

Paper Title: How do biology students believe?

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Abstract:

The relation between science and religion has been a question of interest since the 19th. century. Reflecting international tendencies, in the past ten years the polemic about the theory of evolution has become more and more vehement in Hungary as well. The starting point of my research was that it is worth examining the views of those who have factual knowledge of the matter of evolution (e.g. who learned about it, examined it in laboratories, etc.), and whose attitudes are not formed solely by the general world view they devoted themselves to.

The questions I will talk about on the basis of our results are:

- In what manner are the students religious? As according to some views biology challenges the religious world view, the question arises whether the students majoring in biology are less religious than the average of the university students – or just the opposite?
- What is the relation between science and religion for a university student? Can religion encourage scientific thinking? Do insights of religion and insights of science complement each other or do they contradict?
- Do religion and science refer to the same reality?
- What determines the way a student think about evolution more: is it his/her religious background or his/her university education?
- Do students of biology have any problem in reconciling the two theories: evolution and creation? Do they see any contradiction between them at all? If so, how do they think the two concepts are reconcilable?

It is my belief that it's not just the social sciences but also the whole society that can draw lessons from such research. Examining the religious scientists' way of thinking can show us that these two territories, science and religion, that are often held contradictory to each other can get on well together in the same human mind – with or without inconsistency.

Biography:

Katalin Mund, one of the founders of the 3 Cultures Group, was born in Hungary in 1971. She is a Buddhist theologian, graduated in 1999 at the Gate of the Dharma Buddhist Collage, Budapest, Hungary. The title of her dissertation was: *The religious message, the two fundamental interpretations of Buddhism*. Katalin Mund is also a sociologist graduated in 2004 in Eötvös University, Budapest, Hungary. The title of her dissertation was: *The Gods of East in the West*. Now she is working on her PhD-dissertation on Sociology at Eötvös University. Her research fields are sociology of religion (especially New Religious Movements and Science and religion) and sociology of science (especially problems of interdisciplinarity). She is two-times winner of the Hungarian National Scientific Student Conference on sociology. In 2002 she was awarded with the Mannheim Certificate for the best student of the Department of Sociology in Eötvös University. She was honoured with the Student Science Fellowship Award two times, the Scholarship of the Hungarian republic three times. In 2003 she won the Pro Scientia Gold Medal, Prize of the Hungarian Academy of Science for students and the Pro Renovanda Cultura Hungariae Student Science Foundation Fellowship Award.

Paper:

The relation between science and religion has been a question of interest since the XIX. century. Reflecting international tendencies, in the past ten years the polemic about the theory of evolution has become more and more vehement in Hungary as well. The starting point of my research was that it is worth examining the views of those who have factual knowledge of the matter of evolution (e.g. who learned about it, examined it in laboratories, etc.), and whose attitudes are not formed solely by the general world view they devoted themselves to.

The database of my presentation was provided by a survey that we made among university students of two Hungarian universities (Eötvös University, Budapest and University of Szeged) in the fall semester of the academic year of 2003/2004. The survey was part of a larger national project “*Religion and Evolution in the XX. century and contemporary Hungary*”, leaded by prof. George Kampis, member of our LSI group, the 3 Cultures Group.

Questionnaires were completed during regular class by 562 students, among whom 369 were the students of Eötvös University and 193 students were from Szeged. 318 students studied biology, 126 studied some other natural science and the rest 104 undergraduates studied in the faculty of Humanities (an additional 14 students didn’t answer this question.)

1. Religion

If we are interested in the relation between science and religion it is essential that we make it clear what manner those students are religious, whose attitude about evolution we observe.

Students do believe!

1. Table

Are you a religious person? (%)

Yes I am.	34,8
No, I am not.	25,1
I am religious in some respect.	35,5
I don’t know.	1,1
I don’t want to answer.	3,5
Total	100,0

34,8 percent of respondents say they consider themselves to be part of some religion and an additional 35,5 percent say that they are religious in some respect. Only 25,1 percent declare that they belong to none.

2. Table

What is your religious denomination? (%)

Roman Catholic	40,9
Protestant	11,2
Evangelic	3,7
Other Christian	3,5
Jew	0,4
Hindu	0,4
Buddhist	1,9
Other	3,9
None	23,2
I don’t want to answer	10,9
Total	100,0

Our results slightly differs from the results of the national census in 2001¹ (%):

Roman Catholic	51,9
Protestant	15,6
Evangelic	3,0
Jew	0,1
Other	1,1
(Eastern Church	2,6)
None	15
No answer	10,7
Total	100,0

As you can see there are less students belonging to the traditional churches in our sample than in the national census, at the same time the ratio of the other religious movements are much higher. This shows that it is the young people who are more open to these kinds of new religious movements in Hungary.

A. M. Farkas observed the various Hungarian non-Christian new religious movements (first of all Buddhism) and made a remark that most of the members have the characteristic of mixed identity, that is the followers confess themselves to be Buddhist and Christian or Buddhist and Jew etc. at the same time.² I wanted to test this hypothesis so I let the students mark more than one answer to this question.

3.1. Table

What is your religious denomination?(2.) (person and %)

Protestant	1	0,2
Evangelic	1	0,2
Jew	1	0,2
Hindu	2	0,4
Buddhist	14	2,5
Muslim	1	0,2
Other	2	0,4
None	2	0,4
Doesn't mark two answers.	544	95,8
Total	569	100,0

3.2. Table

What is your religious denomination? * What is your religious denomination? (2.):

What is your religious denomination?	What is your religious denomination? (2)								Total
	Protestant	Evangelic	Jew	Muslim	Hindu	Buddhist	Other	None	
Roman Catholic	1	1		1	1	8		1	13
Protestant			1		1	1	1		4
Evangelic						2			2
Other Christian						1			1
Jew						1			1
Hindu						1			1
Buddhist							1	1	2
Total	1	1	1	1	2	14	2	2	24

¹ www.nepszamlalas2001.hu/dokumentumok/pdfs/vallas.pdf

² Farkas Attila Márton: Buddhizmus Magyarországon, avagy az alternatív vallásosság egy típusának anatómiája. MTA PTI Etnoregionális Kutatóközpont Munkafüzetek 50. Budapest, 1998.

