

**THINKING ABOUT THINKING ABOUT THINKING:
EXPLORING HOW ENTREPRENEURIAL METACOGNITION AFFECTS
ENTREPRENEURIAL EXPERTISE**

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ABSTRACT

Within this study we propose that metacognitive thinking can be deliberately practiced in an entrepreneurial context. Further, we suggest such metacognitive thinking will lead to creation of entrepreneurial expertise by facilitating the self-reflection, understanding and control of one's own entrepreneurial cognitions. A treatment group of 233 students in a four-month entrepreneurship program was exposed to a metacognitively-based curriculum, while a control group of 67 business students enrolled in an entrepreneurship course was not exposed to metacognitive elements. The expertise of both groups was compared. Our findings suggest that students exposed to a metacognitive treatment gain entrepreneurial expertise faster than those who are not. Additionally, close interaction with mentor entrepreneurs does not seem to have a specific effect on the nature of the treatment group expertise.

INTRODUCTION

The greatest discovery of my generation is that human beings can alter their lives by altering their attitudes of mind. – William James (1890, p. 290)

This statement by one of the most distinguished psychologists has been well applied in the field of entrepreneurship. As Mitchell et al. (2004, p. 508) note, previous researchers in entrepreneurial cognition have investigated topics such as: (1) whether entrepreneurs' thinking patterns differ from those of non-entrepreneurs (Busenitz & Barney, 1997; Gaglio & Katz, 2001; Mitchell, Smith et al., 2002), (2) the reasons that some individuals become entrepreneurs while others do not (Simon, Houghton, & Aquino, 2000), (3) the issue of why opportunities are recognized by some individuals and not others, and (4) the question how entrepreneurs think and make strategic decisions (Busenitz & Barney, 1997; Mitchell, Smith, Seawright, & Morse, 2000; Mitchell, Smith et al., 2002). Each of these topics of investigation relates to the way that thinking affects entrepreneurial outcomes. Thus it appears (in the parlance of James, 1890) that individuals who understand the thinking patterns related to entrepreneurship—and desire to become entrepreneurs—can alter their own thinking patterns accordingly.

Of the questions above that research in entrepreneurial cognition seeks to answer, three of the four relate specifically to entrepreneurial expertise (1, 3, and 4), and in this sense entrepreneurial expertise is virtually synonymous with entrepreneurial cognitions (e.g., Gustafsson, 2004; Mitchell et al., 2000). Examples of previous work in the area of entrepreneurial expertise include the composition and creation of entrepreneurial expertise (Mitchell, 1994), the relationship of expertise to entrepreneurial decision-making (Gustafsson, 2004), and the cross-cultural nature of entrepreneurial expertise (Mitchell, Smith et al., 2002). Mitchell and Chesteen (1995) find that in addition to there being cognitive differences between expert and novice entrepreneurs, novice entrepreneurs can enhance their expertise through contact with expert entrepreneurs. This is consistent with expert information processing theory, which suggests that expertise can be created through contact with expert scripts (Glaser, 1984). Within this study we specifically seek to better understand the cognitive mechanisms whereby entrepreneurial expertise is enhanced through contact with experts, and how the cognitive psychology theory of metacognition may inform a discussion of the mechanisms whereby entrepreneurial expertise can be enhanced.

Metacognition refers to ‘thinking about thinking’ (Jost, Kruglanski, & Nelson, 1998) and has been defined to be “the ability to reflect upon, understand, and control one’s learning” (Schraw & Dennison, 1994, p. 460). Two critical components of metacognition are included in its definition. First, there is knowledge about cognition; and second, there is knowledge about the regulation of cognition. Metacognition thus includes both an awareness of cognition and an understanding of strategies to change cognitions. As previously noted, there is reason to expect that deliberate interactions between prospective entrepreneurs and actual entrepreneurs can increase novices’ expertise (Mitchell & Chesteen, 1995). Cognitive psychology theory would suggest that it may be the metacognitive-focus of the interactions between novice prospective entrepreneurs and experts that is important.

