

# **FIELD-DEPENDENCE AND INDEPENDENCE: DOES AN OLD THEORY HOLD PROMISE FOR ENTREPRENEURSHIP?**

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## **ABSTRACT**

*This paper examines the phenomenon of opportunity identification within entrepreneurship and outlines significant gaps remaining in understanding why some entrepreneurs are able to accurately and quickly identify entrepreneurial opportunities while others cannot. Extant cognition research and its role in opportunity recognition was examined and found to be insufficient in explaining the entrepreneurship opportunity identification phenomenon. Older research into field-dependence and independence (FDI) was examined within the context of opportunity identification and the following propositions are advanced: (1) FDI offers a robust and valid testing instrument in the form of the embedded figures test to measure this cognitive dimension, (2) understanding an individual's measure of field-dependence and field-independence can offer expanded insights into opportunity identification and subsequent failures to identify opportunities and offer insights into ways potential entrepreneurs might deliberately exercise or moderate either cognitive style through learning and deliberate practice.*

## **INTRODUCTION**

Modern entrepreneurship education dating from its beginnings with Myles Mace's *Management of New Enterprises* class at Harvard and Peter Drucker's initial *Entrepreneurship* classes in 1953 at New York University was firmly rooted in the management discipline and reflected its focus. Early entrepreneurship texts similarly focused on the management of new businesses (Drucker, 1985; Mintzberg, 1989; Pinchot, 1985). It was not until Venkataraman (1997) proposed that the study of opportunities offered a better understanding of the entrepreneurship phenomenon that much entrepreneurship research began to extend far beyond the field of management. In the ensuing 21 years since Venkataraman's proposition, much has been learned from the field of psychology about unique cognitive traits possessed by those seeking to establish entrepreneurial ventures, but significant gaps remain, particularly surrounding questions about how entrepreneurial opportunities are first identified and evaluated. We propose that this lack of understanding directly impacts both the practice of entrepreneurship through missed opportunities and less effective formal entrepreneurship educational programs. This view was shared in a Kauffman report (Ewing Marion Kauffman Foundation, 2015, p. 10) that concluded: "*The explosion of entrepreneurship education on college campuses may not have had much impact on actual business creation.*" This is especially troubling when McIntyre and Roche (1999, p. 33) defined entrepreneurship education as "the process of providing individuals with the concepts and skills to recognize opportunities that others have overlooked, and to have the insight and self-esteem to act where others have hesitated."

Following Shane and Venkataraman's subsequent (2000) call for an acceptable conceptual framework for the discipline, several sub-disciplines have emerged to provide insight into understanding the nature of entrepreneurial opportunities, how entrepreneurs are able to evaluate these opportunities, and how such opportunities are exploited as new business ventures. Eighteen years later, however, we still don't understand how some individuals are able to identify entrepreneurial opportunities while others are not or how some are able to become economic actors before others.

This work examines some early cognition research not previously applied to entrepreneurship (FDI) and proposes its usefulness in identifying cognitive tendencies of entrepreneurs as they seek to identify entrepreneurial opportunities existing within a larger universe of seemingly unrelated elements by extending the emerging field of entrepreneurial pattern recognition. Doing so will, we propose, narrow the gap that exists in understanding how entrepreneurs identify such opportunities and the degree to which they can be expected to rely on internal or external referents in the process. This is important since we know that not every idea is an economic opportunity and that significant economic and social costs are associated with identification errors in the form of missed entrepreneurial opportunities or failures associated with identification errors on the part of the entrepreneur. We propose that this is of significance to the practice of entrepreneurship and to entrepreneurship education.

## **ENTREPRENEURIAL OPPORTUNITY AND PERCEPTION**

Shane and Eckhardt (2005) expanded earlier definitions by Venkataraman (1997) and Shane and Venkataraman (2000, p. 165) to conclude that "entrepreneurial opportunities [are] situations in which new goods, services, raw materials, markets and organizing methods can be introduced through the formation of new means, ends, or means-ends relationships." Krueger (2005, p. 105) asserted that such opportunities are either "discovered" or "enacted," depending on one's personal epistemological orientation. Regardless of the genesis, entrepreneurial opportunities originate when the entrepreneur responds to multiple stimuli occurring within his or her own cognitive realm as a result of some change and cognitively arranges these different elements into perceptual patterns that can be identified as representing opportunity (Fail, 2011; Krueger, 2005). It is this ability to view a complex cognitive field of seemingly disordered elements and recognize certain ordered patterns of elements to represent opportunity and then to exploit it that separates the entrepreneur from the non-entrepreneur (Gaglio, 1997; Kirzner, 1921). In recent years, a stream of psychology-based entrepreneurial perception research centering on pattern recognition and attention has emerged that seeks to better understand this process (Baron, 2004, 2006; Matlin, 1994).

