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Multidimensional Model of Assessment of Economic Thinking in College Students

Omar Fernando Cortés Peña\textsuperscript{a} *, Raimundo Abello Llanos Ph.D.\textsuperscript{b}, Marianela Denegri Coria Ph.D.\textsuperscript{c}, Andrés Manuel Pérez-Acosta Ph.D.\textsuperscript{d}

\textsuperscript{a} COLCIENCIAS, National Doctoral Program. Universidad del Norte, Doctoral Program in Psychology. Corporación Universidad de la Costa – CUC, Faculty of Psychology, Editor of Journal Cultura Educación Sociedad – CES, Calle 58 # 55-66, Barranquilla – Colombia.
\textsuperscript{b} Director of Research, Development and Innovation, Group for Research in Human Development, Universidad del Norte, Colombia.
\textsuperscript{c} Director of the Center for Economic and Consumer Psychology, CEPEC-UFRO, Universidad de la Frontera, Chile.
\textsuperscript{d} Director of Journal Avances en Psicología Latinoamericana, E. C. Studies in the Behavioral Sciences, Universidad del Rosario, Colombia.

Abstract

The Economic Thinking in undergraduates is a strategic aspect of research in the framework of higher education, given its critical impact on the development of skills and professional standards expected in front of the Scientific and Technological Innovation. The main contribution of this study focuses on the development of a Multidimensional Model of Assessment of Economic Thinking, from the perspective of Self-Organizing Systems. The methodology has an approach empirical-analytic. In relation to the instruments and results correspond to a perspective of Adaptative System based in Item Response Theory (IRT), Complexity Theory and Fractal Models (L-system) about the competence in solving economic problems, knowledge of financial aspects, responsible consumption, sustainable development, and the attitudes to understanding the economic world.

Keywords: Economic Thinking; Economic Socialization Model; Perspective Theory; Complexity Theory; Self-Organized Systems; Item Theory Response (IRT); Computerized Adaptive Test; Chaos Theory; Fractal Models.

1. Introduction

The theoretical basis of this proposal which involves an approximation of conceptual and empirical integration are: Economic Socialization Model of Denegri (Denegri et al., 2003, 2005, 2007, 2008, 2011), Bounded Rationality Theory in Social Science (Simon, 2000), the advances in Prospect Theory (Kahneman & Tversky 1992), research in

* Omar Fernando Cortés Peña. Tel.: +57 (5) 3362207; Fax: +57 (5) 3362200.
E-mail address: ocortes3@cuc.edu.co
Self-organizing Economy and Consumer Expertise of Krugman (1996, 2000, 2006) on the impact of trust and expertise in consumer behavior and dynamic settings, and their contributions on self-organizing nonlinear systems in economy. Loewenstein’s research (Loewenstein, 1988; Loewenstein & Prelec, 1992; Hsee, Loewenstein, Blount & Bazerman, 1999; Frederick, Loewenstein & O’Donoghue, 2002; Berns, Laibson & Loewenstein, 2007) on the intertemporal analysis applied in the processes of decision and choice and the temporal discounting function in terms of economic behavior impact. Finally, the research about the analysis of intelligent consumer behavior beyond the free-will from the perspective of Sandoval, Caycedo & López (2008). The Figure 1, presents an integrated approach of the main references mentioned.

Fig. 1. Theory and Referents of Multidimensional Model of Economic Thinking
Source: Authors

From the perspective of Economic Socialization Model of Denegri et al (2005) in the figure 2, in Colombia has been identified, as a central antecedent the study of Amar, Abello, Denegri & Llanos (2007) about "Economic Thinking in College Students". It was found that only 24% of students reached the level of inferential economic thinking and no difference compared to the academic program to which they belong, as well as the fact that the group presents a difference compared to the level of economic thinking, in comparison with the international context. Other applications of the model in understanding the economic world are identified in the studies of Gempp et al. (2007), Amar, Abello, Denegri, Llanos & Suarez (2008) and Herrera et al. (2011).