Mounting evidence in recent entrepreneurship research suggests that the path to becoming an entrepreneur is not itself special, but is in fact general—rooted in the cognitive systems created by deliberate practice (Charness, Krampe, & Mayer, 1996; Ericsson, 1996). In this study, we propose that metacognitive thinking can be deliberately practiced in an entrepreneurial context. Further, we suggest such metacognitive thinking undertaken in an entrepreneurial context will lead to creation of entrepreneurial expertise by facilitating the self-reflection, understanding and control of one’s own entrepreneurial cognitions, thereby allowing individuals to, as James (1890) suggests, “alter their (entrepreneurial) lives.”

We proceed first, to introduce relevant theory and present a set of hypotheses that flow from extant theory. We then outline the methodology that we use to test these hypotheses. Third, we present the results of our analysis. Lastly, we discuss the implications of our findings with an eye towards further research in this area.

THEORY & HYPOTHESES

Entrepreneurial Expertise

To perform successfully, entrepreneurs should possess a wide knowledge and a number of skills, some of them related to the general business knowledge, including traditional functional areas (Hood and Young, 1993; Ardichvili, Cardozo and Ray, 2003). Entrepreneurs’ knowledge includes greater knowledge of business creation (Gartner, 1989). Other skills that are common for entrepreneurs and managers include the skill in motivating others, influence skills, information sharing and collecting, delegation, communications skills, control, organizing, and planning (Stumpf, Dunbar and Mullen, 1991). Skills particularly relevant for entrepreneurs, would include: knowing the business and markets, being an entrepreneurial force, accommodating adversity, as well as oral presentation skills, interpersonal skills, the ability to prepare and present a business plan, etc. (Baron & Markman, 2003; Drucker, 1985; McMullan and Long, 1990; Ronstadt, 1985; Vesper and McMullan, 1988).

To be able to perform the whole range of tasks at different levels of uncertainty while creating, discovering or recognizing opportunity and creating a venture, entrepreneurs ought to possess the ability to match decision-making mode to the nature of the task. Presumably, this is an important skill which, being highly developed, would distinguish an expert entrepreneur from a novice.

Experts might also be distinguished from novices based on the knowledge structures of scripts that they possess. In the language of cognitive psychology, expert entrepreneurs are characterized by their ability to form and retrieve entrepreneurial knowledge structures or scripts, each pertaining to a distinct type of opportunity. A script, as defined in information processing theory, is “knowledge, [which] is schematized, 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 and Black, 1986, p.1). Thus, expert entrepreneurs likely possess a variety of scripts pertaining to the situations in which different types of opportunities occur. Having encountered specific cues, they would immediately recognize the situation and retrieve the appropriate script.

Because entrepreneurship, either entirely or partially, is about doing something new, performing “new combinations” (Schumpeter, 1934), or creating future goods or services (Shane and Venkataraman, 2000), it involves the future, which is by definition unknown (and, according to Knight (1921), even unknowable). It is therefore quite logical to assume that entrepreneurs usually act under moderate to high degrees of uncertainty. This view is also supported by Sarasvathy’s et al. (2003) classification of opportunities from lower to higher uncertainty (recognition, discovery, creation/ effectuation). It is then understandable that opportunity creation and opportunity discovery, both inherently more uncertain, involve the solving of ill-structured problems. Thus, the quality of decision-making in such settings would likely vary between experts and novices, since experts are better able to recognize the cognitive nature of the task and behave accordingly, whereas novices are not (cf. Hammond et al., 1987; Hammond, 1988).

According to recent results (Gustafsson, 2004) expert entrepreneurs, while engaging in an opportunity identification task, are able to recognize the cognitive nature of the opportunity they confront and adapt their cognitive behavior to the cognitive nature of the task. This would suggest that entrepreneurial expertise is not an inborn aptitude but a skill, which can be acquired by potential entrepreneurs. This, in turn, would suggest that appropriate expert behavior in entrepreneurial situations could be taught and learned.

In this paper, we follow the approach taken by Mitchell et al. (2000) and view entrepreneurial expertise as consisting of arrangements cognitions, ability cognitions and willingness cognitions. Arrangements cognitions are defined as an individual’s knowledge structures about the use of the specific arrangements that support that individual’s own performance and expert-level mastery. Willingness cognitions are those knowledge structures that underlie (inform) an individual’s commitment to venturing. Ability cognitions consist of individual’s knowledge structures about specific capabilities, skills, knowledge, norms and attitudes required to start a venture (Mitchell et al., 2000, pp. 977-978).

