

Scientific and Religious Beliefs about the Origin of Life and Life after Death: Validation of a Scale

Jesús Silva Bautista, Venazir Herrera Escobar*, Rodolfo Corona Miranda

Faculty of Higher Education Zaragoza, National Autonomous University of Mexico, Mexico

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Abstract The variety of explanations to questions about the origin of life, life after death or about the role itself of being in the world are built on the rational reflection that integrates the ideology of human beings as well as less rational practices and more emotional ones than in the whole nourish what has been called "beliefs". Therefore, the aim of this study was to construct an instrument to measure beliefs about the origin of life and life after death. A scale with a Likert 5-point response type was made up of 52 reagents; it was applied to 913 people of the Metropolitan Zone of Mexico City to obtain their psychometric characteristics, all whose schooling was either basic or an academic PhD degree. To identify the discriminative power of each test item, internal consistency, exploratory factor analysis and Pearson's correlation, data was analyzed using SPSS version 21. The final scale was formed by 48 reagents distributed in 4 factors that threw a Cronbach Alfa of 0.874. In conclusion, these results reveal a valid and reliable instrument as well as a useful tool for studying the phenomenon of the origin of life and life after death.

Keywords Belief, Behavior, Scholarship, Science, Religion

1. Introduction

In his need to find an absolute and clear explanation in this world, the human being is immersed in a process of personal search and growth, in which he creates his own vital project based on his relationship with his existence and his conditions of lifetime. Regardless of culture, age, race, sex, profession or educational level, every human being is always in the need to confront certain universal conditions of existence, from there to create his own particular project of life. At the same time that he is part of the world he is also a being capable of constituting the world, because it him the one who interprets and gives meaning to it [1].

In this sense, the variety of explanations to questions

about the origin of the universe, human nature, life after death or about the very role of the being in the world is constructed from the rational reflection that integrates the ideology of the human being as well as less rational and more emotional practices that feed what have been called beliefs; in such a way, that throughout the history the human being has generated a series of answers of religious, philosophical and scientific [2].

When the psychosocial development of the human being is studied within his environment you will find that various factors may influence his behavior, one of the most important factors is precisely the beliefs system. Beliefs have played a determining role in the development of mankind [3] from the primitive man who bestowed upon the unknown divine forces, the judgments of the Holy Inquisition in the Medieval Age, the impact that provoked the conviction that Earth was round about the belief of a Flat Earth and many other beliefs that sustain the behavior of the human being.

In this context, beliefs represent the information that the person has about the object, which is attached to some attribute, is a hypothesis of probability or improbability in relation to the nature of the object and its relations with other objects. They can be conceived as an initial subjective condition that explains a set of seemingly unrelated behaviors and by understanding the cause as the initial condition, therefore the belief is a cause of behavior. Thus, believing implies having a series of expectations formulated as hypotheses, which regulate the actions and relationships of the subject with their environment [4,5,6,7].

As assumptions of our understanding of the world, for Villoro [7] the beliefs can be understood under two conceptions. The first refers to belief as a mental occurrence, that is to say, "(...) it is not about something present in perception or memory, but about what is represented in judgment ..." (p.26). The second conception corresponds to belief as disposition:

(...) a provision is not an occurrence. Occurrences are directly observable, although they may be private or public. They are expressed in statements that narrate situations,

data or facts, in sentences that describe something that happens (...). Provisions are not observable properties of objects, but characteristics that I have to attribute to them to explain certain occurrences (p.31).

Beliefs operate as guides to action that enable the person to respond in one way and not another; However, they are not always expressed in actions, but, only if a certain circumstance arises, will the person behave in a way that supposes the existence of a dispositional state to act [7].

Being judgments and evaluations that people make of themselves and the world around them, beliefs act as filters through which information from the inner and outer world is integrated and contrary to what might be thought, are not derived of environmental or behavioral evidence, but rather precede it and give it meaning. In *The Oxford Companion to Philosophy* [8] it is argued that because beliefs imply a deploying of concepts, unless the individual understands what a particular object is, it may or may not believe in it.

During the 1990s, Pajares [9] stated that "(...) the belief is based on evaluation and judgment (...)"(p.113), which results in a vision of the belief referred to the judgments of an individual on the true or false of a proposition, a judgment that can only be inferred from a collective understanding of what is being said, pretending to do and doing. At this point, it is important to evaluate each component to have confidence that the inferred belief is a reasonably adequate representation of that judgment. In this respect, Llinares [10] points out that "(...) an important aspect is that beliefs cannot be directly observed or measured, therefore, they must be inferred from what people say, pretend and do"(p.9).

Taking into account the characteristics cited by these authors, Pepitone [3] proposes four basic functions that encompass some of these elements. The first function alludes to an emotional part, the beliefs serve directly to handle the emotions; the second function has a cognitive character, where they give cognitive structure, which provides a feeling of control over life; the third refers to a sense of morality, here the beliefs function to regulate the distribution of moral responsibility between the person and the group; finally, the group function, where beliefs promote group solidarity by giving people a common identity. On this latter function, Pajares [9] adds that these provide elements of the structure of values, order, direction and shared values, which is why they acquire emotional dimensions and resist change.

Beliefs encompass all ideas about which there is no secure knowledge, but which are trusted enough to act accordingly; should be relatively stable, otherwise the human being in the face of a confused domain and the usual cognitive and information processing strategies do not give good results, may face uncertainty in not being able to recognize relevant information and appropriate behavior to this phenomenon) [9,11,12,13].

