

Pensamiento mágico en estudiantes. Estudio comparado entre niveles educativos

*Magical Thinking in Students. A Comparative Study Between Educational
Levels*

*Pensamento mágico em estudantes. Estudo comparativo entre níveis
educacionais*

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Resumen

El presente trabajo tuvo como propósito identificar los índices de pensamiento mágico de estudiantes de distintos niveles educativos. La investigación se desarrolló con un diseño descriptivo, correlacional y transversal. La muestra ascendió a 513 estudiantes, 87 de secundaria, 212 de bachillerato y 214 de educación superior. El instrumento utilizado fue la escala de Pensamiento Mágico en su versión de 24 ítems con dos factores relacionados, la cual cuenta con los parámetros adecuados de validez y confiabilidad. En general, los

resultados indican que el nivel de pensamiento mágico de los participantes puede interpretarse como una neutralidad que no corresponde a rasgos marcados de pensamiento mágico o de racionalidad; además, se encontraron diferencias significativas entre niveles educativos y el sexo de los estudiantes. Se sugiere emprender estudios para identificar el origen de tales resultados.

Palabras clave: estudiantes, nivel educativo, pensamiento mágico, sexo.

Abstract

This study aimed to identify rates of magical thinking of students of different educational levels. The research was conducted with a descriptive, correlational and cross-sectional design. The sample was composed for 513 students, 87 of middle school, 212 of high school and 214 of higher education. The instrument used was the scale of Magical Thinking in the version of 24 items with two related factors, which has adequate validity and reliability parameters. Overall, the results indicate that the level of magical thinking of the participants can be interpreted as neutrality that does not correspond to features marked as magical thinking or rationality; also, significant differences between educational levels and gender of students were found. It is suggested to undertake studies to identify the origin of these results.

Keywords: students, educational level, magical thinking, sex;

Resumo

O objetivo deste trabalho foi identificar os índices de pensamento mágico de alunos de diferentes níveis educacionais. A pesquisa foi desenvolvida com design descritivo, correlacional e transversal. A amostra totalizou 513 alunos, 87 do ensino médio, 212 do ensino médio e 214 do ensino superior. O instrumento utilizado foi a escala de Pensamento Mágico em sua versão de 24 itens com dois fatores relacionados, que possui parâmetros adequados de validade e confiabilidade. Em geral, os resultados indicam que o nível de pensamento mágico dos participantes pode ser interpretado como uma neutralidade que não corresponde a características marcadas de pensamento ou racionalidade mágica; Além disso,

diferenças significativas foram encontradas entre os níveis educacionais e o sexo dos alunos. Sugere-se a realização de estudos para identificar a origem desses resultados.

Palavras-chave: estudantes, nível educacional, pensamento mágico, sexo.

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I. Introduction

When we ask ourselves why people believe in strange or supernatural things we can consider different answers, but given the high frequency of this behavior (it is the rule rather than the exception), it is worth postulating that at least some of these beliefs are derived of a tendency to think in certain ways (Fierro et al., 2003).

In this order of ideas, belief systems based on magic, called magical thinking, would merit a more serious study than they are sometimes given.

The category of magical thought arose in nineteenth-century anthropology and was used to designate the way of thinking characteristic of a primitive stage of humanity. It was also considered that this thought was still the predominant mode of knowledge in the peoples called then wild or primitive. Edward Burnett Tylor and James Frazer were the main representatives of that position. The latter, in his book of the early twentieth century, *The Golden Bough*, was who first referred to the "homeopathic magic" that works with the principle of similarity and "contagious magic" that obeys the principle of contact (Fierro *et al.*, 2003).

Also, in the field of psychology Piaget (1929) established that this type of thinking occurs particularly in children up to the age of ten or eleven years -status of concrete operations-, at which point they begin to differentiate between fantasy and reality.

Special mention deserves the connection of magical thinking in the field of psychopathology where this factor has been considered as one of the most influential predictors in the subsequent development of some disorders, especially with schizophrenia (Eckblad and Chapman, 1983), and It has related to the appearance of visual and auditory hallucinations (Close and Garety, 1998, Chadwick and Birchwood, 1994, Dubal and Viaud-Delmon, 2008).