An interesting question then arises concerning how such entrepreneurial expertise is developed. Some suggest that this might be developed through experience (e.g., success or failure). To an extent, however, the prescribed type of experience that is needed depends upon the researcher’s frame of reference. For instance, according to motivational models, suitable entrepreneurial expertise is prompted by success achieved through mastery experience (personal or vicarious), and high intrinsic motivation, which leads to reinforcement of positive motivation (Bandura, 1995; Delmar, 2000). However, entrepreneurial cognition theory and expert information processing theory suggest that to become a true expert capable of making adequate decisions across a variety of tasks, the entrepreneur should possess the knowledge structures or scripts that are thought to be associated with entrepreneurship.

Focused Mentoring and Expertise Transfer

Research in expert information processing suggests that expertise is typically associated with a specific content domain (Posner, 1988). For instance, early research in expert information processing focused on the expertise possessed by chess masters (e.g., de Groot, 1978). Research also suggests that expertise in any given domain can be characterized as a cognitive schema or scripts specific to that domain (Leddo & Abelson, 1986). In general, scripts are memories of

frequently *experienced* situations that people use to interpret instances of related knowledge (Glaser, 1984, p. 100). Accordingly, expertise is gained as scripts are tested, modified or replaced in ways that facilitate learning (Glaser, 1984, p. 101). Thus, expert scripts can be thought of as highly developed, sequentially ordered knowledge in a specific field (Mitchell & Chesteen, 1995). Other researchers suggest that the development of such expert scripts is typically the result of approximately ten years of deliberate practice (Ericsson, Krampe, & Tesch-Romer, 1993; Read, Wiltbank, & Sarasvathy, 2003).

Supporting this notion that deliberate practice can lead to expertise, Mitchell and Chesteen further suggest, following Glaser (1984), that an individual script can be enhanced through contact with experts (1995, p. 290). This hypothesis was tested in a university setting by randomly assigning approximately half of the students in the participating classes to an “expertise enhancement” condition and assigning the remaining students to a “control” group. Both groups were then given the assignment to interview an entrepreneur who had successfully started a business. Following this simple assignment, the treatment group was asked to: first, determine and report their own “rules for succeeding in entrepreneurship;” second, determine and report the mentor’s “rules for succeeding in entrepreneurship;” and third, compare their own script with that of the mentor. The control group did not complete these three-steps. Discriminant functions of the two groups were compared and suggest that the two groups differed in expertise related to both entry scripts and doing scripts. Both groups were also compared a group of expert entrepreneurs; neither group’s entry and doing scripts reflected those of the expert entrepreneurs. The results suggest that exposure to an expert’s script (albeit quite limited in this case) does affect an individual’s own cognitive scripts. But what are the mechanisms whereby this is accomplished? Is “thinking about one’s thinking” implicated?

Metacognition

As an area of research, metacognition has its roots in cognitive psychology. In its most basic form, metacognition is cognition about cognition (Nelson, 1996), or thinking about thinking (Jost et al., 1998). In a recent review of metacognition research, Jost et al. suggest that the focus of the research has been limited in three significant ways:

First, it addresses metacognitive judgments about the self but ignores the role of metacognitions about other people. Second, it emphasizes descriptive beliefs about how the mind actually works to the exclusion of normative beliefs about how the mind ought to work. Third, it considers only online or momentary assessments or adjustments without taking into account memory-based schemas or implicit theories of cognition” (1998, pp. 137-138).

Research by metacognitive social psychologists addresses these limitations. There suggestion is consistent with Mischel’s (1998) suggestion that metacognition is the bridge between social and cognitive psychology.