For people, to change their beliefs to accommodate new ones will require not only developing new behaviors, but

also abandoning the well-established and apparently successful ones, which can lead to disorientation and frustration. In view of this, Myers [14] argues that the human being constantly examines and justifies how the theories that guide his life may be true, thus closing, to the new information that defies his beliefs. Beliefs "(...) have an adaptive function and help the individual to define and understand the world and himself" (p. 325). For this reason, they can be seen as the major determinant of human behavior, although in a specific time and context [15].

The continuous search for an explanation that helps to understand the behavior of the human being has been a permanent work, because, the answers to the question of why he behaves as he does part from the notion that one's origin, nature or character, as well as of the characteristics that are of his own or not [2, 16]; of this, arises the need to be able to explain two fundamental events in the life of the human being: the Origin of the Life and the Life after the Death.

1.1. The Origin of Life

The Origin of Life has been explained mainly through a series of religious, philosophical and scientific answers [2], whose base is in the beliefs system that the human being possesses.

Within Pepitone's [3] classification of beliefs, there are those of a natural-material order, which "(...) refer to that which exists in the material world or that which can be defined as material at some level of analysis. The category includes scientific beliefs and beliefs about history and society"(p.64).

In the conceptualization of scientific beliefs we have considered the notion of science proposed by Olivé [17], who through what he calls the intentional system of action describes science as a complex of human actions performed by intentional agents, oriented by representations ranging from beliefs to complex models and scientific theories, whose structure is normative-evaluative. By evaluative, the author refers that a value in science means that there is some object that is considered valuable because it has a certain characteristic, and that characteristic depends on the beliefs that maintain people with respect to science.

From this, it is important to mention that science, according to Estany [18] is the most important source of knowledge acquisition about reality, a guarantee for the justification of the beliefs that maintains the human being. In this context, the scientific beliefs about the origin of life are based on the principles of Charles Darwin's Theory of Evolution [19]. This theory is considered as scientific, since its content adheres to the concept of science that Bunge raised in 2014 [20], this author points out that science deals with phenomena and facts of empirical reality; It is based on reason and not on sensations, unfounded opinions or dogmas; it is systematic and attempts to be explanatory, not merely descriptive.

The Theory of Evolution by Charles Darwin [19] argues

that evolution occurs by transmitting one generation to the next of what individual biological entities learn or acquire in their confrontations with the environment. In this sense, Darwin proposed a mechanism, natural selection (the variations observed in species in nature can be inherited, some of these variations grant adaptive advantage and its carriers will survive, thus producing a natural selection), material law that eliminates the need for an 'invisible hand' guiding the Universe and therefore 'the theory of evolution is complete in itself and does not require the intervention of mysterious forces unrelated to scientific understanding' [21, 22].

The human being lives daily different personal, environmental and socio-cultural events, processes that, more often than not, involve existential reflections. Although science and technology are one of the most accurate knowledge today, it often does not respond to questions that are of a more spiritual order, such as the why and for what we live; For this reason, within the belief system of the human being to understand himself, the world and others, are that set of beliefs that are based on emotional experience and strongly adheres to the point that [23, 24]. These beliefs are of a religious nature and are based on two important aspects.

The first refers to the function that religion fulfills in the search for eternal and absolutely true truth in the explanation of the world as it is known, as well as in the sacred books where its main support is found and which can only be kept intact if accepted as a whole. The second is that religious beliefs are based on acts of faith; in sacred objects and places; in supernatural events such as immortality, resurrection, reincarnation and transcendence; as well as in a variety of gods, angels and other entities and spiritual powers that are located outside the field of the material; they deal with obedience in divine laws, miracles, and the fate of the soul in later lives [3, 25, 26].

In this sense, it is important to note that the association between belief in the presence of religious elements and behavior is valid only for those subjects for whom these beliefs form an important part of their lives. Thus, different religious beliefs intensify the impact on a given behavior [27].

In this context, religious beliefs concerning the origin of life are based on Creationism [28, 29], Judeo-Christianism [30] and Intelligent Design Theory [31, 32].

For centuries the main positions on the origin of life have emerged from religion, an example of this, is the Judeo-Christian tradition. Judeo-Christianity maintains that human beings are made in the image and likeness of God and have no relation to animals. The mind is an immaterial substance that has powers that are not purely based on the physical structure and can continue to exist when the body dies. Man is conceived as the creation of a transcendent God who has a definite purpose for life, is based on the belief of a personal God who is omnipotent, omniscient and perfectly good, who created and controls everything that

exists, therefore man's destiny depends on his relationship with God [30].

In relation, Creationism [28, 29] as an explanation of the origin of life sustains the a priori acceptance of the existence of a supernatural structure that puts order in things. As a consequence of this divine order, the place that corresponds to each species is predetermined and immutable. Therefore, it rejects any idea of evolution and admits only what is established in the Bible [33].

Along the same lines, the Intelligent Design Theory holds that certain finite material objects exhibit patterns that convincingly point to an intelligent cause. Accepts scientific explanations about the origin of life and human nature, but with certain limitations, that is, consider the evolutionary process as a basically divine work subject to laws given by an intelligent agent (God / Higher Self / Breath or divine Force) [30, 31].

Considering the evolutionary process, Intelligent Design starts from the principle of irreducible complexity, which refers to the inability of some biological systems to have emerged by gradual steps; That is to say, at the biochemical level, there are unique (non-redundant) systems that are composed of several interacting parts that contribute to the basic function, and in which elimination of either part renders the system no longer functional. Natural selection could not create irreducible complex systems, because selection operates when the complex system is already organized. Thus, the complexity of living beings would be irreducible in the sense that their configuration cannot be reduced to small steps, but had to have arisen from a single blow through a being or superior agent [34].

