NEUTROSOPHIC ANALYSIS OF PROCEDURAL OBJECTIVITY AND LEGAL SECURITY IN ABBREVIATED PROCEDURES.

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ABSTRACT
This study focused on exploring perceptions of objectivity and legal security among different groups of legal professionals in the context of abbreviated procedures. Using a methodological approach that combines phylogenetic statistics with indeterminate Likert scales, the study aimed to capture the complexity and multidimensionality of these perceptions. Specific questionnaires were designed and distributed, incorporating items on impartiality, predictability, transparency of the procedure, and personal experiences related to the principle of objectivity. The data analysis revealed a general trend towards positive perceptions of transparency and objectivity in judicial proceedings. However, significant variabilities in the perception of impartiality and predictability were observed, highlighting potential areas for improvement. Through the application of neutrosophic phylogenetic probabilities, a valuable framework was provided for interpreting these complexities, emphasizing the importance of indeterminacy in analyzing professional behaviors and attitudes in legal and judicial contexts.
KEYWORDS: neutrosophic analysis; objectivity; abbreviated procedures; legal security; phylogenetic statistics.

MSC: 62P25, 03B52, 91D10, 93A30, 68T37

RESUMEN
Este estudio se centró en explorar las percepciones de objetividad y seguridad jurídica entre diferentes grupos de profesionales del derecho en el contexto de los procedimientos abreviados. Utilizando un enfoque metodológico que combina estadísticas filogenéticas con escalas de Likert indeterminadas, el estudio tuvo como objetivo capturar la complejidad y multidimensionalidad de estas percepciones. Se diseñaron y distribuyeron cuestionarios específicos, incorporando ítems sobre imparcialidad, predictibilidad, transparencia del procedimiento y experiencias personales relacionadas con el principio de objetividad. El análisis de datos reveló una tendencia general hacia percepciones positivas de transparencia y objetividad en los procesos judiciales. Sin embargo, se observaron variabilidades significativas en la percepción de imparcialidad y predictibilidad, destacando áreas potenciales de mejora. A través de la aplicación de probabilidades filogenéticas neutrosóficas, se proporcionó un marco valioso para interpretar estas complejidades, enfatizando la importancia de la indeterminación en el análisis de comportamientos y actitudes profesionales en contextos legales y judiciales.
PALABRAS CLAVE: análisis neutrosófico; objetividad; procedimientos abreviados; seguridad jurídica; estadísticas plitogénicas.

1. INTRODUCTION

Ensuring the full exercise of rights implies adhering to legal regulations, making the topic significant. By delving into this, a better understanding of the challenges that arise when applying the abbreviated procedure can be gained, especially when the prosecutor does not consider the analysis of evidence for and against, as dictated by article 5, numeral 21, of the Comprehensive Organic Criminal Code. This results in a violation of the constitutional principle of legal security. It is important to consider that, although the abbreviated procedure speeds up the pursuit of justice, the preservation of constitutional principles must not be neglected at any time, for the correct administration of justice, since the State's primary responsibility is to guarantee the protection of guarantees, constitutional rights, and compliance with the law. The constitutional action of protection is part of the Ecuadorian Constitutional Procedural Law, established as a constitutional action that allows protection of the rights recognized in the Constitution and international human rights instruments through a simple, agile, quick, and effective procedure. This action foresees compliance with the principle that safeguards personal freedom and establishes criminal guarantees that allow the protection of individuals' fundamental rights [3]. The historical roots of the abbreviated procedure can be traced back to Roman Law, where it appears as an alternative within the spectrum of special criminal processes. This procedure emerged from agreements between the parties involved in litigation originating from criminal acts. In the Roman legal corpus, the Law of the Twelve Tables codified norms covering a wide range of subjects, establishing a sanctioning regime that facilitated the interaction of different rights. In this

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system, the law of Talion, applicable to severe crimes like theft, and composition, aimed at minor offenses such as insults or minor injuries, were highlighted [4].

