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# CREATIONIST CONCEPTIONS OF PRIMARY AND SECONDARY SCHOOL TEACHERS IN NINETEEN COUNTRIES

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## **Abstract**

*Our work is the first international comparison of teachers' conceptions on Evolution / Creation, using several questions on precise and large samples to identify the importance of creationist ideas in the context of their national, religious, economic, cultural and political backgrounds. This research concerns 19 countries: 13 in Europe, 5 in Africa and one in Middle East: 7050 teachers filled out a questionnaire including several questions on Evolution vs. Creation. Half of them are in-service teachers, the other being at the last year of University before teaching. They are teaching in Primary Schools as well as in Secondary Schools (Biology, or Language). The percentages of teachers' radical creationist conceptions differ more from one country to another (from 2% to 90%) than among religions inside each country. There are some, but not so important, differences between Biology teachers and other teachers. The teachers' conceptions also differ with the level of teacher training: more they are instructed (in any matter), more they are evolutionist.*

## **Key-words**

Creationism - Evolution - Teachers - Religion - Level of teachers' training

## **Introduction**

Although schools are the core targets of the anti-evolutionist offensive (IAP, 2006), relatively few studies have assessed teachers' conceptions of the issue and not one has focused on an international comparison of them. Prior to our project, there had been few surveys (Miller, 2006 ; Special Eurobarometer, 2005) which assessed the spread of creationist and / or evolutionist ideas among adults. The most documented one to our knowledge (Miller, 2006) compiled several polls from 34 countries (of which 32 were in Europe, including Turkey; plus Japan and United States). Its results showed that the U.S. and Turkey were the most creationist countries. A recent work (Hameed, 2008) published data gathered from only one question in six Muslim countries, others than those analysed in the present work, showing a high reject (61 to 73%) of Evolution in five of them, but a less important reject (27%) in Kazakhstan.

We distinguished anti-evolutionist conceptions (radical creationism) from conceptions which were both creationist and evolutionist. In his famous paper "*Nothing in biology makes sense except in the light of evolution*", Dobzhansky (1973) wrote "*I am a creationist and an evolutionist. Evolution is God's, or Nature's, method of Creation*". When teachers have this kind of "creationist-evolutionist conception" they can teach biological evolution at school without problem.

## **Rationale**

What are, in the 19 countries chosen by their diversity (inside Europe, and also outside) the teachers' conceptions on biological Evolution / Creation ? Is it possible, using several questions on precise and large samples, to identify the importance of their possible creationist ideas in the context of their national, religious, economic, cultural and political backgrounds? Our work is the first international comparison of this size analysing the teachers' conceptions related to this topic. Its first results were already published (Clément & Quessada, 2008, 2009).

## **Methods**

This research has been done in the context of the research project BIOHEAD-Citizen in 19 countries in Europe, Africa and the Middle East) (Biohead-Citizen, 2004-2008). The 19 countries were selected for their diversity of economic development and socio-cultural contexts, especially regarding religion (table 1). Between 2006 and 2007, a total of 7,050 teachers anonymously filled out a questionnaire which included fifteen questions related to Evolution (six of which were related to creationism) as well as questions regarding personal information (such as age, gender, and socio-cultural information including political and religious beliefs). The sample was a balanced set of in-service teachers and pre-service teachers (i.e. adults in their last year of teacher training), in both primary and secondary schools, who taught biology or the national language. The table 1 presents the total sampling of each country, with more precisions regarding the declared teachers' religions. The questionnaire has been built during the two first years of the project (2004-6), then tested (pilot test and other tests), translated, validated and finally improved (Clément & Carvalho, 2007). The data are analysed by classical statistical tests as well as by multivariate analyses (software "R") (Munoz & Clément, 2007 ; Munoz et al., 2009).

