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Epistemological development in higher education.

A Study at University of Madeira

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Abstract

The present study fits into the emerging adult cognitive development domain, more precisely in the analysis of higher education student's epistemological beliefs development. The scientific literature of the area considers that student's epistemological beliefs evolve, throughout the academic formation, of more simplistic/absolutist forms to more complex/relativistic forms (Baxter-Magolda, 2004; Perry, 1999). However, most of the students do not reveal higher levels of epistemological complexity (Figueiredo, Pinheiro, & Huet, 2015).

In this paper we present and compare the results of two studies carried out at the University of Madeira, in 2010 and 2016, respectively, which main goal was to analyse the epistemological development of students of higher education and the influence of social and academic variables in the epistemological development.

The research adopted a quantitative methodology and the sample was composed of students from the University of Madeira (295 in study 1 and 232 in study 2), of the 1st and 2nd cycle, distributed by different academic areas. The data were evaluated through the portuguese version of the Parker Cognitive Development Inventory (Ferreira, & Bastos, 1995).

The analysis of the results revealed, in both studies, a predominance of absolutist thinking in the students of the University of Madeira, Contrary to the literature and the studies carried out in this field, there has not been a developmental progression in terms of an absolutist for a more relativistic thought, but rather an increase of absolutism as one advances in the academic formation, being that the students of the 2nd cycle have proved to be more absolutist than students in the 1st cycle. Concomitantly, in both studies, the epistemological development of students varies according to social and academic variables.

Keywords *Epistemological development; Emerging Adulthood; Higher Education*

Introduction

Higher education, in Portugal and in most industrialized countries, continues to be the main goal of many young people and their families, representing the most desired level of education. The frequency of this level of education is mostly made up of young people who are considered, from the development point of view, to be in the so-called emerging adult stage (Arnett, 2010). The emerging adulthood is a stage of development that stands between adolescence and adulthood and we can situate it in terms of age between 18 and 25 years, being that nowadays it can extend until the 30

years. In terms of development, it involves multiple exploratory questions, experiences and tasks in the most diverse domains: identity, affective, professional and ideological. In this sense, emerging adulthood has specific and distinct characteristics of the other phases of development and it is a period of life when important developmental changes take place, all of them interrelated, among which stand out: a) from the psychological point of view, the resolution of certain tasks, namely, the consolidation of autonomy, self-sufficency, the process of separation-individuation; b) from a relational point of view, great changes in the relationship with parents, friends, boyfriend/girlfriend and contexts of education/work that imply gains and losses; c) from an epistemological/ cognitive point of view, a progression from an absolutist to a more relativistic, complex level of thinking (Arnett, 2010).

Epistemological development refers to the changes that occur in personal beliefs about knowledge and the process of knowing (Figueiredo, Pinheiro, & Huet, 2015). Several theoretical models, among which stand out Perry's Intellectual and Ethical Model of Development (Perry, 1981) and the Epistemological Reflection Model (Baxter-Magolda, 2004), which were based on the present study, evidence that during the years of academic formation students progress in a qualitative and hierarchical way (stages/positions) of an absolutist way of thinking, in which everything is right or wrong, in which the teacher always holds the right answer, to a more relativistic, more complex way of thinking, in which it is admitted that there is not always a right answer to a problem, that the most important is to assume and defend a perspective based on facts and evidences and that knowledge is something uncertain and in permanent construction (Baxter-Magolda, 2004; Perry, 1981).Therefore, throughout the academic formation it is not only the quantity and the knowledge that an individual has to change, but also, and essentially, the way of knowing and thinking. It is important to note that although the scientific literature of the area considers that student's epistemological beliefs develop, throughout academic formation, from more simplistic/absolutist to more complex/relativistic forms (Baxter-Magolda, 2004; Perry, 1999), most students are not at the highest levels of epistemological complexity (Figueiredo, Pinheiro, & Huet, 2015).

We can divide the studies of epistemological development into two poles: the studies which focus on the factors that influence the epistemological beliefs and the studies on the impacts of epistemological beliefs. With respect to the former, the studies show that the epistemological development varies according to: the academic area, students from social and human areas show more relativistic levels of epistemological development compared to students of engineering/ technology (Pirtilla-Backman, & Kajanne, 2004); the academic year, students of the first years tend to present an absolute knowledge while the students of the last years present a more relativistic knowledge (Bastos, Faria, & Silva, 2007); gender, studies have shown that there are no gender differences in epistemological development (Baxter-Magolda, 2002; Faria, 2008; Medeiros, 2008), however, a study of Martins (2005), showed significant differences, with the female being more relativistic than the male. About the impact of epistemological beliefs, on the investigations carried out in the field the following conclusions emerge: epistemological beliefs influence learning (Sen, Yilmaz, & Yurdugul, 2014), academic performance Martins, & Ferreira, 2011; Zhang, & Watkins, 2001) and academic motivation (Lin, Deng, Chai, & Tsai, 2013; Mellat, & Lavasani, 2011); the most relativistic epistemological beliefs are a good predictor of self-regulated learning (Braten, & Strømsø, 2005).