In particular, and of special importance to our paper, is the way in which social psychology adds to research on metacognition, as is alluded to in the above cited limitations of previous metacognition research. First, social cognition is thought to add to extant knowledge on metacognition in the suggestion that an individual may possess metacognitions self and about others. To illustrate this point, Jost et al. (1998) cite previous research which found that following an examination of others’ performance on a specific task, individuals’ predictions about their own performance on the same task were no more accurate than their predictions about others’ subsequent performance on the task. Second, social cognition theory introduces

normative concepts into research on metacognition. That is, in addition to the benefits derived from descriptive metacognitive beliefs (e.g., potentially recognizing a deficiency in one's knowledge), there are also specific benefits derived from normative metacognitive beliefs (e.g., possibility of changing intellectual performance) (Jost et al., 1998). As Jost et al. suggest, "Temporarily making people aware of the potentially biasing influences of extraneous factors was sufficient to eliminate the effect of these biasing factors" (1998, p. 148). Lastly, while Jost and colleagues recognize the importance of "online" metacognition, they also suggest that "it is safe to say that people [also] possess long-term beliefs about what sorts of metacognitive strategies or assumptions people ought to adopt in general" (*ibid.*).

The foregoing additions by social psychologists to metacognition research, are relevant to the current study. Specifically, we are interested in the mechanisms whereby expertise is gained through: (1) participation in metacognitively-based education, and (2) exposure to expert scripts. As we note in our introduction, metacognition—or thinking about thinking—has been defined as "the ability to reflect upon, understand, and control one's learning" (Schraw & Dennison, 1994, p. 460). Within this definition are two components of metacognition: knowledge about cognition and the regulation of cognition. Thus, Metacognition includes both an awareness of cognition and an understanding of strategies to change cognitions. In light of the three additions from social psychology research—(1) metacognition about self-and others, (2) normative metacognition, and (3) long-term metacognitive beliefs—it would seem reasonable to suggest that expertise can be enhanced through participation in activities that induce these aspects of metacognition. Indeed, it would seem that situation itself is inherent in the introduction of social-psychological (Fiske & Taylor, 1984) factors into metacognition research.

Indeed, an educational setting where students are coached in the development of their own scripts, and put in contact with the scripts of experts for the purpose of "thinking about thinking," would seem to: (1) stimulate reflection on one's own metacognitions and the metacognitions of others (e.g., an understanding about personal metacognitive strategies *and* a mentor's metacognitive strategy), (2) encourage a normative understanding of potential metacognitive strategies (e.g., considering what should be learned from the mentor's script), and (3) motivate the possibility of "learning" new metacognitive strategies, thereby potentially controlling one's own metacognitions in the long-term. By taking a metacognitive approach to education, educators can thereby induce metacognitive thinking and thus enable students to better gain *knowledge about cognition* and *knowledge about the regulation cognition* (Schraw & Dennison, 1994). Therefore, we suggest that:

Hypothesis 1: Entrepreneurship students who engage in metacognitive exercises—in the form of coached scripting exercises—will be more likely to gain entrepreneurial expertise than students who do not engage in metacognitive exercises.

Our second question relates specifically to the content of the expert scripts to which students are exposed. Expert information processing theory suggests that expertise is developed through deliberate practice of the right content for a sufficient duration at a sufficient intensity (Charness, Krampe, & Mayer, 1996). Insofar as more highly developed expert scripts (greater expertise) provides more appropriate content for deliberate practice, one might expect a positive relationship between mentor expertise and student expertise. Similarly, if students who engage in metacognitive exercises with mentors are able to reflect on both their own metacognitions and the metacognitions of their mentors, one might expect these students to have more highly developed expert cognitions even if the student expertise does not specifically reflect the expertise of their mentor. Thus, we expect that:

Hypothesis 2: The level of mentor expertise will be positively related to student expertise development.

METHOD

The first hypothesis was tested using quasi-experiment research methods with a pre-post test design, using a non-equivalent control group (Cambell & Stanley, 1963). Of this experimental design, Campbell and Stanley state that it “should be recognized as worth using in many instances in which [true experimental designs] are impossible” (1963: 47). Arguably, within a research study addressing entrepreneurship education at the university level, it is a near impossibility to be able to randomly assign students to different treatment settings—the treatment being an entire course. For this reason, education research frequently relies on a quasi-experimental design. One likely benefit of using a non-equivalent control group design is the possibility of higher external validity than in true experimental designs.

