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WHAT PEOPLE THINK ABOUT CLONING? SOCIAL REPRESENTATION OF THIS TECHNIQUE AND ITS ASSOCIATED EMOTIONS

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Abstract: This study explores the social representations of cloning taking in consideration a series of associated emotions and the subjects' level of religiosity. The participants in our study consisted of 356 subjects of different ages and professions. The data collection included four tasks for the subjects to fill in. First, they had to fill in a free task association: starting from the stimulus-word „cloning" they had to associate five words or expressions, and then rank these five words according to their importance. The second task required polarity association for each of the expressions; thus, the subjects had to evaluate them as positive, negative or neutral in relation to „cloning". The third task was a questionnaire evaluating the level of religiosity (28 items). The last task included a list of 35 emotions (positive as well as negative) which subjects had to associate on a scale from 1 to 10 with the bio-medical procedure of cloning. The data analysis was focused on comparing the different groups defined in relation to the level of religiosity, affective polarity, age and level of education. We used the prototipicality technique, developed in the framework of the social representation's theory, in order to identify the elements of the social representations of cloning belonging to the previously mentioned variables.

Key Words: biotechnology, cloning, social representations, risk, religiosity, emotions

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Introduction

Cloning and the perception of social risk

The advanced biomedical and biotechnological researches have given rise to many ethical, social political and economic challenges. For the first time in the history of the mankind, the human person has become a technological object which can be decomposed, recomposed, multiplied, rearranged and subjected to all techniques with no restrictions[1]. The possibilities seem unlimited and the results, published by important scientific reviews, are spectacular.

The majority of the scientific and some lay people have manifested optimism and enthusiasm towards this scientific and technological progress[2], especially, when taking in consideration the benefits in the area of therapeutics. Other people experience skepticism and concern while the religious groups are strongly oriented against a continuation of the research in this field. There is a strong fear that these procedures that control and transform nature, including human nature, could turn against human kind. The technological risks and dangers have continuously grown. Modern times have registered many changes from the „industrial society" to a „risk society", from the „social logic of producing goods" to the „logic of avoiding and controlling risks"[3].

In the vast field of „red" biotechnologies, human cloning raises the most frequent and serious questions. After the successful cloning of Dolly in 1997, the scientific experiments regarding human and animal cloning have continuously extended. Thus, in the following years, famous reviews like *Nature* or *Science*, have reported successful cloning of different animals like pigs, calves, goats, mice, monkeys and, rabbits. It has become obvious that the cloning procedure can easily be transferred to human genetic material and as a consequence, scientific researchers, representatives of the civil society and politicians have engaged in ethical debates in order to formulate recommendations or normative acts to regulate the field of biotechnologies.

The essential distinction made is related to *reproductive* and *therapeutic* cloning. In the first case, the obtained embryo is transferred to the woman's uterus in order to determine a gestation process, ending with the birth of a child who will inherit the donor's genes. In the second situation, the created embryos are not placed in the woman's uterus, but are developed to create stem cells, with important therapeutic consequences for diseases like Parkinson's or Alzheimer's. In general, there is a tendency to accept therapeutic cloning and to reject the reproductive one. The discussions, however, are far from being closed.

The public debates regarding cloning have underlined pro and con arguments, as well[4]. The most frequent arguments in favor of cloning are

rooted in modern philosophy, in the work of John Stuart Mill and Jeremy Bentham. The first is based on the principle of free will and rational choice, with the condition that practicing it will not harm the others or the society. Banning the practice of these medical procedures would break a fundamental human right[5]. The second argument, based on a utilitarian thesis, regards the medical and economic benefits of cloning. In relation to the benefits of cloning, its promoters believe that there is an unjustified fear of the public towards using biotechnologies, and science people are doing too little to reduce people's fear regarding the use of cloning techniques[6].

For the majority of people, the human cloning procedure breaks many ethical norms as well as scientific and religious ones. The strongest argument against cloning regards the breaking of human dignity[7]. The theme is very complex and may be analyzed on different levels: (1) the individual level, referring to the cloned person, as a result of the cloning procedure; (2) the personal level, referring to the person whose cells were cloned; (3) the embryonic level, the immediate product of the cloning, and (4) the humanity level[8]. A large number of inconvenient situations are invoked against cloning, such as depersonalization, the threat to the unique identity[9], difficulties regarding the psychological assumption of an identity in social interactions, juridical status assumption, the promotion of an identity in social interactions, the possibility of economic exploitation, disorders regarding the natural family relations etc. However, the analyses of the objections towards cloning underline people's concern on the risks deriving from the imperfections of the procedure rather than the breaking of the human dignity[10].

Secondly, the cloning procedure implies an asexual reproduction as it doesn't allow the recombination of the genetic material, but only the copying of existing genetic material. The use of the cloning procedure on a large scale would lead, in time, to an impoverishment of the genetic material, diminishing the individual differences (de-diversification and loss of genetic individuality). It is hard to evaluate the long term impact considering the current scientific development and experimentation.

Thirdly, from a theological perspective, human reproduction by cloning happens outside a sexual union between two human beings, husband and wife[11]. On one hand, it breaks the sacred frame of the marriage and, on the other hand, it enhances the human pride in substituting God, in assuming a role of self-sufficiency and transgressing the laws that govern human nature. From this perspective, cloning, as well as other procedures of genetic manipulation, represents a parody of the Divine creation[12].The Orthodox Church rejects cloning[13]: man's life is a God given gift, and people have no right to manipulate it, by playing God.