562 students were asked from whom 24 students grasped the opportunity to mark more than one answer. Most of the persons having double identities are Catholics (13 persons), and protestant (4 persons). Most of the students marking some kind of a double identities confess themselves to be Buddhist. We can suppose that those students who confess themselves to be Buddhist and Christian at the same time, wanted to tell that they are Christian by birth (i.e. they are baptised), but concerning their religion, their world view, their faith, etc. they are Buddhists. If this is true we can add all the persons who confessed themselves to be Buddhists either in the first or second place and we get the somewhat amazing result that from 562 students 25 are Buddhists, that is the 4,4 percent of the whole sample. This means that Buddhism is the third most important religion after Catholicism and Protestantism among university students, Buddhists precedes Evangelicals, other Christians and Jews in a traditionally Christian country!

The regularity and manner of the practice of religion were also asked.

4. Table

Apart form weddings, funerals and christenings, about how often do you attend religious services? (%)

More then once a week.	4,7
Once a week.	12,1
Once in a month.	8,3
Only on special holidays.	16,7
Once in a year.	9,5
Less often.	12,3
Never, practically never.	31,6
I don't want to answer.	4,7
Total	100,0

5. Table

Do You take some moments of prayer, meditation or something like that? (%)

Yes, regularly.	29,9
Yes, sometimes.	42,4
Never, practically never.	23,6
I don't want to answer	4,2
Total	100,0

25 percent of the respondents go to Church regularly (at least once in a month), at the same time 29,9 percent of them pray regularly, that means part of the students don't practice their religion within organized frameworks. There isn't any student visiting a church habitually who doesn't pray or meditate regularly. At the same time there are plenty of students (64 persons) who although pray or meditate regularly attends religious services only once in a while, at the most only on special holidays.

Believers do not have a homogenous image of their God.

6. Table

Which of these statements comes closest to your beliefs? (%)

There is a personal God.	35,5
There is some sort of spirit or life force.	23,2
There is an impersonal directing law of the world.	13,7
I don't know what to think.	6,5
I don't really think there is any sort of spirit, God, life force or impersonal directing law of the world.	10,7
I don't want to answer.	10,4
Total	100,0

We have observed the family background as well. The religious education were measured by three variables.

7.1. Table

Did you attend Bible-classes? (%)

No, I didn't.	30,8
Yes, I did.	66,8
No answer.	2,5
Total	100,0

7.2. Table

Did your parents give you religious background? (%)

No, they didn't.	58,3
Yes, they did.	35,0
No answer.	6,7
Total	100,0

7.3. Table

Did your grandparents give you religious background? (%)

No, They didn't.	48,9
Yes, they did.	45,0
No answer.	6,2
Total	100,0

66,8 percents of the students attended Bible-classes, at the same time religious background was given by parents or grandparents to only less than half of the students. The recent history of Hungary can give an explanation for this phenomena. After the democratic transformation in 1989 there was much more freedom in attending Bible classes, so much the more because it was possible to learn about religion not only in the churches but also in most of the schools. On the other hand parents grew up in the anti-religious atmosphere of the Kádár-era, which surely influenced their way of thinking and their habits. It is likely that many of the parents believed that for safety's sake it won't be harm if their children attend Bible-classes in these doubtful times.

Those students who got all the religious education from their family are more religious than their fellows who didn't get any religious education at all. They visit churches more regularly, and pray or meditate more often as well. As religious education in Hungary means education for the traditional religions that is Catholic, Evangelic, Protestant or Jewish religion, it is not surprising that students getting religious education prefer traditional Churches, they rather believe in a personal God than in some sort of spirit, impersonal life force or directing

law of the world. On the other hand, students having no religious background usually either don't believe in anything, or they are not sure what to think.

Respondents from villages are more religious than their fellows from larger cities and Budapest, and they rather follow one of the traditional religions. Students grew up in Budapest or some other larger cities of Hungary are more responsive to the various non-Christian new religious movements.

The parents' education and their job have no influence on the students' religiosity. There is no significant differences between the different social classes and positions of the family in the society concerning the students' religiosity as well.

There are no differences between the majors and the years either.

2. Science

Reading through the continuously growing amount of literature on the relation between science and religion, one can see the question pops up again and again: Does religion encourage or hinder scientific thinking? Do insights of religion and insights of science complement each other or do they contradict? Do they refer to the same territory of reality or they need to be interpreted on totally different basis? To answer these questions it is not enough for us forming a notion of the students' religiosity but we also need to observe what they think about science in general.

8. Table

Do you think that you can get true knowledge from science? (%)

Yes I do.	50,3
More or less.	39,4
No, I don't.	1,8
I don't know.	4,6
I don't want to answer.	4,0
Total	100,0

Roughly half of the students think that they can get true knowledge from science. However 39,4 percent of the respondents believe that the knowledge gained from science is only more or less true. Who thinks this way? There seems to be no significant differences between genders, majors, years in this respect. Even religion has no importance in this case. Who are those students than and what reasons do they give for this answer?

In the questionnaire respondents marking this answer had the opportunity to explain their point of views in details. Let's see what kind of explanations we got. However the typology is only a rough estimate as most of the explanations overlap each other.