This theory seeks to explain the presence of patterns in nature not by the action of material forces, but by the force of a designer intelligence: there is a supernatural and superhuman intelligence that deliberately designed and created the Universe and everything it contains, including the human being.

In general terms, the religious principles raised up to this point respond to the human being's need to understand their origin and nature based on the existence of an omnipotent and benevolent Creator, who reveals to his creatures the knowledge of his decrees, reveals to every human heart what is right and what is evil, through it can be explained the miracles and allows to confer to every event in the world a sense of transcendence. He is the very perfection. The alpha and omega, the beginning and the end, the foundation stone and the key of the vault, the plenitude and the plenary. It is he who consumes and who gives to all his consistency and his order [3, 26, 35, 36, 37].

Contrasting the scientific postulates with the religious, Tugendhat [37] affirms that it is understandable that, despite the contrary evidence, hundreds of millions of people believe in God, in a Higher Being, an Intelligent Agent, a Divine Designer as the creator of Life, because it is more natural to take that need for a reason than the opposite.

1.2. Life after Death

"From the vast world of enigmas that disturb men, there is an ineffable theme for human understanding, apart from life. A subject that worries and reveals the man, and that he has not been able to decipher, however much he wants to do it. This is the phenomenon of death "(p.60) [38].

From the scientific point of view, Montiel [38] points out that death is defined as follows: "Death occurs when fundamental functions cease: cardiac and respiratory activities, which lead to cessation of brain functions and this ends the whole existence" (p.60)

But for this author should be taken into account that research has now shown that this cessation of the activity of the body is not very reliable, as there have been cases that this clinical death profile has been diagnosed but in which a resuscitation is possible, for example by artificial respiration or massage to the heart. This must occur before a certain time, before there is irreparable damage to the brain due to lack of oxygen. Such patients were clinically dead, but only clinically. In other words, this means that these patients had not died biologically. In these terms, being biologically dead means that at least the brain has ceased completely and irrevocably to function. Biological death is brain death (central death) and finally death of the whole organism (total death)" [39].

In Mexico according to the General Health Law [40] Title XIV: Donation, transplants and loss of life, Chapter IV: Loss of life, Article 343, loss occurs when there is brain death or irreversible heart failure. Encephalic death is determined when the following signs are verified (p.104):

- I Complete and permanent absence of conscience;
- II Permanent absence of spontaneous breathing, and
- III Absence of brain stem reflexes, manifested by pupillary inflexion, absence of ocular movements in vestibular tests and absence of response to nociceptive stimuli.

For Málishev [41], as a denial of life, death is something that directly impacts, is what each human being takes into consideration for the simple reason that represents the end of their existence. Unlike the other living beings, the human being is provided with the knowledge of the irremediable end of his life, and, at the same time, deprived of the resources sufficient to face that this fact; he is conscious of his own end and, at the same time, resists this event. For both this author and Hernández [42], man revolts at death and tries to affirm his existence beyond real life, because acceptance or rejection towards death is directly influenced by both his representation and for the belief in a life after it. From this fact springs the inherent dualism in any believer in the existence of the soul in the afterlife [41].

For Bauman [43] people seek the way to live with the inexorability of death, as well as cultural inventions, being the most outstanding one the idea that death is not the end of the world, but a transit of a world to another, where those who die do not come out of the only world that exists and dissolve and disappear into the beyond of not-being, but

simply move to another world, where they continue to exist in a different form. So the present bodily existence may be no more than a recurrent episode of an endless though constantly changing existence in form or an opening to an eternal life of the soul which begins with death. In this way, the existence of a later life and a chain of successive lives is maintained [44].

Contrary to the postures of an eternal life, Hawking through his commentary on The Guardian in 2012 [45] refutes this idea by stating that he does not count on life after death:

"I see the brain as a computer that stops working when its components stop working. There is no afterlife for spoiled computers; it is a tale for people who are afraid of the dark and how can it be translated and interpreted for people whose hardware still works? We must make the most of our actions. "

In fact, what else could death mean, if not the natural end of every living being?

In general terms, two positions are set forth: on the one hand, death is assumed as an arbitrary fatality, imposed against our will; On the other hand, the scientific reflection that proposes a hidden utility or function of death, often expressed in terms of selective advantage based on mechanisms of evolution [46].

The phenomenon of the origin of life and the life after death lead to the idea of its value as a trail guide of human behavior, because he needs to understand his social environment and himself, to understand the meaning of other people's actions, understand their ways of understanding the world and thus, how they interact with reality [17]. This understanding requires representations and explanations of reality that most of the time occurs through their beliefs.

When we study the history of mankind there is no doubt the importance that beliefs have had in the development of the human species, and there is no human behavior that is not constituted by them. Numerous researches have shown that beliefs affect behavior in a determinant way and at the same time are the best indicators of the individual decisions that people make throughout their lives [3,6,7,9, 47].

As an example, we can find some research studies like Leuba's [48], Larson and Witham [49] and Pérez-Agote and Santiago [50] who were interested in knowing the postures of Scientists on issues such as the origin of life, the existence of God and life after death.

The research conducted by the psychologist Leuba [48] *The belief in God and immortality. A Psychological, Anthropological and Statistical Study* represents a study of the religious beliefs present in American scientists. The hypothesis to be tested was that the more educated people are, the less likely they are to believe in God.

A survey was the instrument used to measure beliefs toward God and immortality in a group of 1000 people chosen by the American Men and Women of Science, which states a general relationship of American scientists.