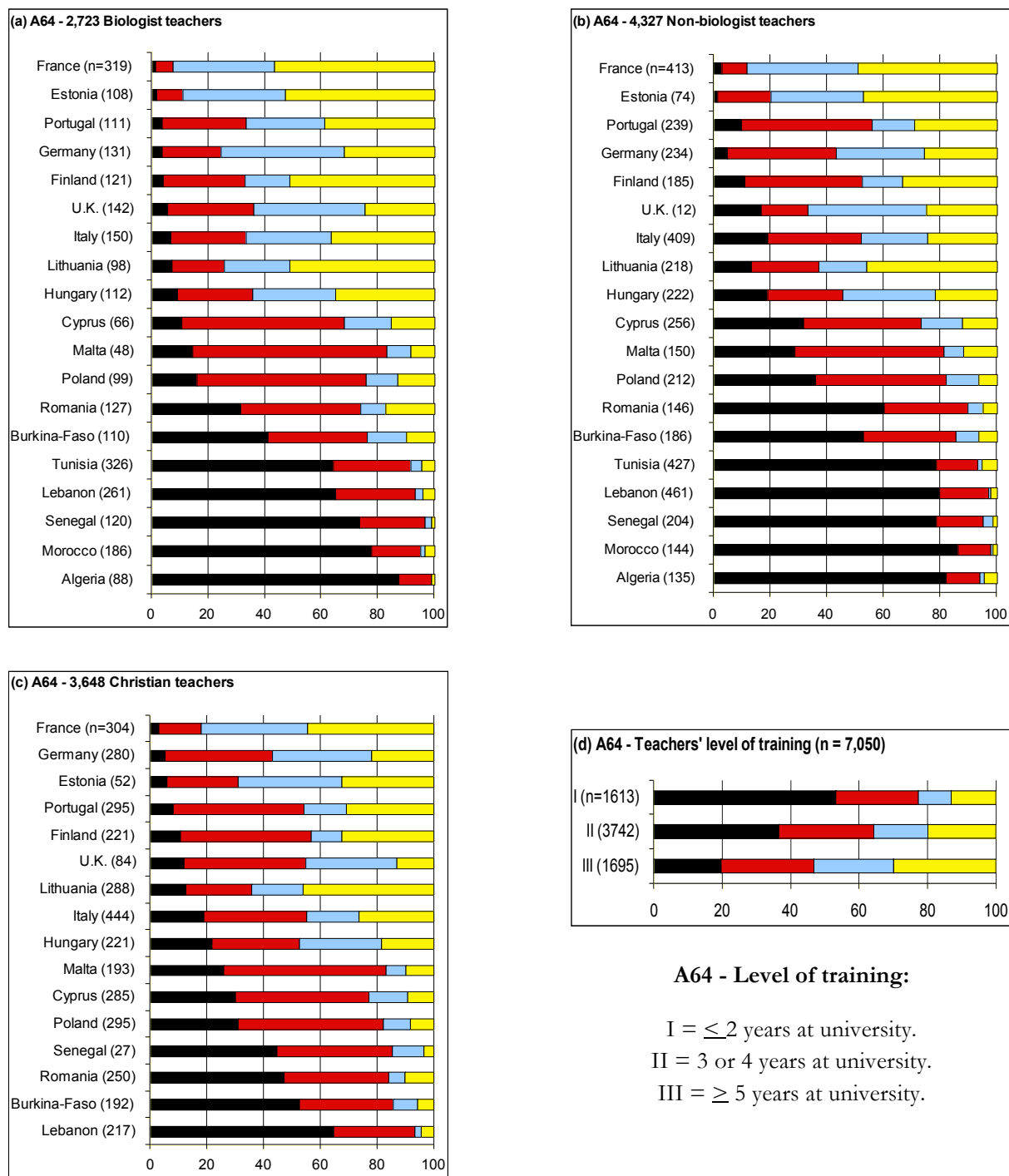
**Table 1. Presentation of the samples for the 19 countries** - "biologists" are the in-service and pre-service biology teachers + other teachers having a training in biology at University (some Primary school teachers). - *Other* = mainly no answer to the question + all the other religions.

	<b>Country</b>	<b>Total</b>	<b>including biologists</b>	<b>% Atheist. Agnostic</b>	<b>% Catholic</b>	<b>% Protestant</b>	<b>% Orthodox</b>	<b>% Muslim</b>	<b>% Other</b>
BF	Burkina Faso	296	110	2,4	45,6	18,6	0,0	24,7	8,8
CY	Cyprus	322	66	4,0	9,0	1,2	77,3	0,0	8,4
DE	Germany	365	131	13,4	44,7	31,8	0,0	0,3	9,9
DZ	Algeria	223	88	1,3	0,0	0,0	0,0	91,9	6,7
EE	Estonia	182	108	43,4	7,7	14,8	2,2	0,5	31,3
FI	Finland	306	121	15,0	1,0	66,3	2,9	0,0	14,7
FR	France	732	319	50,5	38,1	1,9	0,3	1,5	7,7
GB	Great Britain	154	142	33,1	11,0	33,8	0,6	0,0	21,4
HU	Hungary	334	112	15,3	46,4	16,2	0,0	0,0	22,2
IT	Italy	559	150	12,3	78,7	0,5	0,0	0,0	8,4
LB	Lebanon	722	278	0,4	21,1	0,4	8,3	65,0	4,8
LT	Lithuania	316	98	4,1	89,9	0,6	0,3	0,0	5,1
MA	Morocco	330	186	0,6	0,0	0,0	0,0	97,3	2,1
MT	Malta	198	48	0,5	96,5	1,0	0,0	0,0	2,0
PL	Poland	311	99	1,9	94,2	0,6	0,0	0,0	3,2
PT	Portugal	350	111	9,4	76,3	7,4	0,0	0,0	6,9
RO	Romania	273	127	7,3	8,1	7,0	71,1	0,0	6,6
SN	Senegal	324	120	0,9	8,3	0,0	0,0	89,2	1,5
TN	Tunisia	753	326	1,9	0,0	0,0	0,0	96,0	2,1
<b>Total</b>		<b>7 050</b>	<b>2 723</b>	<b>11,8</b>	<b>35,1</b>	<b>8,3</b>	<b>7,4</b>	<b>29,6</b>	<b>7,8</b>