From a historical perspective, Anglo-Saxon law constitutes a key precedent that shaped and provided viability to this procedural modality, offering a more robust legal structure. This framework allowed the prosecutor to assume a predominant role in optimizing judicial management, marking the beginning of the implementation of the abbreviated procedure. This historical foundation facilitated the emergence of legal figures such as plea bargaining and the guilty plea during the 19th century, aligned to simplify the judicial process, reduce associated costs, and provide the accused with an early resolution of the litigation [5]. The incorporation of the abbreviated procedure into Ecuador's legislation does not stem from its legal tradition but rather adopts practices from Anglo-Saxon law, specifically the American concept of "plea bargaining," known in Spanish as "súplica negociada." This procedure is activated when an individual, advised by their defender, acknowledges the consequences of accepting the charges against them in exchange for a reduced sentence, demonstrating a commitment to the principles of efficiency and procedural speed [1,14]. According to the Comprehensive Organic Criminal Code, it is established that the prosecutor's function must be exercised under a prism of objectivity, ensuring the correct application of legal norms and the safeguarding of individual rights. This responsibility encompasses the exhaustive investigation of the facts and circumstances that may affect, both aggravating and mitigating, the criminal responsibility of the processed subject, as well as those aspects that could exonerate, mitigate, or extinguish such responsibility. The clarity with which the Comprehensive Organic Criminal Code articulates the principle of objectivity justifies the need to focus the explanation in this manner, underlining its critical importance within the framework of judicial investigation for its full understanding. Legal objectivity, defined by its impartiality and the absence of preconceptions in the decision-making process, along with legal security, characterized by the predictability and transparency of legislation, constitute fundamental pillars to foster trust in the judicial system and ensure a fair administration of justice. However, it is important to recognize that the interpretation and application of these principles are not manifested uniformly among different members of the legal field, presenting considerable variations among judges, prosecutors, and defenders. Such diversity of perceptions highlights the intrinsic complexity in understanding and managing these concepts, which can be affected by individual, contextual, and procedural elements.

The abbreviated procedure, designed to simplify and expedite case resolution, presents an ideal scenario to explore the dynamics of objectivity and legal security from the perception of different judicial actors. The condensed nature of this procedure raises questions about how objectivity and legal security are maintained and how they are perceived by those immersed in the justice system. In this context, phylogenetic statistics, which emerges as an extension of classic multivariate statistics, offers a theoretical and methodological framework to address the indeterminacy and variability of perceptions [6]. By integrating uncertainty and multiplicity of perspectives into statistical analysis, phylogenetic statistics allows for a deeper exploration of complex phenomena, such as the perception of objectivity and legal security. This study proposes applying phylogenetic statistics and indeterminate Likert scales [7,15] to evaluate how judges, prosecutors, and defenders perceive objectivity and legal security in the context of the abbreviated procedure. Through this innovative approach, the aim is not only to identify patterns and discrepancies in these perceptions but also to deepen the understanding of how the specific characteristics of the abbreviated procedure influence the trust and legitimacy of the justice system. By exploring the intersection between objectivity, legal security, and the abbreviated procedure from a phylogenetic perspective, this study contributes to existing legal literature, offering valuable insights for academics, lawmakers, and legal professionals. Furthermore, incorporating indeterminacy as a central element of the analysis opens the door to a more nuanced understanding of fundamental legal principles and their impact on everyday legal practice.

2. PRELIMINARIES

Neutrosophic and refined neutrosophic set.

Neutrosophic explores the concept of a phenomenon or entity, denoted as "A," concerning its opposite "Anti-A," its negation "Non-A," and the state of being neither "A" nor "Anti-A," referred to as "Neut-A." In this framework, if we consider X as a metric space where its elements are represented as x, then within X, a single-valued neutrosophic set (SVNS) named A can be defined through three distinct membership functions: the truth membership function $T_{A(x)}$, the indeterminacy membership function $I_{A(x)}$, and the falsity membership function $F_{A(x)}$[7]. For any given element x within the space X, the values derived from $T_{A(x)}, I_{A(x)}$, and $F_{A(x)}$ are restricted to the interval [0,1]. These values must satisfy the equation $0 \leq T_{A(x)} + I_{A(x)} + F_{A(x)} \leq 3$), positioning SVNS A as represented by $A = \{ x, T_{A(x)}, I_{A(x)}, F_{A(x)} | x \in X \}$.[8]

Building on this, Smarandache's refined neutrosophic logic segments the concept of truth into several subclasses $T_1, T_2, \dots, T_p$; similarly, indeterminacy is divided into $I_1, I_2, \dots, I_r$, and falsity into $F_1, F_2, \dots, F_s$, where p, r, and s are positive integers that collectively sum up to n [9]. This detailed categorization allows for the establishment of triple refined indeterminate neutrosophic sets (TRINS), which further dissect the notion of indeterminacy into three clear

memberships, thus enhancing precision and relevance for applications such as personality assessments or the nuanced interpretations of Likert scale data. Unlike TRINS, a double-valued neutrosophic set (DVNS) simply splits the concept of indeterminacy into two distinct parts.

