Neutrosophic Estimation to validate a Legal Argument about the Use of Congruous Alimony as a Family Burden on Child Support Determination Trials.

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Abstract. The Constitution of the Republic of Ecuador clearly establishes the prevalence of the rights of children and adolescents, based on the principle of the Best Interests of the Child. However, this research is intended to validate a legal argument, which shows that this principle is violated in maintenance trials if the Mediation Act on Congruous Maintenance agreements is accepted by considering it as a new right holder. With this purpose, we applied a survey to a significant sample of lawyers and law students to measure their agreement with the main points of the argument. The population ratio was estimated using the Large-Sample Neutrosophic Confidence Interval for the Population Proportion. The estimated population results confirmed the relevance of the legal argument conducted.

Keywords: Legal argument; Estimation; Neutrosophic Confidence Interval; child support; congruous alimony.

1 Introduction

The rights of children and adolescents are determined by national and international legislation, which has been applying policies that benefit this priority group, thus guaranteeing respect for and compliance with their rights, in order to achieve effective coexistence between the members of the family unit, society and The State. Thus avoiding the violation of rights by their parents at the time of receiving the necessary care, with regard to alimony and its application to the right to equality [1, 2].

Children and adolescents are a special group. It is very important that they be given more rights than other human beings have. If we want to guarantee their integral development, we must impose their right on everything. This will allow them to grow up in an environment of harmony and, therefore, in the future they will have better perspectives to form themselves as people of benefit to society[3].

In Section Five of Chapter Three (Rights of Persons and Groups of Attention), Title II of the Constitution of the Republic, Article 44 establishes that "the State, society and the family shall promote, as a priority, the integral development of children and adolescents, and shall ensure the full exercise of their rights; the principle of the best interests of the child and his or her rights shall prevail over those of other persons." Children and adolescents will have the right to their integral development, understood as a process of growth, maturation and deployment of their intellect and their capacities, potentialities and aspirations, in a family, school, social and community environment of affectivity and security. This environment will allow the satisfaction of their social, affective-emotional and cultural needs, with the support of national and local inter-sectorial policies[4].

On the other hand, the father and mother are obliged to look after the wellbeing of their children from conception until they reach the age of majority and the law has provided that, in the absence of the main obligors, there are also subsidiary obligors who in this case are the ones who must assume responsibility. These are the grandparents, the uncles and others determined by the law.

In article 69 of the Constitution of the Republic of Ecuador [5, 6], the above mentioned is stated.

Article 69 - Protection of the Family - To protect the rights of the family members: Responsible maternity and paternity shall be promoted; the mother and father shall be obliged to care for, raise, educate, feed, develop

integrally and protect the rights of their children, particularly when they are separated from them for any reason.

Food is one of the fundamental rights of children, as it is above any other right. This is in order to cover the basic needs of minors. The right to food has its origin in the very existence of man, unlike other living beings, a human being cannot survive by himself, it is always necessary to protect him; since food is one of the vital needs of people, someone has to provide it. In this case, it is the moral and legal duty of the children to ensure that their parents look after them and The State guarantees, through its policies, the protection of children and adolescents.

Apart from the divisions that may already be established based on the source, food may also be congruous or necessary, accrued or future; provisional or definitive. Congruous food is defined in Article 351 of the Civil Code as: that which enables the person fed to subsist modestly, in a manner corresponding to his/her social position[7].

Congruous alimony is owed to the spouse, to the children, to the descendants, to the parents, and to the one who made a substantial donation. However, all these people lose the right to congruous food if they seriously injure the food provider. They also lose the right to congruous alimony and, as in the previous case, they are reduced to those simply necessary "when the law expressly limits what is necessary" and this happens in the case of the child of a family absent from the home and who is not well behaved. Currently there is a legal void in which abandonment is not a requirement for demanding congruent alimony for spousal support, however, it is seen at courts that they are presented as a family burden in the alimony trials for the reduction of pensions for this concept[8].

That is why, with this research work, we propose a legal argument that establishes that there is a violation of the principle of the Superior Interest of the Child when taking into account the Mediation Act about the agreement of congruous alimony as a family burden[9, 10].