The analysis of the results confirms the idea that the scientific community is less likely to believe in God than the general public. The author attributed this to the best education of scientists, and predicted that over time and the increase in education of the general public, religious beliefs will become increasingly rare. In this same line, Conkin [48] reports that today, the higher the educational level of individuals, or better their results in intelligence or performance tests, the less likely they are to be Christians.

Following Leuba's (1921), Larson and Witham's [49] study *Leading scientists still reject God* revolves around beliefs about the existence of a God and immortality present in scientists, namely biologists, physicists, and mathematicians. The authors conducted a survey of selected scientists from the American Men and Women of Science, which lists a general account of American scientists. The instrument used represents a replica of the surveys used by Leuba in 1921.

The results obtained coincided with those of Leuba [48], which revealed that most scientists openly proclaim themselves atheists and deny the fundamental truths of the faith. Finally, Larson and Witham [49] point out that if God exists or not, it is a question on which science is neutral.

On the other hand, the data available from the survey on religious attitudes and beliefs, elaborated by the Center for Sociological Research (CIS) in Spain and published by ABC News [50] point in the same sense, as the level of studies increases, the belief in God decreases. The study makes a descriptive analysis of different indicators that may influence the process of secularization. It deals with aspects related to religious beliefs and practices, as well as their influence in other social spheres. At the same time, the relationship between these indicators and some sociodemographic variables, such as age, socioeconomic level and level of education, is studied. The authors of this important study conclude that "Spanish society tends to grow in its average level of studies and, with it, to decrease in its level of religiosity" [50].

Under this line, the article published in *Personality and Social Psychology Review* entitled *The Relation Between Intelligence and Religiosity: A Meta-Analysis and Some Proposed Explanations* by Zuckerman, Silberman and Hall conducted in 2013 [51], shows a meta-analysis of 63 studies which show a significant negative association between intelligence and religiosity. Of the total number of studies analyzed, 53 of them showed a negative correlation between intelligence and religiosity; while the other 10 studies had a positive correlation; that is, from a statistical point of view, high values in intelligence correspond to low values in religiosity.

According to Zuckerman [51], correlation does not mean causality; however, it is not known if there is a causal relationship and do not rule out other possible factors that may influence the correlation; for example, other variables such as age, sex, race or education were analyzed. The first three did not affect the correlation, in the case of education, only one study stated that in fact it did, but the correlation

between education and religiosity was also negative. Overall, the authors argue that according to the results found in the meta-analysis of the 63 studies, intelligent individuals or with certain studies have less need for religious beliefs and practices.

As it is observed, theoretically the main element of analysis in these investigations are the beliefs, religious beliefs specifically on subjects like the origin of the life, the existence of God and the life after the death. According to Damineli and Damineli [21] throughout the last century, the origin of life began to be approached in a scientific way, through laboratory experiments and the study of theoretical processes. It became an eminently interdisciplinary subject, involving cosmology, astrophysics, planetology, geology, organic chemistry, molecular biology, mathematics, and complex systems theory.

In the last fifty years it has been subdivided into several sub-themes, some of which have made remarkable progress. However, some key issues remain unresolved. For this reason, from the social psychology emerged the objective of constructing a suitable, valid and reliable instrument for data collection, that allows to know the beliefs about the origin of life and life after death in people who only have basic schooling and of people who have the academic degree of doctorate; this is because beliefs about these phenomena of reality are different depending on the individual's psychological maturity and the influence of reference frames as diverse as religious orientation, age, sex, schooling, etc. [2, 52].

2. Materials and methods

2.1. Participants

For the purposes of the research, a sample of intentional non-probabilistic type was composed of 913 subjects belonging to the Metropolitan Zone of Mexico City, of which 49.8% are men and 50.2% are women; 46.4% are single while 53.6% are married. As for age, 22.7% is between 18 and 30 years, 26% between 31 and 45 years, 28.9% are between 46 and 60 years, and 22.5% are 61 years and older. Of the sample selected, 57.3% had only basic schooling while 42.7% had a PhD degree. Finally, 71.3% of the total sample believes in God or in some higher divinity whilst 28.7% do not.

2.2. Instrument

The instrument used to measure beliefs about the origin of life and life after death was constructed from two categories of study:

- *Category 1. Beliefs about the origin of life.* For the construction of the reagents of this category the following was taken into account:
 - a From the scientific principles of the Evolution Theory of Charles Darwin [19] were taken into

account the main indicators of study such as species adaptation, natural selection and scientific evidence of evolution. Evolution is the process of change in organisms over time, so that those that exist today are different from the initials. Although there is a chain of continuity over time, it is difficult to infer the properties of the first organisms based on the current ones. The fossils allow to recover some information about the body structure of the ancestors of the current species. This allowed to build an exuberant map of evolution over the last ~ 540 million years [21].

- b As well as the religious postures of Creationism [28, 29], Judeocristianism [30] and Intelligent Design Theory [31, 32], the indicators of these positions were the existence of God, a Divine Breath and an Intelligent Agent, the Bible and finally, the divine design of the universe. Recognizing the existence of this transcendent being, religious postures avoid the possibility of direct refutation by empirical or scientific evidence; providing an answer to questions about the meaning and ultimate genesis of the whole world [8].
- *Category 2. Beliefs about life after death.* The reagents that compose this category were constructed from:
 - a The conception of the phenomenon of death from a scientific perspective. The main indicators for this subcategory were: conceptualization of death, scientific advances to delay life and denial of death.
 - b The dualistic (body-soul) posture that defines life after death from the religious view. Eternal life, God as the savior of humanity, immortality, conception of death and the existence of a soul, were the indicators that were used to describe this subcategory.