The media and scientific debates have had a great impact on the politicians. Thus, many international organizations have recommended banning human cloning, especially the reproductive one. Organizations

such as UNESCO (*Universal Declaration on the Human Genome and Human Rights*, 1997[14]), The European Council (*Declaration on banning the cloning of the human being*, 1997[15]), the World Health Organization (WHA51.10, 1998[16]) have elaborated official documents in this regard[17]. For example, the *Declaration* launched by UNESCO on the 11th of November 1997 recommends (art. 11): „Practices which are contrary to human dignity, such as reproductive cloning of human beings, shall not be permitted". As a consequence, the governments of different countries like France, Germany and Great Britain, have elaborated normative acts based on these recommendations by which they ban reproductive cloning. In general, there is a political agreement regarding the ban of reproductive cloning but, no agreement has been reached with respect to therapeutic cloning[18]. There are also voices suggesting increased political pressure towards scientists, as a result of the public's fear which negatively affects legislative decisions[19].

Research studies on attitudes towards biotechnologies and cloning

Many studies underline a polarization of the public opinion between acceptance and rejection, caused by the lack of information and distrust towards scientists and politicians. Several research teams have developed a series of international studies about risk-perception, trust and attitudes towards biotechnology, public discourse in order to describe and understand the general image and representations that people have developed in relation with this new social object.

For example, in a European research published in 2001, Bauer and his colleagues analyzed the discourse produced by the mass-media on biotechnology and identified eight major themes (ranging from favorable to unfavorable attitudes): progress, economic prospects, ethics, Pandora's Box, runaways, nature/nurture, public accountability and globalization[20]. According to their analysis, „red biotechnology" (the medical application of biotechnology) tends to be reported as positive (*beneficial*), scientific progress while „green" biotechnology (the food application of biotechnology) is more associated with concern and anxiety (*problematic*)[21].

In 2002, Wagner and his colleagues published the result of a series of European studies on the discourse produced by the media and average people involved in a series of focus-group interviews. They developed a theory on collective symbolic coping which explains the dynamics of the social representations of biotechnology. According to their results, symbolic coping with biotechnology in Europe involves four different strategies: a) introducing and understanding the new unfamiliar phenomenon [*„...develop images to understand how it works and what the genes are"*]; b) integrating the new phenomenon in the existing repertoire of social knowledge; c) converging the different interpretations of the

phenomenon into one dominant image containing its essential attributes; d) sharing and reproducing the new reality[22].

In Australia, Tranter (2010) analyzed the reflection of the biotechnologies in the media. The author analyzed newspaper articles from six Australian journals, from 1997-2002. The results were grouped into three categories of information, describing different scenarios. The first category, named *anxiety*, refers to: (a) the science-fiction scenario (themes like Brave New World, Frankenstein, Jurassic Park, army of clones etc.) and (b) human dignity (lack of respect for life, organ harvest, loss of individuality, etc.). The second category of themes, situated at the opposite attitudinal pole was labeled *progress* and is divided in two: (a) recovery opportunities (cancer, Parkinson, Alzheimer) and (b) economic advantages (especially because of animal cloning). Finally, a third category was labeled *compromise* and includes ambivalent or combined themes[23].

A study conducted in Japan showed growing public interest and a positive attitude towards the use of biotechnology and the involvement of the mass media in discussions on this subject[24]. Another study, from Israel, with 120 respondents of which half work in the health domain, shows that 58% of them don't agree with human cloning, but don't reject non-reproductive cloning[25]. Another study, comparing the attitudes of experts with the public, shows that the experts perceive biotechnology applications more useful and harmless than lay people[26].

Regarding the relationship between religiosity and attitudes toward human cloning, the results from a study conducted in US, on Evangelical, liberal protestant, catholic traditionalist and liberal catholic religious practitioners seem to reveal interesting facts. Data analyses indicate a general disagreement with this technique, across all respondents. Secondly, evangelical people are more opposed to human cloning, compared with the other religious groups and are more likely to see cloning as a religious issue[27]. Other studies show that there is no single religious perspective on human cloning; theological and ecclesiastical positions are pluralistic in their premises and their modes of argument[28].

In general, the European public shows optimism. Thus, a comparison of attitudes between 1999 and 2002 in 15 European countries shows an increase in positive attitudes towards biotechnology[29] and a typical profile of the person with a favorable attitude is male, optimistic, well educated and open to the scientific-technological progress[30]. This trend has continued in subsequent years[31], but religious people are less optimistic about the use of biotechnology and the adherents to the Orthodox Church remain most pessimistic[32].

Theoretical and methodological frameworks for the current study

In this section, we will argue our theoretical and methodological choice, the social representation theory. The concept reached European

social psychology in 1961, when the results of a famous inquiry about the public images of the psychoanalysis in French social contexts by Serge Moscovici were published[33].

In his later research, the author developed his conception, showing that social representations are elaborated by lay people in order to gain social knowledge, through socio-cognitive mechanisms which make the passing from unfamiliar (scientific objects, for example) to familiar[34], as well as to regulate the social group's relationships. Social representations help people understand better their personal experiences, to project their future actions, give sense to social events and anticipate individual or collective actions[35]. The development of social representation allows the individual to reconstruct reality and integrate it in his cognitive system, according to the socio-historical and ideological context in which it is placed[36].