The objective of this research is to estimate the level of conformity that exists on the part of the lawyers participating in this type of family litigation, with respect to the current judicial procedure, as well as the degree of acceptance of the aforementioned proposal, through the application of the Large-Sample Neutrosophic Confidence Interval [11] for the Population Proportion.

2 Materials and methods

In order to fulfil the objective of the investigation, a study was made of the population composed of law professionals who work in cases related to the subject analyzed in the Canton of Tulcán, Province of Carchi, Ecuador, obtaining an approximate universe of 345 people, who are lawyers in free practice or students of higher levels. For this purpose, a survey was applied to 108 of them, randomly chosen, which represents approximately 31% of the population, so it is considered a significant sample.

However, in both groups, bias was identified in the information collected about their direct participation in at least one case, in which a congruous alimony mediation act was presented as a justification for the reduction or limitation of alimony. Therefore, it was necessary to identify the neutrosophic frequencies.

In the 1980s, the international movement known as Paradoxism [12-14] (based on contradictions in science and art) was founded by Florentin Smarandache, who then extended it to Neutrosophy (based on contradictions and their neutrals) originating new fields of research's like neutrosophic statistics [15-18]. Neutrosophic Statistics refers to a set of data, such that the data or a part of it are indeterminate in some degree, and to methods used to analyze these data [16, 17, 19, 20].

A Neutrosophic Frequency Distribution [18, 20] is a table displaying the categories, frequencies, and relative frequencies with some indeterminacies[17, 18, 21]. Most often, indeterminacies occur due to imprecise, incomplete or unknown data related to frequency. Therefore, relative frequency becomes imprecise, incomplete, or unknown too.

In this case, we represent the frequencies as a neutrosophic statistic number, which have the form [22-25]:

$$N = d + i \tag{1}$$

with $i \in [i_a, i_b]$

Where

d: is the determinate (sure) part of N,

i: is the indeterminate (unsure) part of N.

i_a: is the inferior limit of i range

i_b: is the superior limit of i range

So (1) is equivalent to:

$$[N + i_a, N + i_b]$$

Setting $min_{nf} = N + i_a$ and $max_{nf} = N + i_b$, the expression we will use to represent the estimated neutrosophic frequencies is:

$$[min_{nf}, max_{nf}]$$

To compute the total for the neutrosophic frequencies[21, 26], we compute the total min and max of m categories estimated frequencies by the following equations:

$$tmin_{nf} = \sum_{j=1}^{m} min_{nfj} \tag{2}$$

$$tmax_{nf} = \sum_{j=1}^{m} max_{nfj} \tag{3}$$

Where:

$tmin_{nf}$ is the total minimum of the estimated frequencies for m possibilities.

$tmax_{nf}$ is the total maximum of the estimated frequencies for m possibilities.

min_{nfj} is the inferior limit of the neutrosophic estimated frequency range for the possibility j.

max_{nfj} is the superior limit of the neutrosophic estimated frequency range for the possibility j.

To calculate the neutrosophic relative frequency of each possibility:

$$min_{nrfj} = \frac{min_{nfj}}{tmax_{nf}} \tag{4}$$

$$max_{nrfj} = \frac{max_{nfj}}{tmin_{nf}} \tag{5}$$

Where:

min_{nrfj} is the inferior limit of the neutrosophic relative frequency for the possibility j.

max_{nrfj} is the superior limit of the neutrosophic relative frequency for the possibility j.

The survey applied is composed of the following questions:

Question 1: Do you think it is right for the Mediation Centers to set up a spousal support agreement knowing that they live together?

Question 2: Do you agree that children should have their child support reduced because the defendant is filing the spousal support agreement as the family's burden?

Question 3: Do you believe that the judge by accepting such a mediation agreement is violating the Best Interest Principle for Children?

Question 4: Do you agree with the statement made in the critical judicial analysis document presented in this research?