Data Gathering

The treatment group consists of all 233 of the master’s level and undergraduate business students at a public university in western Canada between 1997 and 2003 who took a four-month cognitively-based entrepreneurship program, and were exposed to the treatment of metacognitive elements within the curriculum. The control group consists of 67 business students at a large mid-western University in the United States, who took a course in entrepreneurship but were not exposed to metacognitive elements in their course. The respondents were not randomly assigned to the treatment and control groups but the control group students were of a similar age and had a similar educational background as the treatment group. One might even suspect that the US students would have higher baseline entrepreneurial cognitions given the stronger entrepreneurial culture in the United States—making our test more conservative.

Measurement

Our measure of expertise captures the extent to which respondents have expert arrangements, willingness, and ability cognitions. Dimensions of these higher order constructs are measured with the script cue recognition-based summed interval scale method developed by Mitchell et al. (2000). The specific items and their wording are available in the Appendix (Mitchell et al., 2000, p. 992). Our manipulation of entrepreneurial metacognition is based on metacognitive theory. The manipulation of entrepreneurial metacognition accords with the three necessary facets of metacognitive self-control Jost et al. (1998): (1) motivation to implement correctional goals (in the form of course assignments that include a series of scripting exercises to increase one’s awareness of cognition and one’s ability to change these cognitions), (2) conscious awareness of the source of bias and the magnitude of its influence on judgment (through expert input to script content), and (3) time and opportunity to make necessary cognitive adjustments (accomplished by implementing our manipulation over the course of a semester).

Data Analysis

Our first hypothesis is tested using a repeated measures general linear model (ANOVA), where the within subjects factor, expertise, was specified as comprising of the three cognition measures (arrangements, willingness, and ability cognitions), with two levels (pre- and post-treatment).

The second hypothesis was testing using data from 233 of the treatment group students who had paired data from 233 mentor-entrepreneurs selected by (and paired with) student participants.

The students conducted depth interviews with the mentors using a standard interview guide aimed at the transfer of the mentor's expertise. In addition to the same measures described above, mentor expertise was measured using a summed of their arrangements, willingness, and ability cognitions scores, which was then categorized into three approximately equal size groups (the medium expertise group ended up being larger than the other two groups as a result of natural break points in the cumulative distribution of the summed scale). This categorical scale of mentor expertise was used as the between subjects factor in a repeated measures GLM analysis that examined student expertise and the interaction of student expertise and mentor expertise as within subject factors.

RESULTS

Using independent sample t-tests, the baseline (T1: pre course) mean ability cognitions of the treatment group was significantly higher than those of the control group, but no differences were observed in the baseline arrangements cognitions or willingness cognitions (Table 1: Group Means). The repeated measures GLM (Table 2) show a significant multivariate F-statistic for the between subjects effect of group (treatments vs. control) and the within subjects effects of expertise and the interaction expertise * group. Univariate tests within subjects show a significant main effect for arrangements, willingness, and ability cognitions, which suggests that student expertise is significantly enhanced by taking entrepreneurship education. As can be seen in the group means and estimated marginal means (Table 1), arrangements, willingness, and ability cognitions were found to be significantly higher in the T2: post-course measure for both the treatment group and the control group.

As hypothesized (H1) and as evidenced by a significant expertise * group interaction effect, the expertise of students receiving the metacognitive treatment increased at a significantly higher rate than the students not receiving the treatment. This significant interaction effect was above and beyond the significant main effect of group (treatments vs. control) for arrangements cognitions and ability cognitions

Hypothesis H2a and H2b were not supported. The student expertise * mentor expertise interaction effect was not significant (Table 3), suggesting that, within subjects, greater mentor expertise does not lead to greater expertise development by prospective entrepreneurs. In addition, the between subjects effect of mentor expertise was also not significant (Table 3), suggesting that higher levels of mentor expertise were not associated with higher level of expertise in prospective entrepreneurs.

DISCUSSION

In this section we note the limitations of our study, and then briefly discuss implications for research, teaching, and practice.

Limitations

First, as noted previously, the treatment and control groups were not randomly assigned, which can potentially result in problems with internal validity. To the extent, however, that both the treatment group and the control group are similar, lack of random assignment is less of a problem. Because of the educational context, random assignment in a study like this is difficult. As we note previously, however, the demographic information of the students is similar across groups. A second limitation is the possibility that factors beyond the metacognitive treatment itself may contribute to differences between the treatment and control groups. Again, because of the

educational context of this study, it is difficult to rule out alternate explanations; this can also be a strength, however, in that external validity is potentially higher. A third limitation is the comparatively short duration of time for which students are exposed to metacognitive effects—relative to the ten year deliberate practice rule of thumb—which may actually limit our ability to adequately test hypothesis 2; in that the transfer of expertise may not be easily accomplished in a short period of time.