The present research was guided by three main goals: 1) identify and describe the level of epistemological development of students of higher education; 2) analyze the influence of personal (gender) and academic (academic year) variables on epistemological development; 3) comparing the results of the two studies, in order to understand if the pattern of epistemological development verified in study 1 is maintained in study 2. For such, two studies were carried out, the first (study 1) in the year 2010 and the second (study 2) in the year 2016.

Method

Participants

In study 1 take part 295 students from the University of Madeira, aged between 17 and 52 years. The majority of participants are female (n=222, 75.3%) and are mostly single (n=257, 87.1 %). Regarding the academic situation, the majority of participants were attending the 1st cycle (n=227, 76.9%), with a higher concentration of participants in the 1st year (n=132, 44.7%). The participants are distributed by different academic areas, with a higher percentage in basic education (n=78, 26.4%) and a lower percentage in engineering and mathematics (n=36, 12.2%).

In study 2 take part 233 students from the University of Madeira, aged between 18 and 48 years. The majority of participants are female (n=163, 70%) and are mostly single (n=217, 93.1 %). With regard to the academic situation, the majority of participants were attending the 1st cycle (n=157, 67.4%), with a higher concentration of participants in the 1st year (n=132, 44.7%). The participants are distributed by different academic areas, with a higher percentage in psychology (n=78, 33.5%) and a lower percentage in design (n=32, 13.7%).

Measures

Two instruments were used to collect data: socio-academic questionnaire and Parker Cognitive Development Inventory (PCDI) (Portuguese version of Ferreira, & Bastos, 1995). The PCDI is composed of 150 items on a Lickert scale of four points (ranging from totally disagree to completely agree), divided into three subscales: Education, Career and Religion. The instrument evaluates the levels of epistemological development (absolutism, relativism and commitment in relativism) within the framework of the intellectual and ethical scheme proposed by Perry (1981).

The internal consistency was measured for each of the subscales, taking into account the three modes of thinking (absolutism, relativism and commitment in relativism). The values of the Cronbach's alfa are acceptable: Career – Absolutism=.68, Career – relativism=.71, Career – commitment in relativism=.72, Education – Absolutism=.70, Education – Relativism=.78, Education – commitment in relativism=.76, Religion – Absolutism=.77, Religion – Relativism=.80, Religion – commitment in relativism=.71).

Due to the fact that it is a long questionnaire (150 items), and in order to safeguard people participation, in both studies it was decided to use only two of the three subscales of PCDI, that is, the Career and Education subscales, making a total of 100 items.

Procedures

Firstly, it was requested an authorization to the University of Madeira to carry out the studies. The questionnaires were applied in the classroom, requesting the voluntary participation of students. Each questionnaire took 45 minutes to complete.

The data were analyzed through *Statistical Package for the Social Sciences*, version 17 (SPSS 17). We used descriptive analyses (frequencies, means and standard deviation) and inferential analyses (t-test and anova).

Results

Through the analyses of the results we tried to describe the level of epistemological development of higher education students. In both studies there was a predominance of absolutist thinking among students (Table 1).

Table 1 *Means and standard deviations of the level of epistemological development*

	Levels of thinking						
		Absolutism		**Relativism**		**Commitment in relativism**	
	n	**M**	**SD**	**M**	**SD**	**M**	**SD**
Study 1	295	126.2	14.4	95.8	13.0	104.3	13.0
Study 2	233	85.91	13.3	63.53	12.2	62.13	12.1

We also tried to analyze the influence of personal variables, in this case gender, and academic variables, namely the year of academic formation, in the epistemological development of students.

With regard to gender, there were significant differences in the two subscales of PCDI both in study 1 (Career – Absolutism: t=-2.680; p=.008; Education – Absolutism: t=-5,981; p=.000), and Study 2 (Career – Absolutism: t=-1.540; p=.008; Education – Absolutism: t=-4.972; p=.000). As can be seen in Table 2, the female were more absolutist in the two subscales of PCDI than the male participants.

Table 2 *Levels of epistemological development according to gender*

		Study 1		Study 2	
Subscales of PCDI and levels of thinking	Gender	n	M	n	M
Career – ABS	Male	71	35.5	70	34.5
	Female	218	37.1	163	37.2
Education – ABS	Male	71	43.7	70	44.8
	Female	219	49.3	163	49.4

With regard to academic year, there were significant differences in the two subscales of PCDI both in study 1 (Career – Absolutism: F=18.233; p=.000; Education – Absolutism: F=37.866; p=.000), and study 2 (Career – Absolutism: F=19.232; p=.000; Education – Absolutism: F=36.763; p=.000). In both studies there was an increase of absolutism as the students progressed in the academic year, being that the students of the 2nd cycle turned out to be more absolutist than the students of the other years (Table 3).