Although we worked with a statistically significant sample, it was convenient to apply a population estimate of the proportion of responses, to reinforce the validation of the proposal based on the results of the survey. The Large-Sample Neutrosophic Confidence Interval for the Population Proportion was used for this purpose.

Using the classical statistics we can define Large-Sample Confidence Interval for the Population Proportion (π) as follow:

$$I\pi = \left[p - (z\ critical\ value) \cdot \sqrt{\frac{p(1-p)}{n}}, p + (z\ critical\ value) \cdot \sqrt{\frac{p(1-p)}{n}} \right] \tag{6}$$

For the case when $min\{np \geq 5\}$ and $min\{n \cdot (1-p) \geq 5\}$, where:

p = sample proportion = number of sample individuals that possess the property of interest divided by sample's size and n = sample's size.

With the distinction from the classical statistics that in neutrosophic statistics the parameters p and n may be sets instead of crisp numbers, and the z critical value may be a set as well. [27]

The neutrosophic sample statistics p, for $min\{n\}$ large enough, has a neutrosophic sampling distribution (normal curve) that approximates the population mean π and its standard deviation:

$$\sigma = \sqrt{\frac{\pi(1-\pi)}{n}}$$

3 Results

From the results of the applied survey and taking into account the bias in the information collected, the following graph of neutrosophic frequencies was obtained about the composition of the sample.
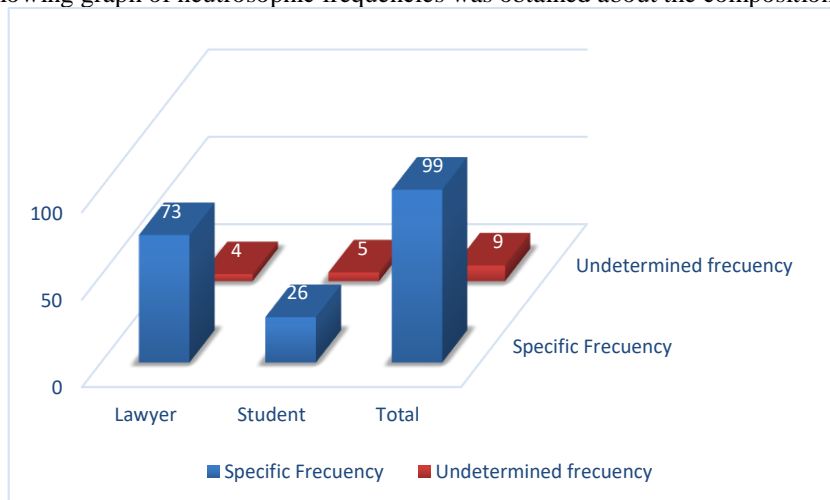

Figure 1. Sample Neutrosophic frequencies

As we can notice, we surveyed between 73 and 77 lawyers who participated in at least one maintenance trial where congruent maintenance was used as justification for a reduction of the alimony. Meanwhile, between 24 and 31.3% of those surveyed were students with at least one similar experience.

The sample results of the application of the survey are shown below (table 1). The neutrosophic proportions were obtained by applying formulas (4) and (5).

Answer	Question 1		Question 2		Question 3		Question 4	
	Frequency	Proportion (p)	Frequency	Proportion (p)	Frequency	Proportion (p)	Frequency	Proportion (p)
Yes	101	[0.93 , 1.02]	97	[0.89 , 0.98]	95	[0.88 , 0.96]	101	[0.93 , 1.02]
No	7	[0.06 , 0.07]	11	[0.10 , 0.11]	13	[0.12 , 0.13]	7	[0.06 , 0.07]
Total	**[99 , 108]**	**[0.99 , 1.09]**	**[99 , 108]**	**[0.99 , 1.09]**	**[99 , 108]**	**[1.00 , 1.09]**	**[99 , 108]**	**[0.99 , 1.09]**

Table 1. Neutrosophic proportions per question

At the sample level, a proportion of positive responses above 89% can be observed for all questions with 98.1% for question 4, which refers to the acceptance of the proposed analysis.

To estimate the neutrosophic confidence interval of the population ratio, we used the neutrosophic confidence level $[0.95 , 0.99]$ for a neutrosophic critical value of $[1.645 , 2.326]$.