Among those who gave the reasons as well the greater number (38 persons) referred to the fallibility of science, that the newer researches can modify the previous results. Thinking about something to be true today can turn up to be not true tomorrow. An additional 12 persons wrote that our knowledge is incomplete, so we can only try to guess in these cases. *"There are things which haven't been realised yet, just like the flat Earth long ago."*

It is impossible to sharply distinguish the second largest group (18 students) from the above mentioned ones, who complain about the lack of evidences. They wrote for example that *"science is the aggregate of verified and not-verified knowledge"*. According to them the verified facts are not separated from the assumptions. Some of them talked about some kind of a wilful misleading. In one answer the lack of evidence accompanied by faith: *"Every science give you true knowledge inside its own model, but the model is something you accept without evidence"*.

An additional 13 students suggested some sort of a conspiracy theory. *“I think there are much knowledge that is kept secret, and mistakes are advertised”*. Two persons believe that science can give true knowledge *“up to the point it is its own interest”*. Seven students protested against the influence of the political and economical interests. Finally one student quoted the distortion of history by way of example.

Twelve respondents drew attention to the impossibility of knowing the objective reality. Let’s see an example: *“Probably there is something like objective reality, but because it is unknowable it is not important after all, however acquiring knowledge is good.”* Two students referred to faith or religion: *“We don’t know a lot of things about the origin of the universe. We assume that there was matter from the very beginning. Religion assumes the existence of God.”*; *“This is based on faith. And we believe in what we think is true.”* One student drew a practical conclusion: *“Nothing should be accepted, there are only assumptions, but we have to work on the basis of something, haven’t we?”*

It is hard to separate from the previous group the following twelve beliefs, where some kind of a philosophical reference appeared. Two students asked back. *“What is truth?”* A third one added: *“False knowledge is also important because truth can be observed only in the light of it.”* Two students blamed science: *“There are all the time discoveries that are true, yet they are not considered to be scientific.”* One student explicitly referred to Kuhn and Feyerabend. An other one noted that *“scientific theories can be falsified”*. One student wrote that *“science says what it believes to be true and not what really is true”*. According to two students science *“reflects the society of the era, and that is not always impartial”*.

Eleven students pointed out that the answer *“depends on which discipline we are talking about”*. Usually it is the study of history they gave as a negative example.

Some students wrote that science can only give *“partial truth”*, *“science throws light upon truth only from special point of views”*. *“Every science gives its own truth which are often contradict to each other.”*

Finally there were only six students being equal to our previous expectation that is they referred to religion: *“Science is only a tool to get better knowledge about God”*; *“Science has many reality but is not enough by itself”*; *“Science is often against religion”*. One of them wrote that *“although science can give true knowledge, except when it is about evolution, that is about the origin of men, animals and the appearance of life”*.

In the second question of our questionnaire we wanted to qualify the issue on the opinions concerning biology. Students of biology were assumed to have a totally different view on biology than students of other majors, as they have a much deeper knowledge on this subject. At the same time we also hypothesized to find religious students to have some problem with pledging oneself to study biology as creation is more or less opposed to one of the most important theory of biology, namely evolution. However there were no significant differences between majors, between senior and juniors, and the influence of religion didn’t appear either.

9. Table

Do you think that biology can give as reliable knowledge as all the other sciences?(%)

There aren’t any differences among sciences in this respect.	63,3
Biology gives more reliable knowledge.	20,7
The other sciences give more reliable knowledge.	6,0
I don’t know.	7,6
I don’t want to answer.	2,5
Total	100,0

The majority of the students (63,3 percent) think there aren't any differences among sciences. At the same time according to 20,7 percent of the respondents biology gives more reliable knowledge. Observing only students of biology this ratio remains almost the same: 18,9 percent of the students of biology, that is 55 students have the opinion that biology gives more reliable knowledge. What did these respondents think when marking this answer? The survey were completed with interviews from which the following three types of explanation took form:

1. Biology is more reliable than the other sciences because it deals with the visible things around us, and not the abstract concepts or invisible elementary particles like for instance physics.
2. Biology is more reliable than the other sciences because here everything is based on experiments that can be done many times again and again and the results would be the same all the time.
3. Biology is more reliable than the other sciences because it deals with living beings. Living beings have a soul while the inorganic things don't have souls. Creatures having a soul are more real than things without soul, therefore biology deals with the most real things.

In our questionnaire it was also asked directly if they can accept the theory of evolution. We supposed that religious students accept the theory less than their atheist fellows.

10. Table

Do you accept the theory of evolution or you don't? (%)

Yes, I do.	70,3
No, I don't.	3,5
More or less.	19,3
I don't know.	3,5
I don't want to answer.	3,3
Total	100,0

Most of the students (70,3 percent) accept the theory of evolution, and just a very few (only 3,5 percent) gave a flat refusal. However there is a third group of respondents who can only accept it to some degree. The questionnaire gave possibility for them to define their positions in details. Let's see what kind of explanations they gave.

Most of them (26 persons) directed attention to the lack of evidences and to *"the missing links"*. *There isn't enough living or fossilized evidence to prove with absolute certainty evolution". The principle, the essence of the theory can be accepted, but the smaller details rise certain difficulties and problems"*. An additional two students emphasised that they can only accept some parts of the theory: *"I can accept the existence of the phenomena of evolutionary development but the earliest parts of phylogenesis, events in the distant past with reservation"*; *"I accept the fundamentals, but it is much more tinged than according to the classical Darwinian theory"*. Several students admitted that their knowledge are incomplete concerning evolution: *"I don't have all the knowledge to accept undoubtedly all its claims"*.

