for opportunities, is a misapplied logic as well. To be sure, entrepreneurial discovery includes anticipation of something unexpected - entrepreneurs expect to be surprised. Thus, as reflected in Figure 1 and Proof 1, explaining variance from the standpoint of an opportunity can help evade volatile variance based on individuals who are aware of self and others. Such considerations derive from contributions such as Hempel and Oppenheim (1965), who describe the nature of empirical outcomes when data are unobserved and unsystematic.

Calls persist for more distinctive entrepreneurship theory (Phan, 2004). The development of more such theory entails variables and boundaries unique to entrepreneurship and not present in other areas of research. Current research in the field tends to import theory and concepts from other areas, which usually emphasizes firms and individuals instead of opportunities (Shane & Venkataraman, 2000). Because research from other areas was not originally designed to study entrepreneurial phenomena, traditional concepts from such areas may not offer new heuristic value for theory development.

Implication 2. Neither systematic search nor serendipity account for entrepreneurial discovery and both mechanisms reflect the purview of purposeful actors, which are problematic as units of analysis in large-sample research and theory development. The

focus of entrepreneurship research should shift toward developing an opportunity construct and explaining variance in opportunities.

Novel Arrangements of Factors

Inherently novel events occur in market-based economic systems. These events may include product innovations, technological advancements, buyer demands, and new means of production. These events go beyond mere novelty of arrangement or “carrying out new combinations” of existing factors (Schumpeter, 1934). The kinds of inherently new arrangements that constitute entrepreneurial discoveries yield emergent properties that are not derivable from historic descriptions of previous circumstances. Thus, research must focus on the particular and accidental aspects of entrepreneurial opportunities rather than searching for recurring regularities.

Implication 3. The convergence of factors in an entrepreneurial discovery can be inherently novel and more than just a rearrangement of already-existing factors that are also novel. Thus, the phenomenon is not amenable to research that seeks reliability.

Non-parametric Statistics and Case Studies

The two basic types of inferential statistical analysis procedures are the parametric and non-parametric. The former are amenable to research depending upon reliability and are of relevance to theories with equilibrium assumptions (Hardle, 1994: 8). They utilize a functional form based on model parameters to explain empirical observations. As a functional form will not define every observation, assumptions of reliability and population distributions serve to provide inferential power. On the other hand, operationalizing data differently and utilizing nonparametric analyses has shown to increase validity in empirical studies of entrepreneurial ventures (Robinson & McDougall, 1998).

Nonparametric statistics do not carry as many assumptions as parametric ones (Siegel & Castellan, 1988: 3). They rely on sample-specific multinomial distributions rather than population-derived univariate or multivariate normal distributions. Non-parametric analyses produce likelihood ratios from logarithmic transformations that forecast outcomes. Publications are available to help make nonparametric statistical techniques such as multiway frequency and chi-square analyses and logistic regression straightforward. For example, Tabachnik and Fidell (1996) present several nonparametric analysis techniques. Hardle (1994) explains the logic of applied nonparametric regression models and contrasts them with parametric approaches. DeMaris (1992) and Menard (1995) provide introductions to logit modeling and logistic regression for binary, nominal, and ordinal outcomes. Garner, Mulvey, and Shaw (1995) discuss nonlinear regression models and frequencies. Liao (1994) illustrates nonlinear regression models for use with discrete outcomes. Long (1997) and Greene (1997) explain different kinds of nonlinear regression models. Siegel and Castellan (1988) describe nonparametric techniques as the most suitable methods for behavioral science research and explain them in terms familiar to researchers who do not consult statistics publications regularly. Finally, statistical software to conduct nonparametric analyses is available in packages such as SPSS, STATA, and SAS with additional information in the user’s guides.

Implication 4. As entrepreneurial discovery does not derive from reliable factors, parametric analysis assumptions about reliable population-based characteristics are not as appropriate as nonparametric analyses.

Research Orientation

The foregoing implications based on principles in *The poverty* suggest a major change in the orientation of entrepreneurship research. A paradigm shift goes to the ontological level of constructs and shifts basic assumptions and research questions. To be sure, if the style of the research is going to change in entrepreneurship, then the nature of the research questions must also change. The research questions compatible with the orientation reflected in this article come in forms similar to, “how do opportunities behave?” or “how do opportunities change in the presence of other factors?” By contrast, the paradigm reflected in this article does not reflect traditional kinds of research questions, which come in forms similar to, “what is the essential process of entrepreneurial discovery?” or “who or what type of person or firm recognizes opportunities?”