Research

This study further confirms the effectiveness of the cognitive perspective in entrepreneurship research (Mitchell, Busenitz et al., 2002), specifically as a way to explain the development of entrepreneurial expertise. This is important because of the role that expertise can have in new venture performance (e.g., Mitchell et al., 2000). Thus, by gaining new understanding of how expertise can be developed, we also gain new understanding about processes that are potentially related to the achievement of specific entrepreneurial objectives (e.g., new venture creation).

Additionally, our findings suggest the potential importance of metacognition research, a literature stream that is relatively new to the field of entrepreneurship. Not only might a metacognitive perspective in entrepreneurship have implications for understanding possible differences between entrepreneurs and non-entrepreneurs, but it also might increase our understanding of the group in between: those individuals who are neither entrepreneurs, nor are they non-entrepreneurs (Sarasvathy, 2004). As Sarasvathy notes, “given that some people want to become entrepreneurs *and (yet) do not*, we need to study *barriers* to entrepreneurship” (2004, p. 713, emphasis in original). In answer to this call, our results suggest that the lack of expertise as a barrier to entrepreneurship may be surmountable through metacognitive interventions. Such a notion has clear implications for teaching.

Teaching

Our findings support the efficacy of entrepreneurship education in general: because of the evidence that both the treatment group and the control group increased in expertise between T1 and T2. This finding should be of some comfort to entrepreneurship educators, when challenged on the importance of entrepreneurship education. Beyond the positive findings about entrepreneurship education in general, we find that the addition of metacognitive elements to such education can *further* increase its efficacy.

An additional implication for teaching is the notion that the length of the process for creating expertise can potentially be shortened. As is suggested earlier in this paper, the development of expertise is typically thought to be the result of approximately ten years of deliberate practice (Ericsson, Krampe, & Tesch-Romer, 1993; Read, Wiltbank, & Sarasvathy, 2003). Our results suggest that this process can possibly be accelerated through metacognitive training. (Of course, we do not suggest that one semester’s worth of metacognitive entrepreneurship education is sufficient; but such “enhanced” education may at least abridge the process by a few years.) Such a reduction in the time necessary to become an expert entrepreneur could have profound consequences at the economy level.

A third implication for teaching arises from lack of support for our second hypothesis. Research suggests that expertise comes through deliberate practice with experts (Charness, Krampe, & Mayer, 1996; Ericsson, 1996). Our findings, however, suggest that the expertise of the mentor does not directly transfer to the novice. There are a number of possible explanations. As suggested in the limitations section, direct transfer of expertise may require deliberate practice

with experts *for a longer duration*, consistent with models suggesting that a *combination* of intensity, duration *and* expert content are required (Charness et al, 1996). A second potential explanation may be that metacognitive thinking actually allows novices to do more than simply transfer expertise (whether high or low) from the mentor to themselves. Rather, novices may sort through the information that they receive; and from this, create their own personalized expertise. While this potential explanation would require additional testing, it may have far reaching implications for teaching. For instance, should it be the case for example, the inclusion of metacognitive elements in teaching curriculum would then be considered to be just as important as the content of the teaching curriculum itself; and entrepreneurship educators would then be responsible to understand how to develop such a metacognitive curriculum.

Practice

If, as we have begun to demonstrate in this study, the creation of entrepreneurs, in reality depends in a non-trivial manner upon a process that is generally accessible to any individual who is willing to deliberately practice to create in themselves the required entrepreneurial cognitions, and if the specific interventions needed are metacognitive in nature, then it may be that the activities based in the “specialness” paradigm intended to stimulate entrepreneurship (such as entrepreneur of the year, the listing of curiosities such as youth v. wealth, etc.), have in fact discouraged it by inadvertently persuading all but the most bold or foolish (in short, all reasonable persons) that entrepreneurship is not for them (cf. Sarasvathy, 2004). New approaches to the creation of entrepreneurs are therefore needed.