The second group with almost similar size (22 persons) directly refer to religion, that is they can accept the theory of evolution up to the point: *"it does not exclude the existence of God"*. Some feel the evolutionary explanation is insufficient: *"It must have played some role, but it couldn't be enough for the formation of present days' life by itself."* Two students questioned *"the evolution of man"*: *"It is not sure that we descend from Apes"*. Some of them seems to accept evolution unwillingly but consider religion to be just as important: *There is*

change in the phylogenesis of animals, but being faithful I believe it can not replace the Creator". [I accept evolution up to the point] "it stays within the territory of science and does not try to solve the "final questions" and does not try to give absolute answers." Some argue for microevolution: "Species come into being today too; but this is only microevolution. For example: subspecies separate definitely. But life descends from God and all the (main) species of animals as well, in which an ability to dynamic change is created". One student thinks that "it is likely that the theory of evolution and the teachings of religion have some kind of similarity". According to a follower of Krisna "there is a spiritual evolution in which the soul moves to species of higher and higher quality, and finally it reaches the human mode of existence."

An additional nine students commented on their answers, but these can not catalogue to one single type. Let's see a few of them. One of them only says: "I can see many problems in it." An other one is uncertain because of "the diversity of living beings". One student wrote: "the driving force is too small for such a big result". Conspiracy theories appear too: "I think it is manipulated. There are many books and articles about that it is only the belief of one concern that is permitted".

The members of the first and the third group offered seemingly more or less scientific arguments. However if we observe their answer concerning their religiosity it can be seen that eighteen students confess themselves to be definitely religious, the other fifteen confess to be religious in some respect, and there is only two students that are not religious. That means that almost everyone of those who can accept evolution only up to some point (or refuse evolution more or less) – at least those who defined their positions in details – are religious to a certain extent. 110 students answered that they can accept evolution more or less, among them there were 57 respondents giving details. All of them except two were religious, which means that it is more important for the religious students to express their opinions on evolution than for the atheists.

The following cross-table shows the relation between religiosity and the acceptance of evolution:

11. Table

Do you accept the theory of evolution? * Are you a religious person?

Do you accept the theory of evolution?	Are you a religious person?			Total
	Yes, I am.	No, I am not.	Yes, I am in some respect	
Yes, I do.	120 30,8%	124 31,8%	146 37,4%	390 100,0%
No, I don't.	14 73,7%		5 26,3%	19 100,0%
More or less.	55 51,4%	11 10,3%	41 38,3%	107 100,0%
Total	189 36,6%	135 26,2%	192 37,2%	516 100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	37,817	4	0,000

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Cramer's V	0,191	0,000
N of Valid Cases		516	

The table show a medium strong relation. Although most of the religious students accept evolution, there is a higher ratio of refusal among them than in the average. The non-religious students usually accept evolution. Most of those students who are religious in some respect accept evolution however quite a lot of them have some problem to accept this theory. One of the cells of the table is empty. There isn't any student who is not religious and does not accept evolution at the same time. That is each of those who refuse evolution are religious persons. Being religious seems to be the only criteria to refuse evolution.

At the beginnings I supposed to find a sharp difference between the students of biology and other majors, because students of biology learn about evolution and they can observe it in the laboratories, etc. So their opinion on evolution won't be as polarized as those who don't know precisely what the theory is about. In the opinions of the later ones religion is supposed to play a larger role in refusing evolution. Nevertheless I have found no differences between the students of various majors.

To what extent do the years students spent in the university influence their responses? I assumed that the more a student deals with biology the more "direct" experiences she or he gains concerning evolution, so she or he has much more to consider in answering the question. So I limited the observation only for the students of biology. The earlier noticed relation appeared only at the first-year students, in the table of the senior the two variables, the acceptance of evolution and religiosity were independent from each other! The result supports my initial hypothesis. For a senior the answer is by no means so explicit for the challenge of evolution. The gained knowledge seems to prevent them to rely solely on the religion when they have to judge the theory of evolution. Unfortunately our sample was too small to draw a considerable conclusion, but this remarkable phenomena needs further observation within the framework of a larger survey. The issue at stake is not less then one of the most important aspects of the war between creationists and evolutionists: How well is the theory (and mechanism) of evolution known by those who refuse it?

We also wanted to find out if the students think the two theory namely evolution and creation are reconcilable. It was assumed that the question is important for the religious students, they have already thought about it and tried to make them consistent with each other. On the other hand perhaps the question has never been raised by the non-religious students, so they wouldn't think the two theories to be reconcilable. Especially because they learned in the elementary and the secondary school that these ideas contradict each other.

12.1. Table

Do you think that evolution and creation are reconcilable theories? (%)

The two theories are reconcilable.	48,3
The two theories are against each other.	37,3
I don't know.	9,5
I don't want to answer.	4,9
Total	100,0

12.2 Table

Do you think that evolution and creation are reconcilable theories? * Are you a religious person?

Do you think that evolution and creation are reconcilable theories?	Are you a religious person?			Total
	Yes, I am	No, I am not	Yes I am in some respect.	
The two theories are reconcilable.	142 53,0%	29 10,8%	97 36,2%	268 100,0%
The two theories are against each other.	42 20,8%	92 45,5%	68 33,7%	202 100,0%
I don't know.	8 14,8%	16 29,6%	30 55,6%	54 100,0%
Total	192 36,6%	137 26,1%	195 37,2%	524 100,0%

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	99,446	4	0,000

Symmetric Measures

		Value	Approx. Sig
Nominal by Nominal N of Valid Cases	Cramer's V	0,308	0,000
		524	

Religious students rather think that evolution and creation are reconcilable theories, while non-religious students are more likely to believe these theories to contradict. Most of those who are religious in some respect holds the two theories to be reconcilable, however the ratio of irresolute respondents is the highest in this group.