Over time some of these concepts have changed. It has been widely recognized that the magical theme is not the heritage of primitive peoples, nor is it a past stage in the development of the psyche of humanity or of specific stages of ontogenetic development. Even today it can be said, based on the evolutionary anthropological theory proposed by Mithen (1998), that magical thinking was only possible after the evolutionary history of the hominids produced a mind with cognitive fluency like that of the human current, that such an event happened 60,000 years ago or less and that, therefore, magical thinking is a recent feature in human evolution.

Of course, this does not mean that glimpsing the world in magical terms is better, superior or more evolved; It refers rather to the fact that thanks to the existence of a flexible mind it was also possible to have magic as a theme to explain what happens.

From this it can be pointed out that the magic has been and is present in the thinking of people all over the world and in all times. If you like, magical thinking is the heritage of the cognitive functioning of human beings and is not restricted to people called savages, psychotic patients or children (Fierro et al., 2003). It can even be indicated, as various research studies have shown, that this phenomenon is also present in adults living in Western societies (Subbotsky, 2004, Woolley and Tullos, 2008).

Now, in terms of its most current conceptualization, the term of magical thought, arising within the cognitive tradition, can be considered as the most used within the psychological literature to refer to superstition. Specifically, this has been defined as the attribution of causes or relationships of an irrational nature to certain events, when in reality there is no relationship or causality (Eckblad and Chapman, 1983).

Magical thinking can then be considered as a type of non-scientific causal reasoning that resorts to supernatural forces and agents to explain natural phenomena, whether daily or extraordinary. Thus, the magical thought has the tendency to attribute intentions and will to inanimate phenomena, to explain natural phenomena by means of supernatural causes and ends and to believe in supernatural powers and invisible entities that act on the physical world. A manifestation of magical thinking is what occurs, for example, in matters such as luck, fate, health and the prevention of supernatural damage (Moral, 2009).

In the same way, the so-called supernatural, supernatural or paranormal beliefs are ways of approaching magical thinking through its externalization or cultural manifestation. (Eysenck y Sargent, 1993; Irwin, 1993; Moscovici, 1992; Moral, 2009).

Specifically and given that magical thinking exists thanks to our cognitive design, product of evolution, it is important to highlight some of its characteristics. In this sense, Tylor recognized two characteristics of magical thinking that are key to a general theory of it. In the first place, that magical thinking is coherent from a logical and ideological point of view and, secondly, that it provides causal explanations in terms of analogies. He also explained several reasons why people who follow this thought and practice magic do not find it false. These include the fact that any failure is attributed to an error in the prescriptions or prohibitions that accompany the rite and not to a conceptual problem and to take a single success as the legitimation of many failures in the interpretation of the evidences (Fierro et al. al., 2003).

For his part, Steven (2001) proposes that magical thinking operates according to some or all of the following five basic principles:

1. Forces There are forces different from those identified by physics, programmed from the beginning of time to do specific things, either alone or together with others; and if you let them, they will do those things.

2. Power The forces, and everything else, are charged with an energy bestowed by a mystic power. The intensity of the energy of each thing can vary making it more or less powerful. Power is transferable through physical contact, sensory perception or mere closeness. In some belief systems force and power come together, as in the concept of "life force".

3. Interconnected and coherent universe. The universe is real or potentially interconnected temporally and spatially. There are invisible threads that unite the totality of what exists; and in relation to time, what has happened, happens and will happen was programmed in advance in the cosmic system. In addition, every event leaves its own mark on the universe.

4. Symbols. Symbols not only represent other things or actions, but they can take on the qualities of what they represent. If a stone represents a powerful and cruel god, it is feared and revered not only the god but the stone itself. The most interesting example is the word. If the word death is enunciated, it can itself bring the dreaded event. Thoughts play a similar role; just thinking about the misfortune of an enemy, is inexorably ensues.

5. The sympathy or affinity between things (Frazer principles). A) Principle of similarity: things or actions that resemble others have a causal connection. B) Principle of contact: things that have been either in physical contact or in spatial or temporal association with other things, still have a connection after separate. Examples of the first principle are the attempts to destroy an enemy by damaging an image of him or the use of figures to which needles or other sharp objects are buried, believing that in this way the represented subject is affected. The second principle is clearly exemplified in the universal belief that if a person's hair, nails or blood is obtained, they can act on it from a distance.