An entrepreneurship paradigm shift is a large event with respect to inertia and tradition. Along these lines, it is worth noting that historicist doctrines have an emotional element that resists change (Popper, 1957: 159). Its assumptions are primitive. As noted in the introduction, they underlie closed social systems on large and small scales. More modern and mild forms of historicism, such as essentialist research, effectively obscure the same assumptions. The assumptions are perhaps best appreciable in the feeling of intellectual security a theoretic doctrine can provide to scholars, who would otherwise have to engage knotty conceptual problems of change and uncertainty.

Implication 5. Entrepreneurship research should orient itself away from delineating composite factors comprising the essence of an entrepreneurial discovery. Instead, it should orient itself more toward delineating the factor constellations likely to accompany it and the ones that are liable to prevent it.

Conclusion

The entrepreneurship area has enjoyed a long tradition of theorizing about the nature of its distinct phenomena (Bygrave & Hofer, 1991). What is missing from this tradition is a contribution from the area of management history. This paper fills that gap by drawing from an established historic store of knowledge outside current discourses to generate present value. I conclude by positioning Popper’s (1957) essay with respect to other historic contributions and some contemporary entrepreneurship research. Other historic work that is significant and reflects a similar logic includes Baldwin (1887), Morgan (1903), and Jennings (1935). Morgan’s (1923) concept of “emergent evolution” and Popper’s (1973; 1979: 67) and Campbell’s (1974) “evolutionary epistemology” reflect similar ideas. All these works emphasize a holistic (not reductionist or atomist) approach to the empirical study of dynamic events. They seek to retain accidental aspects of complex systems and eschew reductionism and analysis. They are amenable to the notion of treating episodic knowledge and opportunities as objective elements.

History scholars who read this journal will find value in these contributions for what they offer to the present. Entrepreneurship scholars will also do well to conduct their own inquiries into these rigorous primary sources with respect to the logic (not content) of their approaches as the entrepreneurship field continues to define itself.

Contemporary examples of entrepreneurship research and theory reflecting the methodological orientation in this paper include Bhave (1994), Fiet (1996; 2002), Robinson and Hofer (1997), Shane (2000), Shane and Venkataraman (2000), Eckhardt and Shane (2003), Murphy and Marvel (2007). Some of these studies appear in influential scholarly journals and are among most highly cited publications in the area. This research is promising with regard to the distinct theoretic development. Its primary focus is on the emergence and existence of entrepreneurial opportunities.

Another historic body of scholarly work, which is somewhat opposite in orientation, includes the older and revered concepts from Descartes (1642), Hume (1739), Locke (1690), Berkeley (1710), and Reid (1764). These contributions are part of the foundation of modern empirical methodologies that seek to explain variance in phenomena via analysis and control of particular and accidental components (Popper, 1979: 68). This style of research engages in what *The poverty* refers to as the essentialist or historicist approach. Contemporary entrepreneurship research reflecting this approach includes most empirical studies that seek to detect an essential type of person or firm and associate it with certain outcomes based on large samples.

Future entrepreneurship research taking stock of the implications in this article will be of a different character than current research in the area. For instance, it may not always seek to predict outcomes. As entrepreneurs are purposeful and self-aware and their discoveries are inherently novel, the operationalizations in such research easily mix data and error. I would qualify this characterization by restating that studies on entrepreneurs and firms are interesting and valuable. They provide educational acquaintance with the act of entrepreneurship. However, as a means to build theory, those forms of study have led to major challenges in the area that invite powerful criticisms of the area's legitimacy (Phan, 2004). An alternative approach that acknowledges the five implications in this article will help meet some of these challenges and respond to such criticisms. The paradigm underlies a different sort of empirical research that rules out certain outcomes and utilizes statistical models that forecast rather than predict. It is unlike the current majority practice of identifying a range of possible outcomes with a definite distribution to achieve prediction. On these grounds, with bolder theorizing, entrepreneurship holds enormous promise as a distinct area of research.

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Table 1
Practical Congruence among Categories and Types of Prediction

		Time		Scope		Function	
		Short-term	Long-term	Small-scale	Large-scale	Prophetic	Technological
Time	Short-term	x					
	Long-term	x	x				
Scope	Small-scale	high	low	x			
	Large-scale	low	high	x	x		
Function	Prophetic	moderate	moderate	low	high	x	
	Technological	moderate	moderate	high	low	x	x

Figure 1
Entrepreneurial Discovery Convergence of Episodic Knowledge Elements