I compared the different religions concerning evolution too. I reduced the religions into three categories:

13.1. Table

What is your religious denomination? (%)

Judeo-Christian	59,8
Other	6,2
I am not religious.	23,2
I don't want to answer.	10,9
Total	100,0

13.2. Table

Do you think that evolution and creation are reconcilable theories? * What is your religious denomination?:

Do you think that evolution and creation are reconcilable theories?	What is your religious denomination?			Total
	Judeo-Christian	Other	None	
The two theories are reconcilable.	207 82,1%	18 7,1%	27 10,7%	252 100,0%
The two theories are against each other.	96 49,7%	14 7,3%	83 43,0%	193 100,0%
I don't know.	28 59,6%	3 6,4%	16 34,0%	47 100,0%
Total	331 67,3%	35 7,1%	126 25,6%	492 100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	59,740	4	0,000

Symmetric Measures

		Value	Approx. Sig
Nominal by Nominal N of Valid Cases	Cramer's V	0,304	0,000
		323	

Those who follow any of the religions based on the Bible outnumber followers of other religions and non-religious students when to think the two theory are reconcilable. The members of the other two groups usually prefer to chose that these ideas are contradict to each other.

We got almost the same results when compering the question to the regularity and manner of practising religion. See for example:

14. Table

Do you think that evolution and creation are reconcilable theories?* Do You take some moments of prayer, meditation or something like that?:

Do you think that evolution and creation are reconcilable theories?	Do You take some moments of prayer, meditation or something like that?			Total
	Yes, regularly.	Yes, sometimes.	Never, practically never.	
The two theories are reconcilable.	121 45,7%	109 41,1%	35 13,2%	265 100,0%
The two theories are against each other.	37 17,8%	92 44,2%	79 38,0%	208 100,0%
I don't know.	8 14,8%	32 59,3%	14 25,9%	54 100,0%
Total	166 31,5%	233 44,2%	128 24,3%	527 100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	66,902	4	0,000

Symmetric Measures

		Value	Approx. Sig
Nominal by Nominal N of Valid Cases	Cramer's V	0,252	0,000
		527	

To sum up we can say that religious people more likely to think that the two theory are reconcilable, while most of the non-religious respondents believe they contradict.

I compared the question with other variables of the questionnaire, however there were no significant differences between majors, years, and any other dimensions of the students' family background either. At the same time a slightly difference appeared as regards gender.

15. Table

Do you think that evolution and creation are reconcilable theories?* Are you a male or a female?:

Do you think that evolution and creation are reconcilable theories?	Are you a male or a female?		Total
	Male	Female	
The two theories are reconcilable.	97 35,3%	178 64,7%	275 100,0%
The two theories are against each other.	61 28,9%	150 71,1%	211 100,0%
I don't know.	8 14,8%	46 85,2%	54 100,0%
Total	166 30,7%	374 69,3%	540 100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9,418	2	0,009

Symmetric Measures

		Value	Approx. Sig
Nominal by Nominal N of Valid Cases	Cramer's V	0,132	0,009
		540	

Men think the two theory are reconcilable in a higher ratio than what we can see among all the respondents. On the other hand in case of women – although most of them think the two theory are reconcilable – the ratio of those are higher who believes the two theory contradict. The differences between the genders don't follow from the differences of religions, years or majors, as in these respects there are males and females in equal portion in the sample.

We also wanted to find out how students think the two concepts are reconcilable? Three alternative answers were given to them in advance: the official view of the Catholic Church, the opinion of Teilhard de Chardin and the classical deist position. Students also had the possibility to express a different point of view.

16. Table

How do you think the two concepts (evolution and creation) are reconcilable? (%)

Both of them are true in their own dimension, on their own level.	41,8
God works inside the evolution directing it from within.	21,1
God created the world, but then the laws of evolution work.	20,0
Else	14,5
I don't know.	2,5
Total	100,0

Most of them (41,8 percent) think that both of the theories are true in their own dimension, on their own level. Those together who chose either the second or third answer amount to approximately the same size of the first group. An additional 14,5 percent of the students suggested something else.

The question were answered by only half of the students, that is those who marked the first option of the previous question, i.e. the two theory are reconcilable. Most of the respondents were religious (89,4 percent) in compliance with our previous expectation. But we also wanted to know how the intensity of religiosity influences the students' choice in marking one of the answers. See for example:

17. Table

How do you think the two concepts (evolution and creation) are reconcilable? * Apart from weddings, funerals and christenings, about how often do you attend religious services?

How do you think the two concepts are reconcilable?	How often do you attend religious services?			Total
	Regularly, min. once a month	Rarely	Never, almost never	
Both of them are true in their own dimension, on their own level.	33 30,6%	34 31,5%	41 38,0%	108 100,0%
God works inside the evolution directing it from within.	31 54,4%	12 21,1%	14 24,6%	57 100,0%
God created the world, but then the laws of evolution work.	25 47,2%	16 30,2%	12 22,6%	53 100,0%
Else	15 37,5%	4 10,0%	21 52,5%	40 100,0%
Total	104 40,3%	66 25,6%	88 34,1%	258 100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20,214	6	0,003

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal N of Valid Cases	Cramer's V	0,198	0,003
		258	

Those who attend religious services regularly agree with the idea that God works inside the evolution directing it from within in higher ratio than the ratio of all respondents and in much lesser ratio they share the official view of the Catholic Church or chose something else. On the other hand those who almost never go to church more likely to choose the category of “else” or the official view of the Catholic Church.

The results are quite similar when examining the regularity of praying or meditating. Those who pray regularly agree with God’s continuous presence in higher ratio than the ratio in the whole sample. The ratio of those is also high who believes that God created the world but then the laws of evolution work, and a relatively few people chose the category of “else” or the official view of the Church. However among those who almost never pray or meditate the ratio of those is higher who chose the category of “else” or the official view of the Church than in the whole sample. In actual fact it is not characteristic of this group to accept God’s continuous presence or the deist position.