## **PATTERN RECOGNITION**

Krueger (2005) postulated that entrepreneurs employ a number of cognitive processes as they identify opportunities from within their environment. Baron (2004) noted that the area of cognition was currently central to entrepreneurship research and since that time, a sub-stream of pattern research has emerged to attempt to explain how entrepreneurs "connect the dots" to identify opportunities existing within complex environments. The author delineated two underlying propositions for pattern recognition in entrepreneurship: First, entrepreneurial opportunity patterns emerge from a field of complex technological, economic, political, demographic, and social

change (Baron, 2006). Second, recognizing such opportunity patterns depends on individual use of one's own cognitive frameworks, developed through life experiences. These frameworks are used as templates to allow the individual to make perceptual connections between otherwise seemingly unrelated events and change (Baron, 2006). Of several pattern recognition theories, two appear to best suggest how such opportunity patterns are recognized: prototype models and exemplar models.

### **Prototype Models**

Matlin (1994) noted that prototypes are cognitive structures holding "idealized examples" that serve multiple purposes: (1) to store category examples; (2) to store points of reference; (3) as a faster method for judging, once primed through cognitive mapping; (4) to store substitutes for names; and (5) as a repository of shared attributes (pp. 225-227). Prototype models posit that when new stimuli are encountered, these are then cognitively compared against existing collections (prototypes) stored in memory to determine where the new stimuli best fit. Such prototype models can be used to explain how new phenomena can be linked to seemingly unrelated events and trends in one's environment (Baron, 2006; Matlin, 1994).

### **Exemplar Models**

Exemplar models do not rely on prototypes but instead on existing knowledge already stored in memory. Newley encountered stimuli are compared for relevance against these knowledge components (Baron, 2006).

### **Joint Operation**

Cognitive research suggests that both prototype and exemplar models are involved in entrepreneurial opportunity pattern recognition (Nosofsky & Palmeri, 1998) with nascent entrepreneurs relying on prototypes until they gain knowledge and experience in a particular area and then relying more on exemplars in their recognition processes (Johnson & Mervis, 1997); a more automatic and less-taxing cognitive process (Baron, 2006).

While pattern recognition offers an explanation of the processes involved in identifying entrepreneurial opportunities, it offers little explanation of why some see such patterns and others don't or time response differences in recognition. We assert that research into field-dependence and field-independence offers some additional explanation.

## **ORIGINS OF FIELD-DEPENDENCE AND FIELD-INDEPENDENCE AS A THEORY**

Field-dependence theory is one of the earlier fields of work in the cognitive sciences. It dates back to 1948 and grew out of laboratory experiments by Herman Witkin and colleagues to examine how individuals could accurately and rapidly perceive the upright using three tests, the body-adjustment test (BAT), the rod-and-frame test (RFT), and the rotating-room test (RRT). It is based on two elements. First, the visual field is usually perceived as a structural form having a vertical and horizontal axis which correlates to these same directions in space. Second, gravitational pull, as perceived through our senses, likewise perceptually defines another vertical axis. Inasmuch as both the external fields and the gravitational pull are normally in the same direction, either one or both together provide sufficient reference (Witkin & Goodenough, 1981). Witkin and his associates separated these two elements experimentally in attempts to examine the basis for the perception of the upright. In the BAT, the research participant was placed in a small

room that could be tilted both clockwise and counterclockwise. In this room, the participant was seated in a chair that could likewise be tilted. When the room was tilted, some participants attempted to adjust their chairs to align with the tilted room and perceived the chair to be straight. Such participants utilized their external visual field as a point of reference. At the opposite end of a continuum, others aligned their bodies close to the gravitational upright, using their bodies as a point of reference. Most participants performed the experiments somewhere in between these extremes. In the RFT, the participant was seated in a darkened room except for a lighted and tilted square frame. A lighted rod was affixed to the center of the frame such that the participant could reposition the rod independent of the frame. Again, the participant could use the external field or body as a point of reference. In the RRT, the participant was seated in a chair that could be tilted. This chair was placed in a small room situated on a circular track such that the room could be rotated on the track, subjecting the participant to “outwardly-acting centrifugal pull and the downward pull of gravity” (p. 9). Again, participants consistently tended to use either the external visual field or their own bodies as a point of reference. Each of these laboratory tests was complex and cumbersome.