Although a substantial amount of research has been done on the biological understanding of death, relatively little is known about the development of non-biological and supernatural beliefs about it. By implication, despite his eventual understanding of the biological facts of death, including the inevitable cessation of living functions, the human being concludes that some form of life after death is possible [53, 54]

From these study categories, a Likert scale was elaborated with five response intervals (1 = Totally disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree); Being formed by 52 total reagents distributed equally between the two categories.

2.3. Procedure

The scale was applied in universities, parks, shops and crowded places of the Metropolitan Zone of Mexico City. In the first instance, the potential participants were contacted by mentioning the objectives, characteristics, conditions of the study and the confidentiality of the information provided in case of acceptance. Once accepting to be a participant of the study, each of the applicators proceeded to read the instructions of filling of the instrument ensuring that the participants fully understood what was requested. Participants responded to the scale in an approximate time of 10 to 15 minutes and the total application of participants responded to the scale in an approximately five week period.

3. Results

3.1. Psychometric Properties of the Instrument

A descriptive analysis of the results of the score in each reagent was made, considering the distribution of the responses through the means and the variances in each of them. The mean and variance of the scale are 160.08 and 702.419, respectively, with the 52 elements analyzed. The average response to the reagents is 3.07; On the other hand, the variance of the reagents ranges from 1,167 (reagent 25) to 1602 (reagent 15). The discriminative capacity of the instrument is reflected in the discrimination index, this index (reactive-total correlation) reflects the degree of homogeneity of the reagents that make up the scale. In this case, the index values range from -179 (reagent 42) to .658 (reagent 14). Through this statistic elements were not eliminated, because the value of 'Alpha if element is removed' did not affect the value of the coefficient previously obtained $\alpha = .872$, a value that indicates an internal consistency among the reagents that make up the instrument (See, Table 1).

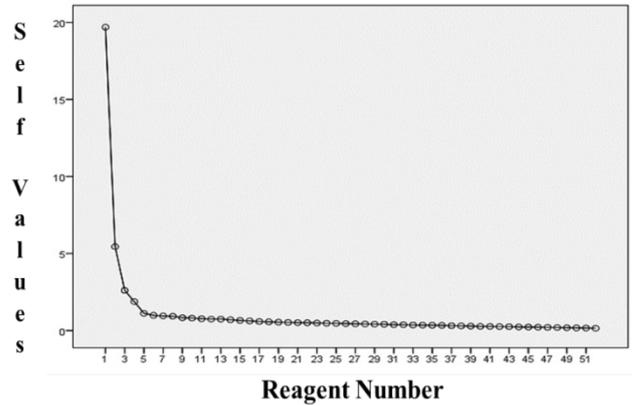
Table 1. Mean, variance and reactive-total correlation statistics in the Instrument of beliefs about the origin of life and life after death

Reagent	Mean	Variance	Corrected element-total correlation	Cronbach alpha if item is deleted
1	2.52	1.475	.454	.868
2	2.55	1.450	.579	.866
3	2.96	1.521	.569	.866
4	3.14	1.479	.442	.868
5	3.72	1.217	-.084	.875
6	3.49	1.340	-.077	.876
7	3.16	1.557	.588	.865
8	3.50	1.302	-.122	.876
9	3.48	1.266	-.077	.876
10	2.84	1.578	.627	.864
11	2.40	1.362	.546	.866
12	2.63	1.529	.582	.865
13	2.70	1.481	.593	.865
14	2.97	1.562	.658	.864
15	3.12	1.602	.627	.864
16	3.15	1.350	.206	.872
17	3.49	1.358	-.009	.875
18	2.56	1.297	.212	.872
19	3.39	1.314	-.135	.877
20	3.56	1.195	-.064	.875
21	2.65	1.552	.637	.864
22	3.76	1.212	.096	.873
23	3.61	1.326	.031	.874
24	2.79	1.476	.639	.864
25	3.82	1.167	-.059	.875
26	3.09	1.450	.568	.866
27	3.58	1.251	-.127	.876
28	2.79	1.533	.640	.864
29	3.44	1.434	.505	.867
30	3.59	1.291	.042	.874
31	2.80	1.382	.481	.867
32	2.87	1.541	.628	.864
33	3.17	1.391	.494	.867
34	3.10	1.470	-.063	.876
35	2.55	1.490	.586	.865
36	2.81	1.564	.643	.864
37	3.96	1.189	-.050	.875
38	2.81	1.458	.547	.866
39	3.35	1.286	-.028	.875
40	3.05	1.295	.283	.870
41	2.58	1.277	.239	.871
42	3.44	1.335	-.179	.877
43	2.76	1.299	.200	.872
44	2.67	1.426	.591	.865
45	2.75	1.547	.612	.865
46	2.79	1.519	.638	.864
47	2.74	1.276	.226	.871
48	3.60	1.287	-.133	.876
49	2.64	1.289	.164	.872
50	2.76	1.292	.146	.872
51	3.60	1.302	-.010	.875
52	2.82	1.562	.624	.864

Following the reliability analysis, in order to find the minimum number of homogeneous factors capable of explaining the maximum information contained in the data, the Kaiser-Meyer-Olkin test was performed on a scale consisting of a total of 52 reagents (KMO) and the Bartlett Sphericity Test to know if these values indicate a positive diagnosis, that is, if they satisfy satisfactorily the conditions to use factorial analysis of principal components.