Table 3 *Levels of epistemological development according to academic year*

Subscales of PCDI and levels of thinking

		Study 1				Study 2			
		Career – ABS		Education – ABS		Career – ABS		Education – ABS	
Study cycle	Academic year	n	M	n	M	n	M	n	M
1st cycle	1st year	130	119.7	131	124.2	79	80.2	79	83.3
	2nd year					36	81.3	36	82.7
	3rd year	94	147.5	94	136.8	42	81.7	42	84.1
2nd cycle	1st year	65	191.9	65	200.8	76	84.6	76	85.2
	Total	289		290		233		233	

Discussion

The studies carried out in the field of epistemological development of the student of higher education reveal that student's progress from an absolutist to a more relativistic thinking, along they advance in academic formation (Baxter-Magolda, 2002, 2004; Faria, 2008; King, & Kitchener, 1994, 2002; Perry, 1981). On the contrary, in the present study the results point to a predominance of absolutism in all years of academic formation, without any progression in the type of thinking. Thus, the predominance of absolutist thinking may be due to the traditional teaching-learning processes, namely to the teaching methods used. The Portuguese education system, from primary education to higher education, continues to be based on traditional teaching, in which teachers have as their main mission the transmission of information and students assume, mainly, a passive role, limiting themselves to absorb this information. Traditional teaching does not encourage or provide sufficient challenges for the epistemological development of students. According to Marchand (2008), the epistemological development is, in Perry's perspective, activated by the use of teaching methods that encourage the risks, research and analyses of complex problems, propitiators of cognitive conflicts, that facilitate the awareness of the incongruities of reasoning.

It should be noted that one of the main goals of higher education institutions should be to promote changes in the students' level of thought. For such, it is necessary to adapt educational practices and policies to the students' level of thinking, challenging the existing ideas in individuals with ideas with a higher level of complexity in order to promote the critical conflict and the restructuring (Faria, 2008). A greater stimulation of self-regulated learning is required, encouraging students to take greater responsability in organizing their school curriculum and encouraging them to think more reflectively (Marchand, 2008). The student should gradually assume a more active role in the learning process, while the teacher leaves the role of specialist and knowledge holder.

But we can not atribute responsability for the predominance of absolutist thought only to the education system. In this way, another of the aspects that can explain this finding is time. As O'Donovan (2010) points out, epistemological development is something that occurs in time. We can not expect students to mature at the thought level if there is no personal maturation, if there are no life experiences that put them face-to-face with diversity.

Regarding gender, the studies do not reveal differences when considered this variable (Baxter-Magolda, 1992; Pirttila-Backman, & Kajanne, 2004; Medeiros, Ferreira, Almeida, Peixoto, Tavares, & Morais, 2002). However, a study by Martins (2005) showed that female participants were more relativistic compared to male participants. In the present study there were also differences in relation to gender, however, and contrary to the results of the study by Martins (2005), the female presented higher levels of absolutism.

Bearing in mind that some studies (Bastos, Faria, & Silva, 2007; Friedman, 2004) evidenced that the students of higher education present higher levels of epistemological development in the more advanced years of academic formation, it would be expected that the students of the 2nd Cycle would reveal a more relativistic level of thought and the 1st Cycle students a more absolutist thought. On the contrary, in the present study there was an increase of absolutism as students advance in the academic formation, being that, in a general way, the students of the 2nd Cycle proved to be more absolutist than the students of 1st Cycle. These results are in agreement with the results obtained in an Elwell (cited by Faria, 2008) and Zhang (2004) study, in which there was an inversion of the developmental sequence proposed by Perry, and students become more absolutist as they progress in academic education. It should be noted that in the present study, as in the Elwell study (cited by Faria, 2008), the sample integrates non-traditional students. Nontraditional students have different characteristics in terms of development than traditional students. The vast majority of these students are in the 2nd cycle, so it may contribute to the explanation of the increase of absolutist thinking in this cycle. It should be noted that this is a recent reality, and the studies carried out for the elaboration of explanatory models of the epistemological development of the student of higher education do not integrate these students. As Faria (2008) points out, the limited research with this type of student is not yet sufficient to allow us to understand if there are indeed developmental differences in epistemological terms in these two groups.

Conclusion

From the present work emerge two aspects of extreme relevance: a) there is a predominance of absolutist thinking in the students of the University of Madeira; and b) there has not been a developmental progression in terms of an absolutist thought for a more relativistic thought, as the literature in the area indicates, but rather an increase of absolutism students advances in academic formation. These facts can be explained by the current characteristics of Portuguese higher education, which continues to be based on traditional teaching, by personal characteristics of the students and by the current particularities of life contexts, which lead more and more students with different developmental and intellectual specificities to higher education.

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The Department of Psychology of the University of Évora and the Institute for Psychology of the University of Leipzig organized jointly the II Leipzig-Évora Scientific Meeting in Psychology, with the purpose of consolidating academic and scientific cooperation between both institutions, fostering mutual knowledge of scholars, scientists and students, broadening common scientific production and reinforcing institutional relations.

This volume, called *Psychology In Education and Health* contains the main contributions presented by scholars of Leipzig and Évora, as well as by guests from the University of Madeira (Portugal) and the University of Veracruz (Mexico).

Papers on the application of Psychology in the fields of Health, Well-being, Education, Child Development and Clinical were discussed. The main areas of research and application in modern Psychology are here represented, like

· Stress management
· Health and Well-being
· Research on personality
· Emotional development
· Attention of elderly persons
· Psychological consequences of disasters
· Learning at school and at the university
· Family interactions

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