Additional research into whether or not perceptual orientation involved separation of an organized field which did not involve a perceived upright led to the development of the much simpler embedded figures test (EFT) in which the research participant is shown a simple graphic form and then required to locate this form embedded within a complex design that includes essential parts of the graphic form such that the participant is required to perceptually disassemble the complex pattern to reveal the simple form (Witkin & Goodenough, 1981). As a result of these cumulative studies, Witkin, et al. concluded that the same individuals that had difficulty isolating the embedded form also had problems differentiating on the earlier room and rod and frame tests. They thus concluded that those individuals were *field-dependent* while those that had little difficulty isolating the embedded figure or perceiving the upright based on their own self-reference were *field-independent* and that these cognitive styles were generalized (p. 16).

Two broad avenues of research ensued from this initial work. First, research investigated the relationship between “disembedding ability” in perception and its role in intelligence. Second, research investigated the role of disembedding ability and “structuring ability” (Witkin & Goodenough, 1981, p. 17). The first avenue was based on the understanding that isolating and extracting something from its complex whole is involved in many problem-solving tasks. Participants identified as field-dependent experienced more difficulty solving problems which required such identification and extraction. The second avenue was predicated on the belief that those that were more active, as field-independent, to break apart the organized field confronting them and to restructure it; might be similarly predisposed to operate on a problem field that is disorganized and impose structure on it. Witkin and his associates incorporated such “self-consistency” into their model, leading to a “theory of psychological differentiation” (Witkin & Goodenough, 1981, pp. 19-22) which recognized its operation in different cognitive domains.

## **FIELD-DEPENDENCE AND FIELD-INDEPENDENCE IN SUMMATION**

Field-dependence and field-independence as a theory represents one of the earliest and most researched cognitive approaches. Much early application was in the area of educational psychology with Witkin, Goodenough, and others publishing numerous research examining the role of FDI in education and learning (Frank, 1986; Jonassen & Grabowski, 1991; Riding, 1997; Tinajero & Paramo, 1997; Witkin, et al., 1977). Interest in it, however, waned within the cognition

research community over the past thirty years due to difficulties in conducting the early laboratory tests, disparate application of the theory, and disagreement over whether FDI is a cognitive style as originally labeled by Witkin, spatial ability (Sternberg, 1997), perceptual ability (Zhang, 2004), an aspect of working memory (Rittschof, 2010), the ability to disembed a stimulus (Koh & Milne, 2012), or a cognitive control (Jonassen & Grabowski, 1991). Richardson and Turner (2000) cited issues with using the more convenient embedded-figures tests in education research since the EFT did not correlate with conventional intelligence tests (Richardson & Turner, 2000). Later research into FDI as emerged in several areas - contemporary educational research into the role of FDI in individual and collaborative learning (Chen & Chang, 2016), the role of FDI on cognitive load and learning achievement (Lopez-Vargas, Ibanez-Ibanez & Racines-Prada, 2017); research into the role of FDI in financial decision making (Chang, Tang & Liu (2016); and persistent FDI research in the field of marketing (Chan, Lowe & Petrovici, 2016; Matthes, Wirth, Schemer & Kissling, 2011; Orin & Crouch, 2014).

Witkin et al., (1977) noted an individual's FDI dimension was shaped by early formative events such as one's rearing, cultural influences, and training. Regardless of typology, however, the understanding established by FDI that individuals possess different cognitive styles or abilities, assumes great importance when placed in the nexus of the entrepreneur and opportunity as he or she seeks to identify patterns within a complex field in search for entrepreneurial opportunities when field complexity and time are important variables.

## CONCLUSION

After reviewing the FDI literature and the sub-stream of entrepreneurship pattern recognition literature, the authors propose the following: (1) FDI offers a robust and valid testing instrument in the form of the embedded figures test to measure an individual's field-dependence or independence, (2) understanding an individual's measure of field-dependence and field-independence can offer expanded insights into entrepreneurial opportunity identification and subsequent failures to identify opportunities and the time required.

From an entrepreneurship perspective, it is "value neutral" accepting strengths associated with both field-independence and dependence and associated weaknesses in both. Entrepreneurs that are field-independent perhaps gain from being better able to perceive opportunities but arguably do so in the absence of important external resources that could lower their risks. Entrepreneurs that are field-dependent could take too long or fail to identify an opportunity. FDI would posit that both can moderate either cognitive style through learning and deliberate practice. FDI is an older cognitive theory not yet applied to entrepreneurship research. What we have recently learned about the nature of enacted entrepreneurial opportunities and the role played by the entrepreneur's own cognition suggests that further research of FDI in entrepreneurial opportunity identification and evaluation is warranted.

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