From his perspective, Moscovici believes that the person confronted with a new type of information has an active role in the formation of knowledge[37]. The person is interested in what happens around her, gathers information from the media, science, and politics and tries to adjust it, to make it useful in order to efficiently respond to social challenges. Thus, man becomes an „amateur scientist" who is interested in classifying the facts that he deals with, to give them significance and to share them with others. Social changes facilitated by the media and interpersonal interactions amplify, enrich and crystallize the social knowledge. It becomes more practical and more necessary in a society in which information is extremely diversified and abundant.

Previous studies have identified an internal structure of social representations and have described a central core organized around the central themes of the public discourse, and a periphery, including minor themes, marginally placed in the public discourse[38]. The first assembly of elements is characterized by stability in relation to contextual variations, is powerfully anchored in the social memory and gives sense and structure to the entire discourse. The peripheral elements have different functions, such as exemplifying, tolerating the contradictions and justifying the central discourse themes[39].

In what concerns cloning, our investigation theme, the social representation, seem like the appropriate concept to identify the population's diversified options. There are several images of cloning, differently structured in relation to people's religious convictions, biological gender, social background, and level of education. Unlike opinions and attitudes, social representations have a much more complex theoretical and methodological profile, proposing a more profound approach based on describing the discursive contents, as well as, original techniques of data analysis[40]. One of these techniques is the prototypical – categorical analysis which we will use in the current study.

Methodology

Sample

365 people participated in our study; 176 of them were males (49.4%) while 180 were females (50.6%); 176 had high school studies (49.4%) while 180 had university studies (50.6%). The subjects were selected from several cities of the North-Eastern area of Romania (historical region of Moldova). The average age was 35.5 years. We limited our sample to subjects with high school and university studies, considering that they are more informed on the subject of our research. According to *affective polarity*, participants were divided into three categories: those with negative affective polarity (N=116, 32.6%), neutral (N=95, 26.7%) and positive (N=145, 40.7%). The *level of religiosity* also divided our participants into two groups: a low level of religiosity (N=160, 44.9%) and a high level of religiosity participants (N=196, 55.1%). We, also, divided the participants by age into the group of young people with ages between 19 and 35 years (N=183, 51.4%) and adults aged between 36 and 60 years (N=173, 48.6%), with an average of 36.51 years. Finally, according to a last variable, *agreement towards cloning,* participants were distributed into three groups: the one who agreed with cloning (N=91, 25.6%), the undecided (N=47, 13.2%) and the ones who disagreed (N=218, 61.2%).

Hypotheses

The general purpose of this study was to investigate the social representation of cloning as well as to evaluate the impact of emotions that people associate to this bio-medical procedure. We anticipated a general representational structure organized on two main axes: a *technical –informational one* (general knowledge, meanings of the term, associated procedures, medical implications, etc) and a *moral - value dimension* (evaluations, positive or negative emotions, bioethical implications, agreement or disagreement, perspectives for humanity).

Our general hypothesis stated that, according to the considered variables (religiosity, affective polarity, age and education) we will identify different structures of the social representation of cloning. The two dimensions described above, would be differently represented (in composition as well as in scale) according to these variables. Thus, adult religious participants with high school studies, who frequently associate cloning to negative emotions, would develop a social representation structured more visible on the affective – value dimension, colored with negative emotions and unfavorable attitudes. On the contrary, the other participants would be more focused on the technical – informational dimension.

We also investigated the emotions (positive and negative) associated with the previously mentioned variables. Thus, we formulated several hypotheses that may be structured in one phrase: *adult women* (36-60

years) with *high level of religiosity, high school studies,* manifesting a *negative affective polarity* and who have declared their *disagreement regarding the cloning procedures* will frequently associate more negative emotions to cloning and less positive emotions than *young men* (19-35 years) with *low levels of religiosity, university studies* manifesting a *positive affective polarity,* and who have declared *agreement with cloning*.

Questionnaire

In order to investigate the internal structure of the social representation of cloning we asked our participants to associate several words or expressions with a stimulus-word „cloning". The free association task is one of the most often used data collection techniques in the field of social representations[41]. Participants received the following instructions: „Starting from the term *cloning,* please indicate the first five words or expressions that immediately come to your mind". Afterwards, the participants were invited to evaluate the affective polarity of the associated terms as positive (+), neutral (0) or negative (-). Later on, we calculated an index of general affective polarity represented by the algebraic sum of the three values.

The second task included an evaluation of the level of religiosity developed by the participants with the help of a questionnaire (Alpha=0.96), consisting of 28 items[42]. The questionnaire was developed on the basis of three other scales: *Revised Scale of Religious Motivation*[43], *Religious Orientation Scale*[44] and *Religiosity Scale*[45]. The results allowed us to divide subjects between a high level of religiosity and a low level of religiosity participants.

The third task consisted in an evaluation of 35 emotions (positive and negative) that people can associate to cloning. The list was composed of 13 *positive emotions* (joy, curiosity, enthusiasm, happiness, interest, love, amusement, pride, astonishment, optimism, ecstasy, hope, surprise) and 22 *negative emotions (*cynicism, disgust, desperation, contempt, fatalism, fear, fury, fright, pessimism, concern, anger, melancholy, panic, boredom, repulsion, shame, terror, sadness, hatred, vigilance, guilt). Each subject was asked to evaluate on a scale from 1 to 10 how much they would associate an emotion to cloning (1 very little and 10 very much). We calculated two indexes, one for positive emotions (Alpha=0.85) and another one for negative emotions (Alpha=0.92).

