
The 'Aha' Moment: Using Psychophysiological Measures to Identify IT Entrepreneurial Epiphanies

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Abstract

This work proposes using psychophysiological measures to improve the complex data-collection process involved in helping individuals discover their dimensions of IT Entrepreneurial Epiphany (ITEE).

Keywords

EEG, eye-tracking, epiphany, IT entrepreneurship

ACM Classification Keywords

H1.2 Human Information Processing. J.4
[Computer Applications]: Sociology, Psychology –
Social and Behavioral Sciences.

General Terms

Measurement.

Research Position

We describe how psychophysiological measures, such as encephalographic (EEG) recordings combined with eye-tracking data, may improve the measure, data collection, and analysis of the relevant dimensions involved in complex decision-making processes. In particular, we focus on the process to determine when an information technology (IT) employee is ready to leave his or her current place of business to start his or

her own business, a moment termed the IT Entrepreneurial Epiphany (ITEE). Psychophysiological measures allow real-time cognitive state assessment when participants may be unable to consciously communicate their thoughts. By combining quantitative (questionnaire, EEG and eye-tracking data) and qualitative (interview interpretations) measures we may more clearly triangulate the dimensions of ITEE.

Related Work

In the Information System field of research, several authors called for better ways to address the class of models/theories dealing with a high number of possible predictors. For instance, Lee et al. [5] found 24 external variables that may affect usage in the Technology Acceptance Model (TAM). A meta-analysis of IT employee turnover identified 43 possible antecedents [3] while another study focusing on IT Entrepreneurial Turnover (turnover of IT employee toward starting a business) found 63 antecedents [7]. For this latter topic, Mourmant and Voutsina [8] suggested to go one step further and introduced the concept of ITEE, defined as *an illuminating moment when the IT employee/future entrepreneur realizes that some or all of the necessary conditions for him or her to quit his or her job and start his or her own business have been met*¹. Identifying the dimensions related to those ITEE, as well as focusing on triggering them could be of great interest for future entrepreneurs.

It is possible to use psychophysiological measures to reveal covert or unconscious responses related to these illuminating moments. Researchers have found that

¹ This is a working definition. See the original paper for a formal definition.

insight (a.k.a. "aha" moment, eureka moment, or epiphany) largely takes place in the right hemisphere of the brain and is evidenced by activations of alpha (8-13 Hz) and gamma (30+ Hz) waves [4, 9]. Further, eye-tracking data, such as pupil size, gaze position, and blink rate indicate varying levels of attention and affect [2] and thus may indicate unconscious saliency of presented dimensions.

Proposed Study

Overview

We suggest that while a future entrepreneur fills in a questionnaire related to the antecedents of IT Entrepreneurial Turnover, a combined measure of his or her EEG and eye-tracking data is collected. We hypothesize that high activations of alpha and gamma will indicate that an item is a dimension of a future ITEE waiting to be triggered. Therefore, in a follow-up interview, the interviewer could relate not only to the answers of the questionnaire, but also to the EEG/eye-tracking measures. In addition to providing additional insights to the future entrepreneur, this approach may decrease biases (e.g., social desirability, respondent lack of focus) identified when administering a questionnaire, as well as uncover unconscious dimensions for the individual. In other areas, such a mixed-method approach (questionnaire combined with follow-up interview), has been shown to be more efficient for data collection and analysis compared to only one method [1, 6].

Equipment

BioSemi ActiveTwo 8-channel EEG bioamplifier (<http://www.cortechsolutions.com>)

Tobii Glasses Eye-Tracker system (<http://www.tobiiglasses.com>)

Steps

- 1) A potential IT Entrepreneur is asked to answer a questionnaire similar to columns 1 to 3 of Table 1. Each item covers a specific dimension related to a potential ITEE. An example of ITEE related to the first item (level of confidence in my marketing skills) would be: "The 'E-Myth Revisited' [the title of the book] [...] I'm glad I read it when I did because it spoke to me directly about, hey, I have this skill. I can put this skill into practice. I don't need to work for somebody to put this skill into practice". For each item, the respondent indicates a self-reported measure related to the importance of the item regarding either his or her decision to quit or his or her decision to start a business.

- 2) While they answer the questions, we will use an eye-tracking device combined with EEG recordings. We will measure the levels of alpha and gamma while noting the pattern of eye-gaze, blinking, and pupil dilation and note if a significant response is observed. This way, we complete columns 4 and 5.
- 3) The results of the questionnaire are then combined with the results of the psychophysiological measures to identify items that have significance per the EEG/eye-tracking data while being low on the degree of importance as reported in columns 2 and 3.

Table 1. Example of potential results from an IT entrepreneur

Item	Self-reported answers ²		EEG + Eye-Tracking Result		Level of agreement among the results	Examples of events which could potentially trigger the ITEE
	This item plays an important role regarding my decision to quit or stay at my job	This item plays an important role regarding my decision to start a business	This item plays an important role regarding my decision to quit or stay at my job	This item plays an important role regarding my decision to start a business		
Q: Level of confidence in my marketing skills	4	7	maybe	yes	high	Reading the book 'The e-myth revisited'
Q: Experiencing relational problems with my manager or with my co-workers	1	1	yes	yes	none	"Worst evaluation ever"
Q: My partner fully supports my decision	7	7	yes	no	medium	Family discussion during Christmas
Q: Serving others is a definition of success	7	7	no	yes	medium	Great volunteering experience
Q: Perceiving opportunities to launch a business	2	6	no	no	medium	Identification of an opportunity in the market
Q: Feeling of being stuck in one role	7	7	yes	yes	high	A job promotion has been refused for the third time

² We use a Likert scale from 1 to 7. 1: I completely disagree; 7: I completely agree

Expected Results and Discussion

First, we need to assess the level of agreement among the importance of a dimension as reported in the questionnaire and the significance of this dimension as recorded by the psychophysiological measures. The dimensions where agreement is not reached are the most interesting to analyze, as they may uncover unidentified or unconscious issues.

Second, once the dimensions are identified, we need to assess if they are related to a potential future IT Entrepreneurial Epiphany. This could be done either directly during the follow-up interview with the future entrepreneur or through an analysis of past case studies (an existing database of ITEE has already been collected by the second author of this paper) to identify epiphanies related to those dimensions.

Conclusion

By using a combination of questionnaire, EEG, and eye tracking measures we hope to contribute to (1) the research related to mixed-method (quantitative data combined with qualitative data), by improving the quality and relevance of the data collected and analysed, and (2) to improve our understanding of IT Entrepreneurial Turnover by shedding light on ITEE.

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