Through these statistical tests it was found that the KMO sample adequacy measure value was equal to 0.973, while the Bartlett Sphericity test yielded an approximate value for $1326 \text{ gl of } c2 = 32902.182$ ($p = .000$). These values indicate that factorial analysis of principal components can be satisfactorily applied.

Through the factorial analysis with oblique rotation the following results were obtained. As for the value of the commonality of each reagent, those that were found below 0.4 were eliminated and reagents 4, 18 and 34 were extracted from the scale. By means of the rotation method of normalization Oblimin with Kaiser that converged in 8 iterations and the method of extraction of analysis of main components five factors were extracted; those with their own values above 1 (Kaiser's criterion) were preserved. The sedimentation graph shows that five of the factors explain most of the variability because the line begins to be straight after factor number five. The remaining factors explain a very small portion of the variability and are probably of minor importance (See Graph 1).



Graph 1. Graph of sedimentation by factors

The five factors as a whole explain 59.102% of the total variance of the scale; however, factor number five was eliminated because only 2 reagents formed it. Reagent 30 did not reach the criterion of equal or higher factor weights to 0.35, whereby it was removed and reagent 37 shared factorial weight in factor three, where was conserved. Thus, a total of four factors remained, which together account for 56.953% of the total variance of the scale (See, Table 2).

The factor solution obtained with the four factors is shown in Table 3. After these analyzes the scale was confirmed by 48 reagents with a value of coefficient $\alpha = .874$.

Table 2. Explained variance, cumulative variance, means and standard deviations of each factor

Factors	% Variance explained	% Accumulated variance	M	DE
FACTOR 1. Religion: Origin and life after death	37.870	37.870	2.93	1.234
FACTOR 2. Death: Scientific advances	10.468	48.339	2.81	.962
FACTOR 3. Science: Conceptualization of Death	5.010	53.348	3.68	.887
FACTOR 4. Darwinism	3.605	56.953	3.54	.934

Table 3. Configuration matrix, total variance explained and Cronbach's Alpha by factors

Reagent	Factorial load			
	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
	Religion: Origin and Life after death	Death: Scientific advances	Science: Conceptualization of Death	Darwinism
14. Eternal life is a state of communion with God.	.895	-.066	.037	.035
28. I think that it is God who gives the virtue of immortality to the human being.	.872	-.009	-.010	.046
36. God will be the resurrection of men at the end of time.	.846	-.003	.076	-.061
24. Death means the beginning of life in heaven	.839	.026	-.024	.021
46. From the supreme heaven of the universe God created the world as it is known.	.835	.007	.033	-.071
21. The moment the human being recognizes the greatness of God, he obtains eternal life.	.834	.013	.059	-.023
10. In order to attain eternal life, it is necessary to obey the precepts of God.	.830	-.014	.080	-.054
15. I believe that God created man in His own image and likeness.	.826	-.040	.081	-.089
52. The soul and body of the dead will be reunited again in their perfect form at the end of time.	.819	.034	-.047	.005

7. I think God is the beginning and end of all things.	.813	-.096	.017	-.008
32. I think the Bible manifests God's plan for the creation of mankind.	.813	-.016	.153	-.108
45. I believe that God has the power to resurrect people who have died.	.810	.006	.045	-.088
13. The complexity of the biological structure of living beings is the exact work of a divine designer.	.780	-.016	.006	-.076
26. I think that the only thing left of people to die is their soul.	.776	-.052	-.080	.075
35. I think the Bible is the main source of knowledge about the origin of the human being.	.764	.037	.153	-.170
3. I consider that death is the passage to another life.	.757	-.028	-.268	.134
2. The evolution of living beings began to act after a divine breath.	.754	-.022	.010	-.046
44. Life on Earth had to be the result of divine actions deliberately undertaken by an intelligent agent.	.752	.096	-.063	-.065
12. I consider that the bible is the main source of knowledge about the origin of life.	.746	.037	.238	-.205
38. I believe that behind the diversity of living beings there is an intelligent designer.	.703	.069	-.166	.006
11. I believe that the full existence of the human being begins after death.	.696	.093	-.060	.026
29. I consider that the human being is confirmed by body and soul.	.694	-.131	-.112	.021
31. Nature alone was unable to create the complex structures that make up life.	.621	.020	-.023	-.055
33. I consider that the existence of people dying disappears only from this world.	.612	-.025	.073	.040
1. I think it is possible for a person who has died to be resurrected in another world.	.590	.048	-.299	-.004
41. I believe that the advances of science will be a solution to save mankind from the phenomenon of death.	.031	.825	.034	.035
49. For me scientific studies on aging will help save the human being from death.	-.038	.806	-.049	.090
43. I believe that in the future humanity will be able to prolong life for as long as it wishes.	-.004	.746	.001	.062
47. I believe that cloning technology is a practical resource in the fight against death.	.032	.744	.054	.020
50. Genetic modification is a resource for combating death.	-.054	.736	-.010	.132
40. I believe that through scientific advances the human being seeks immortality.	.033	.627	.052	-.129
16. I believe that man is generating scientific resources to avoid death.	.027	.526	-.059	.018
23. The only thing left of people to die is a lifeless body.	-.047	.076	.717	-.008
51. I believe that death is the end of the existence of the human being.	-.056	.033	.685	.151
22. Death is the end of the existence of the human being on Earth.	.076	-.060	.669	.018
17. Death is the end of the existence of every living being.	-.011	.027	.659	.155
37. Death is the irreversible loss of vital functions.	-.080	-.120	.451	.294
5. The genetic constitution of living beings is the result of natural selection.	.032	-.034	-.124	.801
20. The biological similarity of living beings allows us to reconstruct the relationship between the different evolutionary lines.	.007	.086	-.111	.780
25. I believe that fossils show the evolution of the simplest beings to the most complex.	-.009	-.007	.024	.729
8. The complexity of the biological structure of organisms on Earth is the result only of the evolutionary process.	-.069	.002	.103	.698
6. Scientific evidence is the only way to know the origin of the Universe.	.006	.002	.158	.685
9. I think that the multitude of species that we see today are the result only of the process	-.013	.006	.125	.683
27. Studies of molecular biology demonstrate the evolutionary closeness of the human being to the primates.	-.092	.023	-.023	.683