A final item requested the participants to declare their agreement or disagreement towards cloning: agreement, disagreement and undecided („I don't know").

Results and comments

As characteristic to the free task association techniques for data collection, we initiated a data narrowing activity by assimilating the

synonyms, the flexional forms and other linguistic derivates. For example, the „copy" label includes terms and expressions like, copies, Xerox, identical copy, exact copy etc.

The data was analyzed according to the prototypical – categorical technique, developed by Pierre Verges, in a study regarding the social representation of money in France[46]. Participants' associations were reorganized according to two indicators: *frequency of appearance* for the entire sample of participants and *medium rank of appearance* for each term. For that, we used the statistical software, Evoc2000[47], which elaborates tables with double entrances according to the previously mentioned indicators.

The elaborated table requires a special lecture; each of the quadrants has a different meaning for the internal structure of the social representation. Thus, the elements considered for centrality (possibly central) are positioned in the left upper quadrant while the peripheral elements are placed in the right downer quadrant. The other two quadrants host the elements with an ambiguous status, which are neither central nor peripheral. This disposal is exemplified in the table 1[48].

Table 1

	High rank	**Low rank**
	The element placed on the first positions of the associative chain (under a certain threshold)	*The elements placed on the last positions of the associative chain* (above a certain threshold)
High frequency (above a certain threshold)	High frequency – high rank (CENTRAL ELEMENTS)	High frequency – low rank (AMBIGOUS ELEMENTS)
Low frequency under a certain threshold)	Low frequency – high rank (AMBIGOUS ELEMENTS)	Low frequency – low rank (PERIPHERAL ELEMENTS)

Based on the technique described before, we elaborated tables representing the internal structure of the social representations for the entire sample of participants as well as for different groups defined by the levels of the independent variables that we took in consideration.

Global analysis of the social representation of the cloning

The table below includes the terms with frequencies higher than 10. The four quadrants have been delimited by the intermediary frequency 20 and the medium separation rank of 2.8 (see table 2).

Table 2

Global representation (N=356)			
		Rank of appearance	
		< 2.8	*>2.8 or = 2.8*
Frequency	*>20 or =20*	**Copy 170:2.353** **Dolly 52: 2.442** **Duplication 49:1.939** Identical 49:2.653 Fear 31:2.419 Similarity 30:2.233 Multiplication 29:2.690 Immoral 20:2.450	Experiment 42:3.000 Science 39:2.897 Evolution 33:3.303 Biotechnology 30: 3.200 Identity 30:3.167 Medicine 28:3.071 Progress 24:3.083 Unreligious 23:2.913 DNA 21:2.810 Curiosity 20:3.350
	< 20	Inhuman 11:2.636 Tube 10:2.700	Life 18: 3.444 Cells 18:3.333 God 17:3.118 Sin 17:3.471 Organs 17:3.176 Research 17:3.176 Future 17:3.529 Genetics 16:2.813 Reproduction 15:3.467 Personality 13:3.077 Artificial 12:3.500 Laboratory 12:3.167 Population 11:2.818 Hope 10:3.600

We formulated a hypothesis about the existence of a double structured social representation: a *technical-informational* dimension and a *moral-value* one. The elements seem to group themselves in this way, the first dimension includes elements like: *copy, Dolly, duplicate, identical* etc., and in the second dimension we find words like: *fear, immoral, unreligious, inhuman* etc. Dolly the sheep picture, very present in the data obtained, is an objectification („materialization") of the abstract notion of cloning[49]. People need a concrete image to approximate a scientific concept and to make it familiar.

Generally speaking, we see that the technical-informational dimension is better represented on both levels: the central core and peripheral system. At this level, we distinguish between two categories of elements: (1) regarding the *copying of the genetic information (the basic meaning of the term)* with the purpose of creating a new cloned organism (*copy, duplicate, identical, similarity, multiplication* etc.), which underline the idea of replication; (2) regarding *the sciences, research or medical procedures* (*Dolly, experiment, science, biotechnology, medicine, progress, DNA, tube* etc.).

The three terms that are in bold in the table are with certainty the central elements of the social representation of cloning. This affirmation is based on the fact that no matter which variable we explored, as we will see further, the three elements were always positioned in the upper left quadrant of the social representation. The three terms belong to the technical – informational dimension and are attached to the basic meaning of the bio-medical procedure of cloning. The affective – value dimension is represented in the global structure of the social representation but, we didn't find it in the other structures of the analyzed groups. The scale of this dimension is underlined by the fact that out of the eight possible central elements (upper left quadrant), five of them belong to the informational dimension and only three are part of the affective - value dimension.

We notice that what is lost by centrality (quality) is recovered in quantity. The affective – value dimension is, thus, much better represented at the medium and peripheral level, especially, by religious terms like *inhuman, unreligious, God, sin, artificial* etc.