On the other hand and in terms of its dimensions or components, Moral (2009) considers that the construct Magical Thought is integrated by at least the thematic areas of Witchcraft and Magical Damage, Superstition, Supernatural Causes, Premonitions, Spirits and Evil Entities, Healing and Magic Remedies and Spirits of the Dead, which are defined below:

-Bruch and magic damage. The word witchcraft is used to denominate those acts that are carried out to harm a person through magical procedures (Gereis, 2009). This practice or knowledge is associated with those people who are supposed to possess supernatural powers.

-Superstition. Superstition is a belief not related to faith and contrary to reason. Consists of attributing to things, actions or people, magical virtues. People tend to relate a favorable situation to a specific object and can turn it into a talisman, by the mere fact that both were presented simultaneously, without questioning the natural cause of the event (RAE, 2001).

- Supernatural causes. It is understood by the supernatural as something that transcends the expected, the natural, the visible, in the sense of the mysterious and extraordinary (Hoebel, 1973). What for this case this case refers causes of events to supernatural situations.

-Premonitions. Premonition is understood as a premonition or foreshadowing that something will happen. The ability to anticipate events or situations before they occur (RAE, 2001).

-Espíritus and malignant entities. It is conceived by spirit and entity to an immaterial being endowed with intelligence (RAE, 2001). Malignant beings have the ability to inflict emotional and / or physical harm on people.

-Sanation and magic remedies. Healing involves restoring lost health through magical procedures that usually use or help objects, potions, incense, herbs and fire (RAE, 2001).

On the other hand, in terms of the functions that the magical thought provides to the subjects, it can be indicated that the use of the same can have two primordial purposes: the "productive", which refers to generating the expected result through carrying, for example, an amulet to an examination, and the "protective", which consists of protecting from certain dangers, as would be the case of putting the babies a red ribbon to protect them from the evil eye. Even in a series of studies it is shown that the incidence of magical thinking increases with the danger and uncertainty of the situation (Farkas, 2003). For example, it is indicated that in situations in which the person lacks information or knowledge, magical thinking can

emerge as a way to make sense of what is happening, which makes the individual's world more meaningful, more predictable and controllable (Farkas, 2003).

Specifically, authors such as Jahoda (1969) have argued that the lack of information, the conditions of uncertainty or the inability to explain certain events provide circumstances that favor the appearance of magical thinking. However, others consider that it is mainly the stress that all these situations entail, which facilitates their appearance (Bleak and Frederick, 1998, Ciborowski, 1997, Einstein and Menzies, 2006).

Regarding the theories that explain the origin of such thinking, Moral (2009) points out that five can be distinguished: functional-adaptive, pathological features, personality traits of cognitive deficiencies and contextual interpretation.

-Functional-Adaptive. Functional-adaptive theories, supported by anthropologists and psychoanalysts, argue that paranormal beliefs are models of explanation of reality, based on a form of primitive or infant mental functioning that gives security to the person. Hence, it is easy to derive that people with a more primitive or rudimentary organization of their personality, with greater problem of controlling anxiety and situations generating high levels of anxiety will tend to adhere more firmly to paranormal beliefs.

-pathological scars. Personalities with obsessive or psychotic features are especially prone to maintain these types of beliefs.

-Rates of personality. The theories of personality traits emphasize extraversion and openness to experience as predisposing to open up and accept unusual experiences and unconventional interpretations; likewise, the anxiety trait would facilitate the belief in the magical as a means of regulating the constant emotional discomfort by a mechanism of cognitive assurance.

- Cognitive deficiencies. The theory of cognitive deficits conceives people who believe in the paranormal as subjects with marked biases in their judgments of inference and verification of reality, which may be determined by their social background; in turn, some cases due to a clear psychotic pathology.

-Contextual Interpretation. He points out that many subjects are exposed to supernatural or unusual experiences, lived directly or vicariously. Given these situations, depending on the cultural context attributed different meanings and explanations to them. In some cases they will subtract all value and credit; on the contrary, in others, they will be intensified and recreated under new paranormal meanings. So personal experience and the context of cultural meanings are key to distinguish many believers from skeptics.