19. I believe that the existence of every living being on Earth is the product of evolution alone.	-.102	.101	.165	.640
48. I believe that scientific evidence is primordial to explain the origin of living things.	-.181	.155	.041	.541
39. I think that the scientific evidence is sufficient to understand the complexity of the biological structure of the human being.	-.044	.184	.173	.514
42. The origin of life on Earth arose from the combination of chemical and physical elements.	-.229	.196	-.088	.514
Total reagents	25	7	5	11
% Of Total Variance Explained	37.870	10.468	5.010	3.605
Cronbach Alpha coefficient value	.975	.864	.730	.915

FACTOR 1. Religion: Origin and Life after death.

This factor represents the religious beliefs towards God or a divine agent as creator of the life in the Universe, of that which transcends the material world and that puts men and the Universe in contact with which is beyond the matter, leaving aside the Evolutionary theory. In this sense, God is the one who will raise men at the end of time; the being who created the world as it is known, to man in his image and likeness; Which gives the virtue of immortality to the human being. Likewise, we recognize an eternal life, a soul and a body that will be reunited again in its perfect form at the end of time. Death is conceived as the beginning of a life in heaven, the passage to another life where the full existence of the human being begins after his death. This factor contains 25 reagents out of 48 totals. The highest absolute value is .895 corresponding to reagent 14 "Eternal life is a state of communion with God". This factor is the one that has greater weight in the scale, its explained variance constitutes a 37.870 % whose coefficient value $\alpha = .975$

FACTOR 2. Death: Scientific advances. With 7 reagents out of the total 48, this factor has an explained variance of 10.468% with a coefficient value $\alpha = .864$. The reagent with the greatest factorial burden is the 41. "I believe that the advances of science will be a solution to save mankind from the phenomenon of death", whose value is .825. The content of this factor refers to the fact that death is a phenomenon of inescapable reality, where advances in science such as genetic modification, studies on aging or cloning can become a tool to postpone death indefinitely.

FACTOR 3 Science: Conceptualization of Death. To die is the end of the existence of the human being, of the existence of every living being on Earth. With this conception about death, the fourth factor of this study, composed of 5 reactants of the total 48, is defined. The number 23 "The only thing that remains of people when dying is a body without life" is the reagent with greater factorial load with a value of .717. This factor explains the 5.0107% of the variance with a coefficient value $\alpha = .730$.

FACTOR 4. Darwinism. 11 are the reagents that make up this factor; its explained variance is 3.605% with a value of coefficient $\alpha = .915$. The reagent with the highest factor load is the number 5 "The genetic constitution of living beings is the result of natural selection" with a value of .801.

The basis of this factor is supported by the Theory of Evolution of Species [19], which assumes that this theory is the most rational explanation about the origin of man and scientific evidence are primordial to explain the origin of living beings.

Once the scale factors, which measure the psychosocial category *beliefs*, a Pearson correlation analysis was applied in order to know the degree of association between them.

Correlation analysis showed considerable correlations. **Factor 1. Religion: Origin and Life after death** interacts significantly with **Factor 2. Death: Scientific advances** with a very low significant correlation with negative direction and a value of $r = -149 (**)$; **Factor 3. Science: Conceptualization of Death** whose interaction shows a low correlation with negative direction and a value of $r = -302 (**)$; finally, **with Factor 4. Darwinism** finds a significant correlation with negative direction and a value of $r = -620 (**)$.

On its side, **Factor 2. Death: Scientific advances** significantly interacted with **Factor 3. Science: Conceptualization of Death**, whose value of $r = .187 (**)$ shows a very low correlation with positive direction; The interaction with **Factor 4. Darwinism** shows a significant moderate correlation with positive direction and a value of $r = .456 (**)$.

Finally, **Factor 3. Science: Conceptualization of Death** with a value of $r = .467 (**)$ shows a moderate correlation with positive direction with **Factor 4. Darwinism**. These indices showed a significant correlation at a level of significance of 0.01.

4. Discussion

The continuous search for an explanation that helps to understand the behavior of the human being has been a permanent work. For this reason, the answers to the question of why it behaves as it does are based on the notion that one has about its origin, nature or character, as well as the characteristics that are its own or not [16]. Faced with this, one of the factors that have given man the answers to these questions has been their beliefs.

Empirical research on the subject of beliefs about the

origin of life and life after death and directly involving the conceptions of science and religion as explanations for these phenomena is not very common; however, scientific interest in the cognitive bases of religious belief has grown in recent years. The little research that has been done has focused on the cognitive processes that can promote religious unbelief, testing the hypothesis that analytic processing promotes such disbelief [54, 55]. In countries such as Spain, England and the United States [48, 49, 50, 51, 55] there is a series of investigations that have been put to test the hypothesis that the formal education, the analytical processing or the IQ can be determining factors in the generation of religious disbeliefs.