The social representation according to the level of religiosity variable

Below we can notice the internal structure of the social representation for the two groups, high level of religiosity and low level of religiosity, with frequencies ranging from a minimal 8, to an intermediary one of 14 and a separation rank of 2.7 (see table 3):

Table 3

		High religiosity (N=196)		**Low religiosity (N=160)**	
		Rank of appearance			
		< 2.7	*> 2.7 or = 2.7*	*< 2.7*	*> 2.7 or = 2.7*
Frequency	*> 14 or = 14*	**Copy 98:2.357** Identical 33:2.606 **Duplicate 30:1.767** **Dolly 25:2.560** Similarity 20:2.150 Fear 18:2.500 Multiplication 15:2.333	Experiment 26:2.962 Science 22:3.318 Evolution 17:3.706 Medicine 15:2.933 Sin 15:3.533 Identity 14:3.357	**Copy 72:2.347** **Dolly 27: 2.333** **Duplicate 19:2.211** Science 17:2.353	Biotechnology 17:3.471 Evolution 16:2.875 Experiment 16:3.063 Identical 16:2.750 Identity 16:3.000 Multiplication 14:3.071 Future 14:3.214

	< *14*	Unreligious 12:2.417 Immoral 9: 2.667 Inhuman 8:2.625 DNA 8:2.500	Biotechnology 13:2.846 Cells 12:3.750 Progress 12:3.167 God 11:3.273 Curiosity 10:3.900 Genetics 9:3.333 Artificial 9:3.556 Research 9:3.222 Contempt 8:3.375 Life 8:3.250	Fear 13:2.308 Immoral 11:2.273 Similarity 10:2.400	DNA 13:3.000 Medicine 13:3.231 Progress 12:3.000 Unreligious 11:3.455 Life 10:3.600 Curiosity 10:2.800 Organs 10:3.400 Research 8:3.125 Personality 8:3.125 Reproduction 8:3.500

We hypothesized that people with high levels of religiosity will show more interest for the elements of the affective-value dimension compared to the people with a lower level of religiosity which will evoke more elements belonging to the informational - technical dimension. The results show a partial confirmation of the hypothesis: the participants with low levels of religiosity present no affective - value central elements. If we compare the upper left quadrants of the two groups of participants, we can observe that religious people have the same structure as the general sample, while the less religious people have introduced a new strong element *science.*

Some of the negative terms are common for both groups even if they are positioned in different quadrants: *fear* (f*r=18:2.5/13:2.3[50]) *immoral* (f*r=9:2.6/11:2.2), *unreligious* (f*r=12:2.4/11:3.4), while other elements are not present in the second table: *inhuman* (f*r=8:2.6), *sin* (f*r=15:3.5), *God* (f*r=11:3.2), *contempt* (f*r=8:3.3) etc. We can, also, observe that religious people are not misinformed, they underline the negative potential of cloning but, are aware of the positive aspects of the phenomenon, as well: *evolution* (f*r=17:3.7), *progress* (f*r=12:3.1), *life* (f*r=8:3.2); these elements, however, are less represented in their internal structure compared to the less religious people.

We may interpret these data as the consequence of the presence/absence of religious preoccupations for the second group. The church is against cloning, and many religious authors, sciences or clericals don't agree with this type of procedure. The religious participants value the uniqueness of a person, they are afraid of what may happen in the future if technology goes out of our control, and they believe that the risks for humanity are much higher than the benefits.

The internal structure of the representation of cloning according to the affective polarity

The affective polarity measures have divided our sample into three groups: positive, neutral and negative polarity. The comparison from table 4 shows only the results for the subjects registering positive and negative affective polarity. The small number of subjects per group has determined

us to consider a minimal frequency of appearance equal to 6 and an intermediary one of 10, while the medium rank of separation was 2.7.

Table 4

		Negative polarity (N=116)		Positive polarity (N=145)	
		Rank of appearance			
		< 2.7	*> 2.7or = 2,7*	*< 2.7*	*>2.7 or = 2.7*
Frequency	*> 10 or = 10*	**Copy 65:2.292** Identical 18:2.444 **Duplicate 16:1.750** **Dolly 13:2.462** Similarity 11:2.182	Experiment 18:3.111 Science 15:3.467 Evolution 12:3.000 Identity 12:4.083 Medicine 10:2.800	**Copy 64:2.375** **Dolly 25:2.280** **Duplicate 17:2.412** Science 15:2.467 Fear 11:2.273	Identical 21:2.905 Evolution 17:3.412 Experiment 16:2.813 Biotechnology 14:3.214 Multiplication 13:2.846 DNA 12:2.917 Life 11:3.636 Immoral 11:2.727 Research 10:3.100 Identity 10:2.800 Medicine 10:2.900
	< 10	Immoral 8:2,125	Multiplication 9:2.889 Unreligious 9:3.111 Fear 8:3.000 Genetics 8:3.000 Cells 7:3.143 Progress 7:3.000 DNA 6:3.000 Biotechnology 6:3.167	Similarity 8:2.125 God 6:2.667 Tube 6:2.667	Personality 9:2.778 Progress 9:2.778 Unreligious 9:3.222 Sin 8:3.625 Inhuman 8:2.750 Organs 8:3.375 Cells 7:3.571 Genetics 7:2.857 Reproduction 7:3.286 Future 7:3.429

The internal structuring of the central elements for the people with negative polarity is predominantly oriented towards the informational dimension. We were expecting for certain negative emotions to appear in the upper left quadrant, but that was not the case. We can also observe that these types of elements are better represented (for example, *fear*) in the case of the positive polarity subjects (*fear* - f*r=8:3.0 / 11:2.2).

A possible methodological explanation could be that, for the analysis, we only considered the elements with frequencies higher than 6, and the prevalence that would have given a qualitative difference is positioned at the level of the low frequency elements. Thus, we could conclude that this structuring is in consonance with the structural perspective of the social representations theory which states that the elements that tinge or give an affective coloring are frequently positioned in the peripheral areas.