To sum up we can say that religiosity relates to the way the students think about the reconcilability of the two theories in such manner that the more determinant religiosity in the students’ life the more it is likely they believe in God’s continuous presence and vice versa: the less intensive the practise of religion it is more likely the students accept the official view of the Church or believe in something else. This result suggests that for the deeply religious students the position of the Church is of lesser importance than we thought. On the other hand the first answer that both theories are true on their own level is attractive for the not so religious students not because it is the official point of view of the Church but because this one is the easiest to accept without conflict. This answer is the one that makes unproblematic scientific researches, as here science does not influence if one believes in God or not and also making science is not influenced by one’s religion.

This hypothesis seems to be supported by the following table too, in which – I have reduced the sample for the biologists only – the answers were sorted by years. As there were a little bit low number of respondents I had to combine the years.

18. Table

How do you think the two concepts (evolution and creation) are reconcilable? * How many years have you completed in the university?:

How do you think the two concepts are reconcilable?	How many years have you completed in the university?		Total
	One or two	Three or four	
Both of them are true in their own dimension, on their own level.	43 69,4%	19 30,6%	62 100,0%
God works inside the evolution directing it from within.	32 86,5%	5 13,5%	37 100,0%
God created the world, but then the laws of evolution work.	31 93,9%	2 6,1%	33 100,0%
Else	26 96,3%	1 3,7%	27 100,0%
Total	132 83,0%	27 17,0%	159 100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14,695	3	0,002

Symmetric Measures

	Value	Approx. Sig.
Nominal by Nominal N of Valid Cases	Cramer's V 0,304	0,002
	159	

Almost all the seniors thinks that both theories are true in their own dimension, on their own level, as against the juniors who preferred this answer the less. It is likely that after spending three or four years in the university with learning about evolution and making experiments in the laboratories this solution is the one that helps to cease cognitive dissonance. In case of non-biologist students the table was independent.

The students choosing the category of “else” had the possibility to express their opinions in details. However the respondents usually did not give any alternative solution on how to reconcile the two ideas but either added some remarks on the issue or expounded their own attitudes, or they judged the answers to be loose and give something similar to the original but with their own words. As it is very difficult to define types of answers so I would rather like to show you just a few example.

Two students wrote: *“the theory of evolution can't give us all the answer yet”*; *“the truth will appear later”*. Two respondents are hesitating: *“I believe in evolution, but I do not preclude anything”*; and *“Creation doesn't prove the existence of God, evolution, development had to start somehow”*. A girl on the contrary thinks that *“they verify a lot of things with the evolutionary theories so to avoid dealing with God, they don't want to realize who he is.”* Two boy responded that *“science answers the question of “how”, the Bible give answers to the question of “why”*”. An other two students think that each of us has to decide by oneself how he or she wants to make the two theories consistent to each other. According to five respondents the evolution and the story of creation are the same, but *“speeded up”* or *“the men of the ancient world wrote it down this way”*; *“as in that time philosophy was the most precise discipline among sciences and there were no proved facts about the origin of life,*

people needed to believe in something, that is how religions came into being, in which a parallel can be drawn between symbols and scientific facts.” Four students called attention to that “God is not necessarily such as the Church shows him.”; “I can imagine that evolution doesn’t happen such a way we learn about it, but some sort of external force “meddle” with it, but it is not necessarily that God, who appears in the Christian religions. I consider ambiguous the whole concept.” An other three respondents believe that “God created the world, evolution is part of it.” Other solutions: “God influences the occurrence of any mutation”; “Everything happens according to God’s will.”; God’s task is included in the laws of evolution.”; “God created the possibility of evolution. (Is God the physical laws?)”. And a nice comment: “If it is really God who created the world he couldn’t do it better then the way of evolution!”

Although I supposed the answers given by the students of biology to be more cultivated, in fact there isn’t any significant difference between the responses of biology majors and other students.

The relation between science and religion were observed with an additional direct question too:

19. Table

Do you think that science can substitute religion (can it give answer for the “big questions of life”)? (%)

Yes, I do.	22,8
No, I don’t	61,3
I don’t know.	10,4
I don’t want to answer.	5,4
Total	100,0

Usually religious students think that science can not substitute religion, meanwhile the non-religious students think it can:

20. Table

Do you think that science can substitute religion (can it give answer for the “big questions of life”)? * Are you a religious person?

Do you think that science can substitute religion?	Are you a religious person?			Total
	Yes, I am.	No I am not.	In some respect.	
Yes, I do.	10 8,2%	73 59,8%	39 32,0%	122 100,0%
No, I don’t.	170 49,3%	52 15,1%	123 35,7%	345 100,0%
I don’t know.	12 21,8%	14 25,5%	29 52,7%	55 100,0%
Total	192 36,8%	139 26,6%	191 36,6%	522 100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	117,654	4	0,000

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal N of Valid Cases	Cramer’s V	0,336	0,000
		522	

We got quite a similar table in observing the intensity of practising religion, both in the case of observing the regularity of attendance in ceremonies or in the case of observing the regularity of praying. Let's see the first:

21. Table

Do you think that science can substitute religion (can it give answer for the "big questions of life")? * Apart from weddings, funerals and christenings, about how often do you attend religious services?

Do you think that science can substitute religion?	How often do you attend religious services?			Total
	Regularly, min. once in a month	Rarely	Never, almost never	
Yes, I do.	8 6,3%	28 22,2%	90 71,4%	126 100,0%
No, I don't.	122 35,8%	103 30,2%	116 34,0%	341 100,0%
I don't know.	10 17,9%	13 23,2%	33 58,9%	56 100,0%
Total	140 26,8%	144 27,5%	239 45,7%	523 100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	64,760	4	0,000

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Cramer's V	0,249	0,000
N of Valid Cases		523	

3. Inconsistency

Finally we arrived to our third object of aim, that is to observe the consistency of the students' thinking. One part of the questionnaire was put together just for testing this issue. Seventeen questions were asked concerning evolution sometimes in a religious approach sometimes in an atheist way. Observation was reduced here only for the biology-students, because I assumed that they really know this subject, while students of other majors may never think about these questions before.