First, it must be verified that $min\{np\} \geq 5$ and $min\{n \cdot (1 - p)\} \geq 5$ is fulfilled for each one of the questions of the survey. For example:

Question 1
$min\{np\} \geq 5$
$min\{[99 , 108] \cdot [0.93 , 1.02]\} \geq 5$
$99 \cdot 0.93 \geq 5$
$92.07 \geq 5$
$min\{n \cdot (1 - p)\} \geq 5$
$min\{[99 , 108] \cdot (1 - [0.93 , 1.02])\} \geq 5$
$99 \cdot 0.06 \geq 5$
$6.42 \geq 5$

When the verification was done for the rest of the questions, the results shown in table 2 were obtained.

Verification	Question 1	Question 2	Question 3	Question 4
$min\{np\} \geq 5$	$92.07 \geq 5$	$88.92 \geq 5$	$87.08 \geq 5$	$92.07 \geq 5$
$min\{n \cdot (1 - p)\} \geq 5$	$6.42 \geq 5$	$10.08 \geq 5$	$11.92 \geq 5$	$6.42 \geq 5$

Table 2: Verification of the minimum requirement

Given the results in Table 2, the neutrosophic confidence interval of the population ratio can be estimated. By applying (6) to each of the questions we obtained:

$$I\pi_j = \left[p_j - (z\ critical\ value) \cdot \sqrt{\frac{p_j(1-p_j)}{n}},\ p_j + (z\ critical\ value) \cdot \sqrt{\frac{p_j(1-p_j)}{n}} \right]$$

Where $j = question\ number$ with $j = 1, 2, 3, 4$

In table 3, we can follow the steps to calculate the neutrosophic interval of confidence of the population proportion as a neutrosophic set.

Neutrosophic Interval	Question 1		Question 2		Question 3		Question 4	
	min	max	min	max	min	max	min	max
Neutrosophic Z	1,645	2,326	1,645	2,326	1,645	2,326	1,645	2,326
p_j	0,935	1,020	0,898	0,980	0,880	0,960	0,935	1,020
$1 - p_j$	0,065	0,071	0,102	0,111	0,120	0,131	0,065	0,071
$\sqrt{p_j(1-p_j)/n}$	0,024	0,027	0,029	0,033	0,031	0,036	0,024	0,027
$Z \cdot \sqrt{p_j(1-p_j)/n}$	0,039	0,063	0,048	0,077	0,052	0,083	0,039	0,063
$p_j - Z \cdot \sqrt{p_j(1-p_j)/n}$	0,896	0,957	0,850	0,903	0,828	0,877	0,896	0,957

$p_j + Z \cdot \sqrt{p_j(1 - p_j)/n}$	0,959	1,047	0,927	1,013	0,911	0,995	0,959	1,047
$I\pi_j$	0,896	1,047	0,850	1,013	0,828	0,995	0,896	1,047

Table 3: Neutrosophic interval of confidence of the population proportion calculation.

As can be seen, for each of the questions asked, a positive response was estimated in favor of the main points of the proposed critical judicial analysis. It can be assured, with a significance level of between 95 and 99%, that more than 89.6% of the population studied would answer Yes to question number 1, more than 85% to question number 2, between 82.8 and 99.5% to question number 3, and more than 89.6% would answer Yes to question number 4.

This allows us to infer that the proposal of the present investigation would have a high level of acceptance within the community of law professionals of the Canton of Tulcán, with experience in food trials.

Conclusions

The application of the neutrosophic statistics, allowed to estimate the population proportion in spite of the bias present in the collected information, as well as to contribute with certain flexibility to its level of significance. The results obtained from the use of the Large-Sample Neutrosophic Confidence Interval for the Population Proportion, constitute the statistical foundation of the validity of the proposed critical analysis given the favorable population estimate for each of its elements.

Therefore, it can be assured that the majority of the lawyers of the studied population consider that the Principle of the Superior Interest of Children is being violated, with the current procedures identified in this research.

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