The internal social representation of cloning according to age

Further on, we present the two internal structures of the two groups of participants: young people (19-35 years) and adults (36-60 years) (see table 5). The minimal frequency is 8, intermediary frequency 14 and the separation medium rank is 2.7.

Table 5

		Age: 19-35 years (N=183)		**Age: 36-60 years (N=173)**	
		Rank of appearance			
		< 2.7	*> 2.7 or = 2.7*	*< 2.7*	*> 2.7 or =2.7*
Frequency	*> 14 or = 14*	**Copy 80:2.450** **Duplication 32:2.063** **Dolly 27: 2.296** Identical 24:2.667 Science 21:2.619 Fear 18:2.667 Multiplication 18:2.611	Evolution 20:3.200 Experiment 20:2.900 Identity 17:3.235 Medicine 16:3.063	**Copy 90:2.267** **Dolly 25:2.600** Identical 25:2.640 Similarity 17:2.471 **Duplication 17:1.706**	Experiment 22:3.091 Biotechnology 18:3.278 Science 18:3.222
	< 14	Similarity 13:1.923 Immoral 11:2.636	Unreligious 12:3.000 Biotechnology 12:3.083 Progress 12:2.917 Sin 11: 3.818 Curiosity11:3.455 God 10:3.700 DNA 9:2.889 Research 9:3.000 Organs 9:3.111 Cells 8:3.125	Fear 13:2.077 Genetics 9:2.556 Immoral 9:2.222	Evolution 13:3.462 Identity 13:3.077 DNA 12:2.750 Medicine 12:3.083 Progress 12:3.250 Multiplication 11:2.818 Unreligious 11:2.818 Life 11:3.364 Future 10:3.000 Cells 10:3.500 Curiosity 9:3.222 Research 8:3.375 Organs 8:3.250 Evil 8:2.750 Reproduction 8:3.625

The central structure of the social representation of the young people (19-35 years) contains elements like *science* (f*r=21:2.6), fear (f*r=18:2.6), and *multiplication* (f*r=18:2.6). There are four common elements for both groups of participants: *copy* (f*r=80:2.4/90:2.2), *Dolly* (f*r=27:2.2/25:2.6), *duplication* (f*r=32:2.0/17:1.7), and *identical* (f*r=24:2.6/25:2.6) which allows us to say that compared to the previous comparison, these two structures are more similar.

There are no significant difference in regard to the affective – value dimension, either. For example, if we consider the first three quadrants as the most important (ignoring the low right one) we have the same elements and similar frequencies for both young and adult people: *fear* (f*r =18:2.6/13:2.07) and *immoral* (f*r=11:2.6/9:2.2). In conclusion, the two structures are similar, except young people value more the cloning as related to *science*, a distinct element which is centrally positioned for their group (f*r =21:2.6/18:3.2).

The social representation according of cloning according to the level of education

The last variable we considered for our study is related to the level of education of the participants and how that influences their way of representing the cloning. The minimal frequency is 8, intermediary frequency is 14 and medium separation rank is 2.7 (see table 6).

Table 6

		High school studies (N=176)		**University studies (N=180)**	
		Rank of appearance			
		< 2.7	*> 2.7 or =2.7*	*< 2.7*	*> 2.7 or = 2.7*
Frequency	*> 14 or = 14*	**Copy 92:2,293** Identical 28:2.500 **Dolly 24:2.583** **Duplicate 23:1.826** Fear 19:2.526 Multiplication 17:2.471	Science 21:2.810 Experiment 18:3.111 Medicine 15:3.200 Progress 14:3.214	**Copy 78:2.423** **Dolly 28:2.321** **Duplicate 26:2.038** Similar 17:2.353	Experiment 24:2.917 Evolution 22:3.409 Identical 21:2.857 Identity 19:3.368 Science 18:3.000 Biotechnology 17:2.765 Unreligious 14:3.071
	< 14	Similarity 13:2.077 Immoral 11:2.455 Unreligious 9:2.667	Biotechnology 13:3.769 Curiosity 12:3.583 Future 12:3.333 Organs 11:3.000 Evolution 11:3.091 Identity 11:2.818 DNA 10:3.200 Research 9:3.556 Laboratory 9:3.111 Artificial 8:3.750	Fear 12:2.250 DNA 11:2.455 Genetics 9:2.222 Immoral 9:2.444	Medicine 13:2.923 God 12:3.417 Cells 12:3.333 Multiplication 12:3.000 Life 11:3.818 Progress 10:2.900 Sin 10:4.000 Research 8:2.750 Curiosity 8:3.000 Personality 8:3.000 Reproduction 8:3.125

We hypothesized that people with high school studies would represent cloning less in terms of informational elements (technical and scientific elements) compared to people with university studies. We, also, hypothesized that the former are more oriented towards affective – value elements than the later. The hypotheses were partially confirmed, because

the affective element with the highest value, *fear,* is centrally placed for the participants with high school studies while for the others, the participants with university studies it is positioned at a second, intermediary level (f*r=19:2.5/12:2.2). There is only one element *immoral*, with identical positioning and similar frequency for both groups (f=11:2.4/9:2.4).

On the other hand, we can notice the presence of other affective – value elements in the second table and the absence of these elements in the first one: *God* (f*r =12:3.4), *sin* (f*r =10:4.0), and *life* (f*r =11:3.8) etc. Our conclusion is that people with university studies are more sensitive to the religious aspects of cloning as compared to those with high school studies who present rather undefined fears towards cloning. This result differs from those obtained by *Euro barometer*, where the person with more optimistic attitudes towards biotechnology corresponded to well-educated people[51].