## Results

### 1 - National context, belief in God and GDP

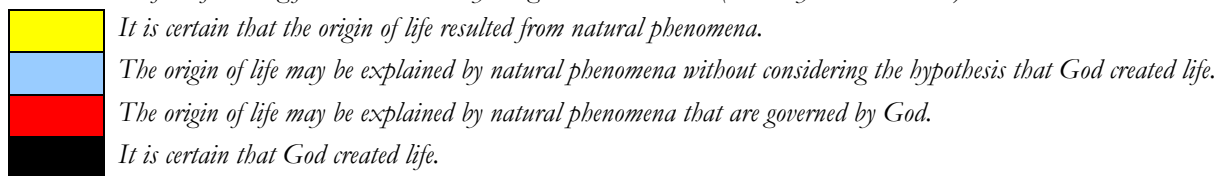
In several countries, most of the teachers display creationist conceptions. There is a very large contrast across countries: for instance, for a question related to the origin of life, from 2% to 90% of radical creationist conceptions, Figure 1). There is a very significant correlation between such conceptions, belief in God and religion practice and also a strong inverse correlation with the GDP (Gross Domestic Product) per person. The GDP/person (Gross Domestic Product / person) is correlated with the degree of belief in God ( $r = -0.69$ ,  $p$ -value = 0.001) and of religious practice ( $r = -0.76$ ,  $p$ -value = 0.0001) and also with the teachers' creationist conceptions ( $r = -0.73$ ,  $p$ -value = 0.0004).



**A64 - Level of training:**

- I =  $\leq 2$  years at university.
- II = 3 or 4 years at university.
- III =  $\geq 5$  years at university.

**A64 - Which of the following four statements do you agree with the most? (tick only ONE answer)**



**Figure 1 - Answers to question A64 (“origin of life”) in the 19 countries (7,050 teachers)**

A large proportion of creationist teachers also acknowledge evolutionary processes (for example, in the Figure 1: item 3: *"The origin of life may be explained by natural phenomena that are governed by God"*). The percentage of radical creationist conceptions related to the origins of mankind is similar to those of the origins of life, with the same, marked differences between countries. The answers to the four other questions related to creationism are significantly correlated with those from the questions on origins of life (figure 1) and of humankind.

## 2 - No (or few) difference between religions inside each country

The percentage of teachers' creationist conceptions differs more between countries than between religions within the same country. Among the 3,648 Christian teachers, the percentage of evolutionists varies greatly: from 97% in France to 36% in Lebanon (Figure 1c).

More precisely, in each country, there is no significant difference between conceptions of Catholic and Protestant teachers (Chi<sup>2</sup> test).

In our samples, Orthodox teachers were dominant in Cyprus (77%) and Romania (71%), and less present in Lebanon (8%) (Table 1). Their answers about the origin of life are not significantly different from those of Catholic teachers ( $p > 0.05$ , Chi<sup>2</sup> test) within each of these three countries.

In Burkina Faso and Lebanon, there were Muslim and Christian teachers (Table 1). In Burkina Faso, 40% of the Muslim teachers are radical creationists compared to 53% of Christian teachers, whereas the trend is reversed in Lebanon where the proportion of radical creationist answers is higher among Muslim as opposed to Christian teachers (80% compared to 65%). In summary, the proportions of creationist and evolutionist conceptions do not vary, or vary scarcely, within the same country according to the religion of the teachers, but when one takes into account teachers who share the same religion, they vary very strongly from one country to another. This conclusion does not concern agnostic or atheist teachers who are evolutionist regardless of their country.

## 3 - The influence of university teachers' training

A Chi<sup>2</sup> test (with Bonferroni's correction) shows that biologists are more evolutionist than non-biologists. As explained in the legend of the table 1, "biologists" are the in-service and pre-service biology teachers + other teachers having a training in biology at University (some Primary school teachers). Nevertheless, the figures 1a & 1b show that the difference between biologist and other teachers is not so important; the difference is significant in only 9 countries among the 19.

We also found that the greater length of time a teacher studied at university, the more evolutionist he or she is, regardless of the subject he or she teaches in primary or secondary schools. Of the total sample of 7,050 teachers, the proportion of radical creationists (Figure 1d) is 20% after 5 years or more of university, 37% after 3 or 4 years, and 53% after 2 years or less. These differences are the same for the 5 other questions related to creationism. Since this effect may be a bias resulting from the lower level of teacher qualification in less developed countries, we tested

the variation in conceptions across number of years spent at university when the variation across countries and religions was controlled. A randomization test confirmed the effect of the length of teacher training at university (p-value < 0.001).

## **Conclusions and Implications**

We just summarized our results here, answering to the research questions: there are very important differences of teachers' conceptions on Evolution / Creation from one country to an other. And we identified, using several questions on precise and large samples, strong correlations between creationist ideas and some other features than their nationality: degree of believing in God and of religious practice (but very few with other political or social). These results could be discussed more precisely country by country. We just wish to conclude here that they offer encouragement to teach Evolution in schools in a more effective way, and, more generally speaking, the longer is the period of teacher training at university, the greater the acceptance of evolutionist ideas.

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