Now and with the purpose of providing empirical referents, below, interesting evidences are reported that give an account of the state of the specialized research on the present object of study. In this sense authors such as Guerrero, Avila and Miranda (2008) claim that there are some sociodemographic variables that are involved in determining the type of thought or magical beliefs such as sex, socioeconomic status and age. These authors found that the socioeconomic level is the variable that most influences the type of magical thinking of people, being those with fewer resources who have the highest levels of magical beliefs. On the contrary, Reynoso (2013) points out that the socioeconomic level does not significantly interfere in the levels of magical thinking, at least when the population studied are students from first entry to a degree.

In a study similar to the present one, Cárdenas, Gallardo, Adaos and Bahamondes (2013) investigated the presence of beliefs in the paranormal in psychology students of diverse Chilean universities. For these authors the discipline of psychology has struggled for decades for the recognition of its scientific status, which implies an eminent opposition to magical beliefs and other forms of superstition, as well as the establishment of a firm commitment to empirical evidence and rationality argumentative This work revealed how a significant proportion of students maintain superstitious beliefs or have doubts about the occurrence of such phenomena. In addition, the research contemplated the comparison of magical beliefs to the variables of religiosity (students who considered themselves believers and practitioners of some religion), sex and semester in progress, where significant results were found mainly in the variable of religiosity. On the other hand, in a work similar to the aforementioned one and also with psychologists (in this case Mexicans) Caldera, Amador, Reynoso and Zamora

(2015), reported that in the female sex there is a greater incidence in this type of thinking and that there are significant negative correlations between the latter and the semester or level of advancement in the educational program.

In turn, Farkas (2003), in a study whose objective was to study the use of magical strategies in the process of coping with academic stress by university students in Santiago, Chile, found that 27.5% of participants reported using these mechanisms in situations that generate stress in the school environment and that this variable relates significantly to the so-called attribution of external causality and academic performance; concluding in this last sense that at lower performance, the use of said strategies is more frequently resorted to.

On the other hand, and relating magical thinking to the variable schooling, Moral and Tovar (2012) found that the lower the schooling, the more the trend increases, evidencing that this condition is highly consistent with other jobs, especially with those where it is attempted to associate said variable with the so-called paranormal beliefs.

From these referents, this research was formulated as the primary objective to identify and compare the presence of magical thinking in students of different school levels, namely, secondary, baccalaureate and bachelor. Primarily the task was to identify the manifestation of magical thinking and know the relationship of this phenomenon with the sociodemographic variables of schooling and sex.

It should be noted that initially hypothesized that there are significant differences in the rates of magical thinking according to the educational level and sex of students. Specifically, the idea arises that, as some researchers maintain, formal education influences the decrease in this type of reasoning.

II. Method

Type of study. The focus of the research was quantitative and the design was non-experimental with a transversal character with a descriptive and correlational scope.

Participants. The study included students from three educational levels, namely, high school, high school and first-year undergraduate students. The total number of people reached 513 students: 87 in high school, 212 in high school and 214 in first university. The sex of the population was 241 men and 272 women.

Instrument. The Magical Thought Scale was used in its version of 24 items with two related factors (EPM24), which was elaborated and validated by Moral in 2009. The reagents have a likert format with seven rank points, three in each polarity and an intermediate one. They are scored from 1 (totally disagree) to 7 (totally agree). The half is written in a sense of conformity with rational responses (first factor) and the other half (second factor) in the sense of conformity with irrational or magical answers. The scale scores in the sense of magical thinking, so that half of the reagents with rational answers are invested in their total score (Moral, 2009). The reported internal consistency was acceptable since the Cronbach alpha obtained was .833; In addition, the test has validations of content, criteria and construct required. The scores obtained in the scale below 51 imply marked features of skepticism and rationality; from 51 to 94 neutrality and from 95 or more, marked traits of magical thinking.

Process. In order to apply the Magical Thought Scale and after the consent of the respective authorities, students who attended the aforementioned educational levels were visited and asked to answer the items that it contemplates.

In terms of ethical considerations, it should be noted that during the data collection process an informed consent was administered through which the research team undertook not to disclose the data individually, but globally and only for academic and scientific purposes; In addition, in the case of minors, parental consent was managed through the representatives of the participating institutions. Also, during the application of the instrument the objectives of the investigation were explained in detail.