Therefore, to construct a suitable instrument for the data collection, valid and reliable, that measures the beliefs towards the origin of life and the life after the death in people who only count on basic schooling and of people who have the degree PhD academic was the main objective of this research. Through the corresponding statistical analyzes to obtain the reliability and validity of the instrument, this objective was reached. As a result, an instrument was composed of 48 reagents with a five-point Likert response scale, structured into four study sub-categories corresponding mainly to scientific beliefs and religious beliefs proposed in theory and were named on the basis of their content.

In the subcategory Religion: Origin and Life after death there are 25 the reagents that evaluate the religious beliefs whose foundation is in the Creationism [28, 29], the Judeo-Christianismo [30] and the Theory of the Intelligent Design [31, 32].

In the subcategory Death: Scientific advances there are 7 the replies that explain the great scientific advances in relation to improving the living conditions of human beings in order to prolong life.

With 5 reagents, the subcategory Science: Conceptualization of Death encompasses a frame of reference of how science conceptualizes the phenomenon of death from a medical-biological view.

Finally in Darwinism 11, are the reactants that explain the origin of life through the Theory of Evolution of Charles Darwin [19].

By interacting significantly the four subcategories maintain a theoretical congruence in relation to the theoretical framework that underlies this research. The subcategory Religion: Origin and Life after death is constituted by religious beliefs and by maintaining a negative relation with the subcategories Darwinismo, Death: Scientific advances and Science: Conceptualization of the Death whose foundation are beliefs of scientific type, shows that Beliefs toward supernatural events such as immortality, resurrection, and transcendence; Spiritual powers that are located outside the field of the material; in divine laws and the fate of the soul in later lives; as well as, in a personal God who is omnipotent, omniscient and perfectly good, who created and controls everything that exists and

therefore the destiny of man depends on his relationship with God [3, 25] ; they do not correlate with scientific beliefs to explain the phenomenon of the origin of life and life after death. After all, as a consequence of this divine order, the place that corresponds to each species is predetermined and immutable. Therefore, any idea of evolution is rejected and only what is established in the Bible is admitted [33].

For example, for Christianity, the understanding of the origin of life and the life after death is centered on the expectation that there will be an encounter with God who will judge the facts of life and whose destiny will be eternity; according to the positive or negative of these facts one will have a future that will lead to a heaven or hell [56].

This negative relation between scientific and religious beliefs has a nuance in the fact that the origin of species through Darwin's natural selection [19] generated the opposition of the Protestant and Catholic Church, this by weakening two pillars that had as immovable: on the one hand biblical authority, and on the other, a way of conceiving the creation of the world and the emergence of the various species closely linked to the literalness of the Genesis narrative [21, 33, 54].

For creationists the Bible is the first authority in all areas. They argue that there must be a complete subordination of science to what is said in Scripture in its literal sense. Therefore, it is frequent that the sacred text is fought as an argument to decide on the truth of a scientific hypothesis. The consequence of this attitude is that the creationists try to refute the scientific claims that seem to contradict Scripture and replace them with others that are more in keeping with them. In this case, the only possibility of achieving this is to find characters of a certain scientific or technical repute who are able to defend the "biblical" truths by giving a scientific air to the arguments used. One of the central ideas that openly maintains against what is admitted today by science is that evolutionism is not able to explain either the origin of the world or the origin and diversity of the species we see in nature [31, 32, 53, 54, 57].

On the other hand, the subcategories Darwinism, Death: Scientific Advances and Science: Conceptualization of the Death displayed a significant relation between themselves in a positive way, that is to say, the beliefs on the Theory of the Evolution of Charles Darwin [19] like it best explains the origin of life by being complete in itself and not requiring the intervention of mysterious forces alien to scientific understanding [21, 22], correlate with beliefs that the phenomenon of death is the total cessation of brain function, of cardiac and respiratory activity, bringing with it the end of the existence of the human being and with it, the total rejection of a life after death. In these terms, being biologically dead means that at least the brain has ceased completely and irrevocably to function. Biological death is brain death (central death) and finally death of the whole organism (total death) [39]. Coupled with this, they also correlate with beliefs that scientific advances are the only

tools that over time can end up prolonging life indefinitely.

In relation to the above, the research of Leuba [48], Larson and Witham [49] and Pérez-Agote and Santiago [50], put to discussion the fact that religious beliefs belong to the field of faith and scientific beliefs in the field of knowledge, and both domains do not have to contradict themselves or attempt to interfere in each other's field. In the words of Andrade [34] "(...) science tries to understand the world; religions, in general, are attributed the mission of giving meaning to life. They can be mutually clarified, provided that each one remains in its own territory".

According to Legare, Evans, Rosengren & Harris [53], although they are often conceptualized in contradictory terms, the common assumption that natural and supernatural explanations, i.e. beliefs, are incompatible is psychologically inaccurate. On the other hand, there is considerable evidence that the same individuals use natural and supernatural explanations to interpret the same events and that there are multiple ways in which both kinds of explanations coexist in individual minds. In this sense, knowing the beliefs about the origin of life and life after death brings with it a series of data that could be controversial. Knowing the beliefs of people also knows an elementary part of them: their behavior. This is because beliefs can be seen as a conceptual substrate that plays an important role in the thinking and action of each person [47].

Beliefs allow the human being in general to direct from his behavior in the way that best suits his interests and needs to his knowledge, values, judgments, dispositions, personal theories, strategies of action, norms and practical principles, to name only a few actions that allow you to direct your daily life.

In general terms, the construction of a valid and reliable scale is justified since the study of beliefs is indispensable; without them the human being is incapable of making decisions and determining courses of action; therefore, it is of great importance that the objectives of education should encourage discussion and verification as far as possible.

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