Fig. 2. Economic Socialization Model

Medina & Sandoval (2011, p.436) about of Behavioral Perspective Model suggest that “From original BPM model remains a radical behavioral view of general behavior explanation and the purchase behavior in particular, namely: (a) an interactionist view behavior - environment, from strengthening and / or weakening of behavior, and (b) a level of analysis focuses on the situatedness and historicity as key factors for the prediction and control of human behavior and technology development that implies for that (Foxall, 2007)”, (see fig. 3).
From the theoretical and empirical referents presented below is illustrated in Figure 4, the Multidimensional Model of Assessment of Economic Thinking; with its key components of cognitive skills in macro and micro problems solving, knowledge about financial aspects, responsible consumption and sustainable development, and attitudes to understanding the economic world (Cortés, 2011).

Within the theoretical and methodological articulation in the Multidimensional Model of Assessment of Economic Thinking, has joined the analytical perspective derived from Complexity Theory and the Self-organized systems, represented in the figure 5 (Goldstein, 1998; Morin, 2007; Schneider & Sorners 2006; Barberousse, 2008).

In addition Bloch (2012) provides new arguments that strengthen the present study, with your approach from complexity theory and chaos theory in front the analysis of fractals and nonlinear dynamics, for explain the implications in the practice and research in psychology. In this case, within of geometrics models has been identified the explanatory potential of fractal “L-System, designed by Aristid Lindenmayer in 1968 to model cell development.
In this model, the cells are represented by symbols and cell subdivision is modelled by replacing these symbols with strings of symbols" (McWorter, 1997, p.1, see fig. 6).

![L-system or Lindenmayer System. Lindenmayer (1968)](http://en.wikipedia.org/wiki/L-system#Examples_of_L-systems)

2. Methodology

The methodological approach was developed with an approach empirical-analytic. The central instrument of pilot phase is the "Multidimensional Scale of Assessment of Economic Thinking (MSAET)" (Cortés, Denegri, Abello & Pérez-Acosta, 2011) with a pilot sample of 100 college students. This instrument was designed from the Scales of attitudes towards money, debt patterns, habits and practices of consumption, cognitive skills in economic problems solving and an adjusted version of TAE (Denegri et al., 2003, 2005, 2007, 2008, 2011). The results correspond to the pilot phase a perspective of Adaptative System based in Item Response Theory (Rasch, 1963; Hambleton & Swaminathan, 1983; Avendaño & Medellín, 2001; Reise, Ainsworth, & Haviland, 2005; Cortés, 2008), Computerized Adaptive Test (Van der Linden & Glass, 2007; Van der Linden, 2008), Complexity Theory and Fractal Models (L-System and Fractional Brownian Motion).

3. Results

The results of pilot phase includes the psychometric analysis from IRT and an analysis derived from Fractal Models from the perspective of L-system, designed to illustrate the multidimensional perspective of functional integration of the components of Economic Thinking of college students develop. The figure 7, illustrates the Test Characteristic Curve with a Logyt Function from the framework of IRT.

![Fig. 7. Test Characteristic Curve](Source: Authors)

Figures 8 and 9, were derived from the pilot phase with the CONQUEST software and to identify the fractal nature exhibiting the characteristic curves within the alternatives of the items, and the joint analysis of the information functions of the items (Logyt (Θ), Normal (Z) and Fractional Brownian Motion in Fractal Dimension).
Finally, the figure 10 illustrates the diagram of performance adjusted from Computerized Adaptive Test, applied to set of 32 items of assessment of economic thinking. In the implementation of the CAT, all subjects have the same starting point, but each of them has a particular route of his performance than traditional measurement methods. The diagram identifies approximate L-System fractal model.

4. Conclusion

The multidimensional assessment of economic thinking is a constant challenge facing the integration of theory and practice in psychology, from an interdisciplinary perspective with implications and new approaches a level epistemological, conceptual, methodological and analytical. In this sense, the use of the fractal models allows the generation of functional alternatives for interpretation and understanding of the results of psychological measurement and assessment in the horizon of economic behavior.

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References