Analysis of the data. To analyze the results, the means were obtained and the frequencies were identified. To investigate significant differences of magical thinking (EPM24 and two factors) with the educational level variable, a unidirectional or one-way variance analysis was performed; In addition, a correlation analysis was carried out using Spearman's rho correlation coefficient. For the case of the differences between magical thinking in the variable sex, the t-test for independent samples was handled. These data were calculated using the statistical package SPSS, 20.

III. Results

The general results (Table 1) indicate that the level of magical thinking (EPM24) of the participants can be interpreted as a neutrality ($\bar{X} = 71.31$), which does not correspond to marked features of magical thinking and neither to skepticism-rationality.

Table 1. Pensamiento Mágico (EPM24).

Número de participantes	Puntuación mínima	Puntuación máxima	\bar{X}	DE
513	24	125	71.31	20.556

Fuente: Elaboración propia

When classifying the levels of magical thinking, it was noticed that almost 13% of the participants obtained marked features in said variable, while the rest of the population was classified in a different grade.

Table 2. Resultados generales en la clasificación del pensamiento mágico (EPM24).

Grado de pensamiento mágico	Frecuencia	Porcentaje
Rasgos marcados de escepticismo y racionalidad	95	18.5%
Neutralidad	352	68.6%
Rasgos marcados de pensamiento mágico	66	12.9%
Total	513	100.0%

Fuente: Elaboración propia

Then, in order to justify the use of parametric tests, the criterion of normality was considered first and secondly that of homoscedasticity. In this sense and through the Kolmogorov test, a value of $z = 1,100$ and a significance of $p = 0.178$ was obtained, which indicates the normality in distribution of the variable magical thought; Likewise, the Levene statistic indicated the homoscedasticity between the variances in the different comparison groups.

Through ANOVA, significant differences were found in the general scores of magical thinking according to the educational level variable ($F(2,512) = 27.344$; $p = .000$).

Table 3. Pensamiento mágico (EPM24) y nivel educativo.

Nivel escolar	N	\bar{x}	DE
Secundaria	87	79.21	19.905
Preparatoria	212	75.54	18.448
Licenciatura	214	63.91	20.500
Total	513	71.31	20.556

Fuente: Elaboración propia

To identify among which groups there were differences, the Tukey posttest was applied. With the support of such analysis, the difference between the bachelor's degree and the other two school levels was evident.

Subsequently, and with the intention of identifying differences between educational levels in each factor (factor 1, pattern of responses to rational reagents and factor 2, pattern of responses to irrational reagents) ANOVA hypothesis tests were used. As can be seen in Table 4, there are significant differences between educational levels in each factor.

Table 4. Factores del pensamiento mágico y nivel educativo.

Nivel escolar	Factor 1 (patrón de respuestas a los reactivos racionales)					Factor 2 (patrón de respuestas a los reactivos irracionales)				
	\bar{X}	DE	F	gl	p	\bar{X}	DE	F	gl	P
	Secundaria	52.402	16.751				35.609	11.324		
Preparatoria	55.382	10.240				34.924	11.067			
Licenciatura	61.439	13.783	19.193	512	.000	29.345	11.098	16.941	512	.000
Total	57.403	13.495				32.713	11.465			

Fuente: Elaboración propia

Once and after the application of the Tukey post-test, differences were detected (in both factors) between the bachelor's degree and the other school levels.

On the other hand, and with the purpose of identifying associations between the educational level and the overall score of the test, and for each factor, correlation analyzes were performed with the support of Spearman's rho statistician. As a result, a significant correlation was obtained both in the factors and in the EPM24, although it should be noted that this association was low (see Table 5).

Table 5. Correlaciones entre Nivel Educativo y EPM24 y Factores.

	Factor 1 (patrón de respuestas a los reactivos racionales)	Factor 2 (patrón de respuestas a los reactivos irracionales)	Pensamiento mágico (EPM24)
<i>rho</i> Spearman	.262	-.229	-.303
P	.000	.000	.000

Fuente: Elaboración propia

According to the sex variable (Table 6) it was found that the level of magical thinking (PWM24) in men was 69.34, while in women it was 73.06 (both in the neutrality classification). With the support of the student's t test, statistically significant differences were identified ($t(511) = -2,049$, $p = 0.041$). Afterwards, the effect size was calculated, finding a value of 0.18, indicating that although there are differences, the groups do not differ too much from each other.