For example, this confirmation of the deliberate practice method of learning entrepreneurship suggests that previous approaches to entrepreneurship may have been overly restrictive (Davidsson, 2003), and therefore the reexamination of existing approaches to entrepreneurship by SBDCs, universities, and other institutions tasked with the enabling of entrepreneurship within given communities. We wonder, for example, whether what appears to be an effective way to think about entrepreneurship—a business-plan focused mindset—may not actually be all that effective when it comes to creating the expertise needed to function effectively as an entrepreneur. And what appears to be somewhat abstract and theoretical—metacognitive development activities—might really be pragmatic and empirically sound, leading to a resurgence of the “apprenticeship” notion and the raising of the question: Is entrepreneurship a craft or a trade, like art or plumbing?

From a practice standpoint, it may be time to stop and *think about how we think* about entrepreneurship. As Sarasvathy (2004) notes, current thought about entrepreneurship—which arguably affects current entrepreneurship policy—may overlook our largest constituency: those individuals who are not entrepreneurs, but want to become entrepreneurs, and just do not *know* how. Returning to the quotation by James (1890) which began our paper, by assisting individuals to alter their own thinking *through thinking about that thinking*, we as a field may be able to assist these individuals in enhancing their entrepreneurial expertise, thereby allowing people to “alter their lives” through more productive wealth creation activities.

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Table 1: Means**Group Means**

	N	Arrangements Cognitions		Willingness Cognitions		Ability Cognitions	
		T1	T2	T1	T2	T1	T2
Treatment Group	233	1.95	3.07	4.30	5.19	2.70	4.99
Control Group	67	1.94	2.04	4.51	4.70	2.39	2.57
T-Test Significance		.714	.000	.247	.029	.037	.000

Estimated Marginal Means

	Arrangements Cognitions	Willingness Cognitions	Ability Cognitions
Group			
Treatment	2.51	4.75	3.84
Control	1.99	4.60	2.48
Expertise			
T1: Pre	1.95	4.41	2.54
T2: Post	2.56	4.94	3.78
Group*Expertise			
Treatment			
T1: Pre	1.95	4.30	2.70
T2: Post	3.07	5.19	4.99
Control			
T1: Pre	1.94	4.51	2.39
T2: Post	2.04	4.70	2.57

Table 2: Repeated Measures GLM

	F.	Sig
Multivariate Tests		
Between Subjects		
Group (Treatment vs. Control)	21.5	.000
Within Subjects		
Expertise	38.4	.000
Expertise * Group	26.8	.000
Univariate Tests: Within Subjects		
Expertise		
Arrangements Cognitions	32.0	.000
Willingness Cognitions	15.1	.000
Ability Cognitions	93.6	.000
Expertise * Group		
Arrangements Cognitions	22.0	.000
Willingness Cognitions	6.2	.013
Ability Cognitions	68.4	.000
Univariate Tests: Between Subjects		
Group		
Arrangements Cognitions	13.5	.000
Willingness Cognitions	0.4	.509
Ability Cognitions	62.6	.000

Table 3: Mentor Effects

Group Means

	N	Arrangements Cognitions		Willingness Cognitions		Ability Cognitions	
		T1	T2	T1	T2	T1	T2
Mentor Expertise							
Low	74	1.94	2.92	4.16	5.05	2.62	4.64
Medium	90	1.90	3.06	4.22	4.89	2.67	5.00
High	68	2.03	3.22	4.54	5.68	2.79	5.32

Multivariate Tests

	F	Sig
Between Subjects		
Mentor Expertise	1.5	.187
Within Subjects		
Student Expertise	130.1	.000
Student Expertise * Mentor Expertise	0.8	.547

Univariate Tests: Within Subjects

Student Expertise		
Arrangements Cognitions	106.5	.000
Willingness Cognitions	44.9	.000
Ability Cognitions	339.9	.000
Student Expertise * Mentor Expertise		
Arrangements Cognitions	.4	.681
Willingness Cognitions	1.0	.359
Ability Cognitions	1.4	.255

Univariate Tests: Between Subjects

Mentor Expertise		
Arrangements Cognitions	0.7	.503
Willingness Cognitions	2.9	.056
Ability Cognitions	2.1	.130