Let's see first the "atheist" approaches:

22. Table

Do you agree? (%)

	Yes, I do.	No, I don't.	I don't know.	I don't want to answer.	Total
1. There is no substantial difference between men and animals in respect of their origin and essence.	56	32,7	8,2	3,1	100,0
2. Every species included men are the results of the biological evolution.	80,5	6,6	9,7	3,1	100,0
3. The dying out of species contradicts the divine dispensation.	11,3	63,5	15,4	9,7	100,0
4. The development is the outcome of several accidental events.	43,4	39,9	13,2	3,5	100,0
5. All living creatures' apparent expedience actually doesn't have any goal or meaning.	12,9	67,6	14,8	4,7	100,0
6. The vestigial organs seem to be useless and meaningless according to the theory of independent creation.	18,6	39,3	35,5	6,6	100,0
7. Human life in itself can have a purpose.	74,8	14,8	8,2	2,2	100,0

We have received a not even roughly homogeneous table. The strongest hesitation was produced by question 6 considering vestigial organs. Although it is one of the classical arguments of evolutionary controversy students seem to be not able to interpret it. So I left this question out of my further observation.

Results concerning the third and fifth statements are also surprising. Originally I assumed that non-religious students would agree with them as against religious students who would refuse them. There is indeed a significant difference comparing these answers to the religiosity of the students, still the reason of these weird results came into being is due to the responses of the non-religious students. Although they accepted the statement in a higher ratio than we could see among all the respondents, in case of statement 3 there were 52,8 percent of them, in case of statement 5 there were 51,3 percent of them who could not agree. This ratio remained the same when I observed it according to years as well.

The third statement about the dying out of species was probably approached in a logical basis by the non-religious students, that is although they don't believe in divine dispensation, still "in a peculiar way it can work".

Nevertheless we can't refer to "logic" in case of statement 5. The assertion grasps one of the most important elements or rather to say the essence of the evolutionary theory. The refusal of this idea by the religious students is not really surprising because it sharply contradicts their world view. But why, on what grounds do the non-religious students refuse it? My hypothesis is that maybe old, deep-routed habits work in their thinking. In the ideology of the socialist system (mainly in the "dropping down form of ideology": in the education, in the phrases and slogans, etc.) similarly to the religions there is no room for accidents, everything must have a goal and meaning all the time. That means the respondents either don't understand the evolutionary theory or they don't want to understand it, and it seems that this fact can't be changed by the years spent in the university as there is no difference between the seniors and the juniors.

The result becomes specially considerable when comparing it with the second statement, namely "Every species included men are the results of the biological evolution". This sentence which is "savoured of a textbook" was accepted by almost all the students (80,5 percent of them). Although religious students are more likely to refuse this assertion as against their non-religious fellows who usually accept it, still the majority of religious students (69,1 percent) agreed with it! At first sight it isn't a big contradiction as part of these

students formed the group of respondents who think evolution and creation are reconcilable theories. Notwithstanding the problem with the concept of evolution is raised again. How do students interpret this theory?

Now let's have a look at the typical religious arguments:

23. Table

Do you agree? (%)

	Yes, I do.	No, I don't.	I don't know.	I don't want to answer.	Total
8. Evolution can not explain the perfection and complexity of certain organs (e.g. eye).	17,6	58,5	23,3	0,6	100,0
9. The theory of evolution can not explain the rise of certain species.	31,1	42,8	23,9	2,2	100,0
10. The process of evolution has a goal and follows a direction.	43,1	36,5	17,3	3,1	100,0
11. Studying nature means at the same time to study God.	24,2	48,7	17,9	9,1	100,0
12. The evolution moves toward spirituality.	4,4	47,5	41,2	6,9	100,0
13. The laws standing behind natural processes suggest a divine nature.	28,3	42,8	23,6	5,3	100,0
14. There is a being in the world that is responsible for the laws of evolution.	23	48,1	23,3	5,7	100,0
15. The direction and real purpose of evolution is nothing else but the final union with God.	7,5	55	30,8	6,6	100,0
16. The apparent order or coherence of the world embodies the nature of God.	23	46,5	24,2	6,3	100,0
17. A living organism can originate only from a living organism.	45,9	36,8	14,5	2,8	100,0

The table shows a more complete homogeneity than the previous one. However two statements don't fit into the line. Above all the 12. statement, that is "The evolution moves toward spirituality". The majority of students couldn't interpret the concept of "spirituality". Similarly the 15. assertion led to a "weird" result too. It says: "The direction and real purpose of evolution is nothing else but the final union with God." While the atheist respondents "knew" that they had to answer "No" if they want to be self-consistent, the religious students became unsure. On the one hand it can mean that they don't know the big theories of theology concerning evolution, theories intending to integrate evolution into religion (e.g. Teilhard de Chardin). On the other hand the concept of "union with God" seems to be also problematic.

All the other responses show a roughly similar distribution. However the high ratio of unsure respondents in all the questions deserves attention. Who are they? All the statements show a direct relation to religiosity, that is the students considering themselves to be definitely religious usually agree with these sentences, the non-religious are usually refuse them. On the other hand respondents considering themselves to be religious only in some respect are unsure in a higher ratio then the average. Probably they don't know which of their world view to follow: the religious one or the scientific one. At the same time they agreed with most of the atheist approaches. (Except for two – statement 4. and 5. – where the unsure students represented a higher ratio.) This may refer to the fact that those who are religious in some respect prefer the scientific world view, and they shape their religiosity accordingly.

There are some statements that more or less express the same idea, sometimes only by using different words, sometimes with opposed sign. It is worth to compare how students answer to the questions with similar topics. How consistent is their way of thinking? Bellow I will present three tables by way of illustration.