The emotional evaluation of the participants towards cloning

(a) A first analyses category considered the variable *gender*. The results show that, men have higher scores on *positive emotions* as compared to women [t (354) =2.069, p=. 039]. It seems that men have a more favorable attitude towards the cloning and its perspectives as compared to women to be more reserved. The data show similar results for *negative emotions;* women have lower scores on intensity of the negative emotions associated to cloning than men [t (354) = -2.016, p=.045]. This may be explained by the fact that women have a negative position towards the procedures of cloning which imply creating new lives in an unnatural manner.

(b) As concerned to *age,* we hypothesized that participants with ages between 19-35 years will evaluate cloning more positively than participants with ages between 36-60 years who will experience rather more negative emotions. We believe that prudence and religiosity reach higher levels as people grow older, and this would support our hypothesis. The results show insignificant differences for positive emotions [t (354) = 1.772, p=.077] as well as for negative emotions [t (354) = -0.510, p=.610]. It is possible that these data could be the result of the fact that all participants, no matter their age, have access to the same type of information and to the same religious beliefs.

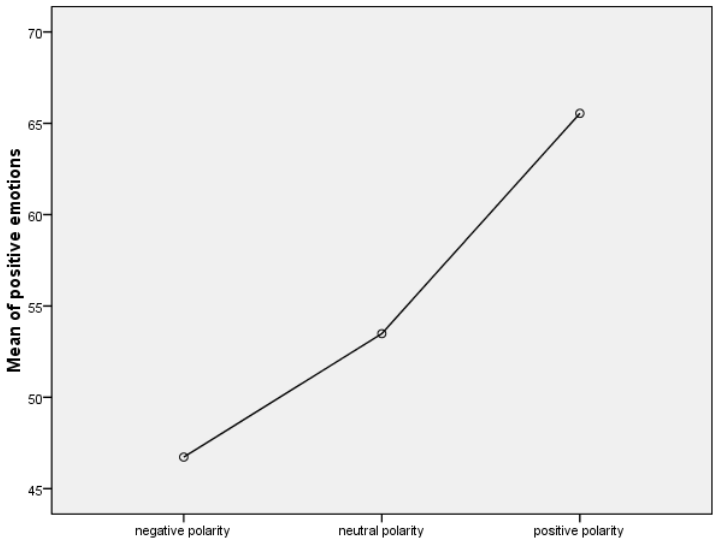
(c) For the *level of education* variable, the analysis of both categories of emotions does not indicate any significant differences. We had hypothesized that people with superior education would express more positive emotions towards cloning as compared to participants who have a high school education, as the result of higher levels of openness to novelty and more access to information. The results show no significant statistical differences: for *positive emotions*, [t (354) =-1.135, p=.257] and for *negative emotions*, [t (354) = 0.263, p=.793]. We believe that the results could be the

cause of equal access to media information regarding the cloning procedures.

(d) Further on, we hypothesized that, participants with high levels of religiosity will experience more negative emotions towards cloning, while less religious participants will experience rather positive emotions. The data confirm the hypothesis, for *positive emotions* [t (354) = 3.153, p=.002], as well as *negative emotions*, t (354) = -4.935, p=.000. In general, religious people are resistant to cloning as they believe giving life to a new creature (a „new species", said one of our participants in his free association task) means not only breaking God's rules and principles but an attempt to life too. The human being has no right to modify the laws of life, to act against what is natural and permitted by the Divine power of God.

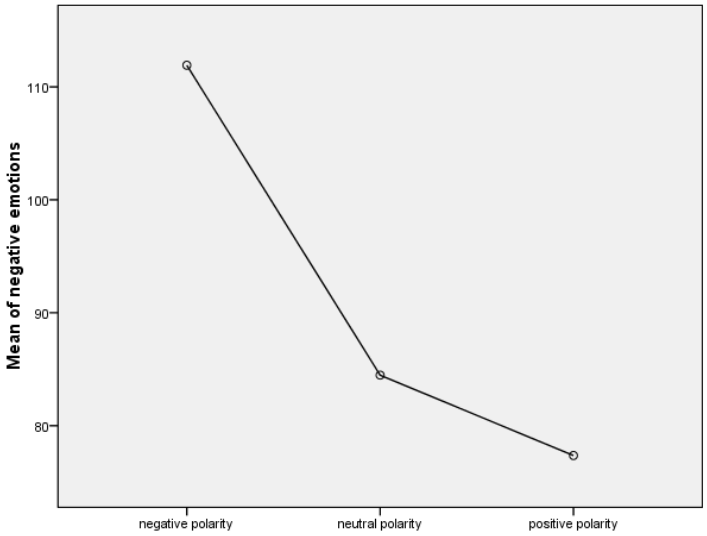
(e) The data has underlined interesting results concerning the relation between *affective polarity* and the emotions people associate to cloning as well as the participants' coherence in filling in the research tasks. The results confirm our initial evaluations; the positive affective polarity correlates with the high level of positive emotions associated to cloning, F (2, 353) = 22.170, p=.000. The graph below shows that participants with positive polarity have higher scores than the participants with negative polarity, while neutral participants are in the middle of the distribution. The Bonfferoni post-hoc tests show significant differences between the participants with positive polarity and those with negative polarity (p = .000) and neutral polarity (p=.000). There are no significant differences between the groups of neutral and negative polarity (p= .107) (see fig. no. 1).