Table 6. Frecuencias, medias y desviación estándar de sexo y pensamiento mágico (EPM24).

Sexo	Clasificación de Pensamiento Mágico			\bar{x}	DE
	Rasgos marcados de escepticismo y racionalidad	Neutralidad	Rasgos marcados de pensamiento mágico		
Hombre	53	157	31	69.34	21.277
Mujer	42	195	35	73.06	19.772

Fuente: Elaboración propia

Then, and with the aim of identifying differences between sexes in each factor, student t tests were used for independent samples. As can be seen in Table 7, there are significant differences between said variable and the second factor.

Table 7. Factores del pensamiento mágico y sexo.

Sexo	Factor 1 (patrón de respuestas a los reactivos racionales)					Factor 2 (patrón de respuestas a los reactivos irracionales)				
	\bar{x}	DE	t	gl	p	\bar{x}	DE	t	gl	P
	Hombre	57.643	14.874				30.983	11.151		
Mujer	57.191	12.168	.378	511	.705	34.246	11.541	-3.247	511	.001
Total	57.403	13.495				32.713	11.465			

Fuente: Elaboración propia

IV. Discussion

In general, the results indicate that the level of magical thinking of the participants can be interpreted as a neutrality that does not correspond to marked traits of magical thinking and not to skepticism-rationality. This situation may be due to the fact that the mere fact of being studying and moving up in the formalized educational levels (with study programs based on content derived from scientific inquiry) generates in the students more rational explanations for different events. This statement is consistent with what was proposed by Moral and Tovar (2012) when they argue that the association between a low level of schooling and magical thinking reflects that to the extent that the person is more in touch with the scientific and critical thinking of the Current Western society becomes more reluctant to magical thinking and that such contact is obtained essentially through the educational system, especially if you access higher education.

Although of course, it should be noted that as some researchers (Fierro et al., 2003) point out, magical thinking has not disappeared completely and there are still people in whom it occurs in a considerable way.

However, the fact that in the present study there were significant differences between educational levels, specifically between higher education and the other two, supposes the following explanations:

- There is a qualitative difference between the average and higher level with university studies in terms of rational explanations about events.
- The students who access the university level (which obviously are not all those who graduate from high school) have developed higher academic skills that distinguish them from those not admitted or those who for various reasons did not continue their studies.
- University students are required, from the training point of view, greater contact with information or knowledge derived from scientific research.
- A greater number of university professors are researchers specialized in various areas of knowledge.

However, such explanations, as is common in social studies, can not be generalized to all contexts and / or regions, since in other environments it has been shown that magical thinking does not decrease in a good proportion of university students, as was the case of psychologists from different Chilean higher education institutions (Cárdenas et al., 2013).

It should be noted that in the present investigation no significant differences were found between the two levels of secondary education, which means that both levels share similar characteristics that are not found in the higher university level.

On the other hand, the reason that can explain significant differences of magical thinking in the variable sex, revolves in the sense that the women of the research environment, have greater contact with other types of non-formalized education (the one that occurs in the family, the community and even the one that provides the diverse means of mass communication) that resorts to a greater number of magical explanations; for example, horoscopes, reading letters, home remedies and assistance to instances that do not resort to scientific procedures in health matters. However, as is evident, it is necessary to carry out

more in-depth research to support such arguments, especially when in other studies no significant differences were found according to the sex of the participants. (Farkas, 2013).

V. Conclusion

In conclusion, it is now pertinent to expand research in other contexts, in addition to considering other variables that could correlate or even explain the presence of magical thinking; For example, the socioeconomic level, the religion, the place of origin, the cultural group to which they belong and especially in the educational environment, it would be convenient to look for correlations between magical thinking and the variable of academic performance. In addition, it is considered advisable to carry out longitudinal investigations (that follow the evolution of magical thinking of the same people at different moments of the school trajectory) and qualitative cut that provide elements of a comprehensive nature with respect to the findings obtained in this Indagatory.

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