24. Table

Every species included men are the results of the biological evolution. * The theory of evolution can not explain the rise of certain species.

Every species included men are the results of the biological evolution.	The theory of evolution can not explain the rise of certain species.			Total
	Yes	No	I don't know	
Yes, I agree.	72 28,6%	120 47,6%	60 23,8%	252 100,0%
No, I don't agree.	14 66,7%	4 19,0%	3 14,3%	21 100,0%
I don't know.	9 30,0%	9 30,0%	12 40,0%	30 100,0%
Total	95 31,4%	133 43,9%	75 24,8%	303 100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17,899	4	0,001

Symmetric Measures

		Value	Approx. Sig
Nominal by Nominal N of Valid Cases	Cramer's V	0,172	0,001
		303	

Only a weak relation is gained between the two sentences which is astonishing by itself, because the two arguments are roughly the opposite of each other, so a much clearer arrangement should have been appeared. Nevertheless we can see that those who think that *“every species included men are the results of the biological evolution”* do not agree with the assertion that *“the theory of evolution can not explain the rise of certain species”* in a higher ratio then the average. At the same time those who accept that *“the theory of evolution can not explain the rise of certain species”* refuse the assertion that *“every species included men are the results of the biological evolution”* in a higher ratio then the average. It also deserves attention that there were 72 students (among whom 61 juniors) who agreed with both sentences, that is they think that every species are the results of the biological evolution and at the same time they believe that the theory of evolution can't explain the rise of every species.

A similar inconsistency appears when compering the 4. and 10. statements:

25. Table

The process of evolution has a goal and follows a direction. * The development is the outcome of several accidental events.

The process of evolution has a goal and follows a direction.	The development is the outcome of several accidental events.			Total
	Yes	No	I don't know.	
Yes, I agree.	52 39,1%	62 46,6%	19 14,3%	133 100,0%
No, I don't agree.	69 62,7%	36 32,7%	5 4,5%	110 100,0%
I don't know.	16 29,6%	21 38,9%	17 31,5%	54 100,0%
Total	137 46,1%	119 40,1%	41 13,8%	297 100,0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	33,180	4	0,000

Symmetric Measures			
		Value	Approx. Sig
Nominal by Nominal N of Valid Cases	Cramer's V	0,236	0,000
		297	

A not too strong relation appeared showing that those who think that “*the development is the outcome of several accidental events*” refuse the statement that “*the process of evolution has a goal and follows a direction*” in a higher ratio than the average and vice versa: those who can't agree with the first statement are usually agree with the second one. Yet there are 52 students among the 297 respondents who can agree with both assertions. That is they think that “*the process of evolution has a goal and follows a direction*” and at the same time they also believe that “*the development is the outcome of several accidental events*”. In this respect there is no differences between the juniors and the seniors: every sixth of them in both groups accepted both sentences. And what opinion do that 36 respondents hold about evolution who could not agree with any of the statements?

The following results compering the 5. and 6. statements are also hard to interpret:

26. Table

All living creatures' apparent expedience actually doesn't have any goal or meaning. * The process of evolution has a goal and follows a direction.

All living creatures' apparent expedience actually doesn't have any goal or meaning.	The process of evolution has a goal and follows a direction.			Total
	Yes	No	I don't know.	
Yes, I agree.	14 34,1%	22 53,7%	5 12,2%	41 100,0%
No, I don't agree.	103 49,5%	72 34,6%	33 15,9%	208 100,0%
I don't know.	15 31,9%	16 34,0%	16 34,0%	47 100,0%
Total	132 44,6%	110 37,2%	54 18,2%	296 100,0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15,215	4	0,004

Symmetric Measures			
		Value	Approx. Sig
Nominal by Nominal N of Valid Cases	Cramer's V	0,160	0,004
		296	

Those who think, that “*the process of evolution has a goal and follows a direction*” refuse the statement that “*all living creatures' apparent expedience actually doesn't have any goal or meaning*” in a higher ratio than the average. Meanwhile those who think that “*all living creatures' apparent expedience actually doesn't have any goal or meaning*” refuse the statement that “*the process of evolution has a goal and follows a direction*” in a higher ratio than the average. However there were 14 students who agreed with both sentences, that is they think “*all living creatures' apparent expedience actually doesn't have any goal or meaning*” they also think that “*the process of evolution has a goal and follows a direction*”.

But what kind of goal and direction does the process of evolution follow according to them that does not appear in the living beings?

It is also puzzling what those 72 students of biology thought who could not agree with any of the statements? They think that living creatures have goals or meaning but at the same time the process of evolution does not follow an exact direction. Did the religious world view determine their answers? It seems to contradict to this idea that not all of them are religious: Among the 72 students there are only 21 characterized with deep religiosity, 35 persons are religious only in some respect, and the remaining 13 respondents are not religious at all.

It seems to be a more reliable explanation, that the concept of “goal” or “expedience” presents the problem again. It looks as if independently of both the theory of evolution and of religiosity the majority of the students would like to believe that the natural or physical processes (included evolution), and also each and every living being have goal, meaning or direction. So the students’ way of thinking and their world view is characterized by purposefulness or we can even say a teleological attitude. Purposefulness and consequently a kind of rationality is more acceptable for them then contingency – which after all means irrationality. Therefore the idea of evolution in its original, pure form seems to be hard to digest even for the students of biology.

The survey has some significance beyond the issue of evolution vs. religion as it questions the existence of human thinking. The respondents seemed to prefer thinking in commonplaces, conventional patterns, stereotypes, unquestionable clichés originated from their nurture, traditions etc. This is maybe the explanation for the inconsistencies and contradictions existing in their world views. It is possible that the results were proceeded from the unformed, unestablished personalities and world views of the respondents as they were relatively young, but it is also possible that the results represent the contingency and inconsistency of the ordinary men’s thinking.