Figure 1



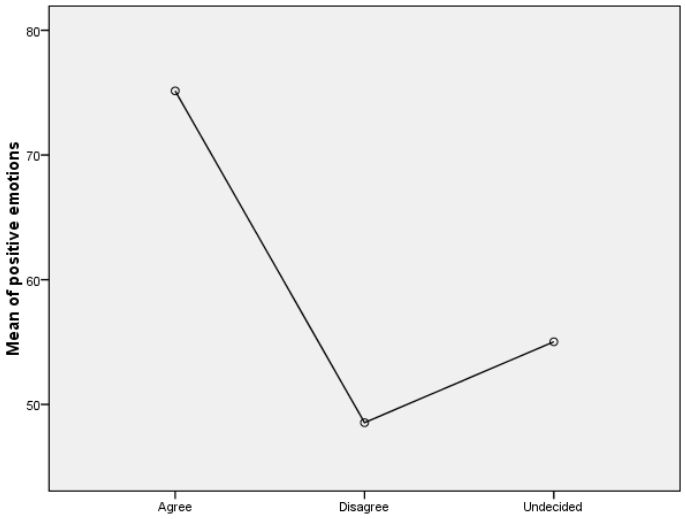
Similar results were obtained for the *negative emotions* associated to cloning [F (2,353) = 23.366, p=. 000]. The Bonfferoni post hoc tests indicate significant differences between the participants with negative polarity and those with neutral (p=.000) and positive polarity (p= .000). There is no significant differences between the groups of positive and neutral polarity (p=.594) (see fig. no. 2).

Figure 2



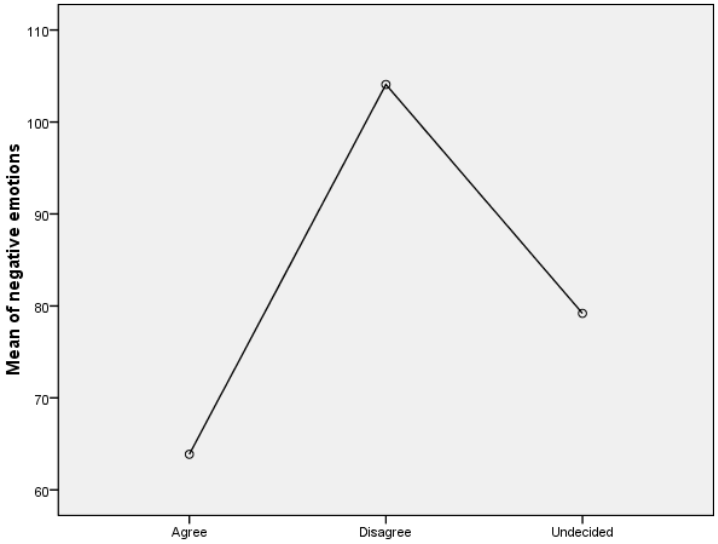
(f) Finally, two variance analyses have been used in order to investigate the influence *of agreement /disagreement towards cloning* on the intensity and polarity of the emotions associated with cloning. The results indicate that low levels of agreement are related to less intense positive emotions [F (2, 353) = 47.949, p=.000]. The Bonfferoni post-hoc tests show that there are significant differences between people who agree with cloning and those who disagree (p=.000), and the undecided (p=.000), but there are no differences between undecided and those disagreeing. (p=. 195) (see fig. no. 3).

Figure 3



As to negative emotions, the stronger the people disagree with cloning, the higher the intensity of their negative emotions become [F (2, 353) = 22.170, p=.000. Bonfferoni post-hoc tests indicate significant differences between those agreeing and those who disagree (p=.000), but not with those who are undecided (p= .112). There is a significant statistical difference between those disagreeing and those who are undecided (p= .001) (see fig. no. 4).

Figure 4



In conclusion, the data has shown a concordance between the participants' answers to the free task association and the emotions

associated with the cloning task; as for the agreement/disagreement, the participants who agree, experience more positive emotions than those who disagree as a consensus between the affective and cognitive dimensions of their attitudes towards cloning[52]

Conclusions

The most important results of our study are focused around the religiosity variable. In general, religious people experience resistance to cloning as compared to less religious people. The internal structure of the social representation of cloning for the religious people is organized around the affective – value elements as well as negative ones. Thus, *fear*, is one of the terms which appears as central for religious people. They associate more negative emotions to cloning than positive emotions, as compared to the less religious participants.

The term *fear* creates, by its frequency and rank of appearance, the highest differences between the two categories of participants, the results which are confirmed by the statistical analysis undertaken. Religious participants feel more responsible about the impact of cloning on the evolution of the human species in relation to their religious principles, bioethical norms and possible negative consequences. Elements like *sin, God, unreligious*, *life* together with *fear* and *immoral*, outline the negative image developed by religious people about cloning.

These results are related to the gender variable, where women have the same way of positioning themselves as religious people. Thus, we can identify a profile of the „against cloning type": women who are more religious. Other results showed that age and level of education have an insignificant impact. Romanian people are Orthodox-Christians and have proved to have a high level of religiosity which makes them sensible to any procedure that affects life, considered a sacred gift from God. Moreover, Romanian women have a traditional lifestyle in relation to family and their purpose in society.

To conclude, the differences we found between the participants as a result of several variables that were taken into consideration do not underline different social representations of cloning; the data outline a unique social representation with different structures depending on the social experience and characteristics of the participants.

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