A TRINS A in X is detailed by five membership functions: positive $P_{A(x)}$, indeterminately positive $IP_{A(x)}$, indeterminate $I_{A(x)}$, indeterminately negative $IN_{A(x)}$, and negative $N_{A(x)}$, each associated with a specific weight w_m within the range of [0,5]. For every element x in X, it is established that: [10,20]

$$P_A(x), IP_A(x), I_A(x), IN_A(x), N_A(x) \in [0,1]$$

And accordingly, their weighted forms:

$$w_m P(P_A(x)), w_m IP(IP_A(x)), w_m I(I_A(x)), w_m IN(IN_A(x)), w_m N(N_A(x)) \in [0,5]$$

subject to the condition that:

$$0 \leq P_A(x) + IP_A(x) + I_A(x) + IN_A(x) + N_A(x) \leq 5$$

Hence, TRINS A is represented as:

$$A = \{ x, P_A(x), IP_A(x), I_A(x), IN_A(x), N_A(x) | x \in X \}$$

When considering two TRINS, namely A and B, defined within the metric space X, their intersection results in a third TRINS, C, denoted as $C = A \cap B$. The definition of membership for C in terms of truth, truth-leaning indeterminacy, pure indeterminacy, falsity-leaning indeterminacy, and falsity is determined by functional relationships grounded in the respective membership values of A and B.

$$T_{C(x)} = \min(T_{A(x)}, T_{B(x)})$$
$$IT_{C(x)} = \min(IT_{A(x)}, IT_{B(x)})$$
$$I_{C(x)} = \min(I_{A(x)}, I_{B(x)})$$
$$IF_{C(x)} = min(IF_{A(x)}, IF_{B(x)})$$
$$F_{C(x)} = \max(F_{A(x)}, F_{B(x)})$$

In the realm of refined Neutrosophic, a pivotal fourth definition is introduced concerning the computation of a generalized weight, which encapsulates the influence of all membership functions within the framework of Triple Refined Indeterminate Neutrosophic Sets (TRINS). This definition is instrumental for assessing the significance and contribution of each membership function to the overall value of a neutrosophic set. The generalized weighting for a TRINS A, denoted as w_A, is mathematically defined as:

$$w_A = (\sum_{i=1}^{n} w^T T_{A(x_i)} + w^I IT_{A(x_i)} + w\, I_{A(x_i)} + w^F IF_{A(x_i)} + w^N F_{A(x_i)}) \quad (1)$$

Here, $w^T, w^I, w, w^F, y\, w^N$ signify the weights associated with the truth, truth-leaning indeterminacy, pure indeterminacy, falsity-leaning indeterminacy, and falsity membership functions, respectively. These weights are essential for evaluating the importance of the various membership functions within the neutrosophic set and determining their contribution to the broader theoretical construct of neutrosophic analysis.

This approach emphasizes the nuanced understanding that in a neutrosophic context, not all membership functions are of equal importance or influence. By assigning distinct weights to different types of membership functions (truth, various forms of indeterminacy, and falsity), this methodology acknowledges the complexity and multi-dimensionality of phenomena that neutrosophic sets aim to model. Consequently, the generalized weight w_A serves as a critical tool for synthesizing the diverse influences of these membership functions, providing a more comprehensive and differentiated insight into the nature and significance of the set in question.

Basic Notions on Plithogeny

F. Smarandache's concept of Plithogeny elaborates on the genesis, establishment, progression, and advancement of new entities through the vibrant and organic amalgamation of pre-existing entities, which could be opposing, Neutrosophic, or compatible. This notion champions the synthesis and consolidation of theoretical frameworks and insights spanning diverse disciplines, effectively calling for a cross-disciplinary melding of knowledge from areas as varied as the soft sciences, hard sciences, arts, and the theoretical dimensions of literature. [11]

Within this framework, a Plithogenic Set is identified as a non-trivial set P, situated within a given domain $U (P \subseteq U)$ characterized by one or more distinguishing attributes $A_1, A_2, \ldots, A_m, m \geq 1$. Each attribute within this set is capable of taking on values from a broad spectrum *S* of possible states. This spectrum can manifest in various forms – be it finite or infinite in nature, discrete or continuous in representation, and open or closed in its range. [12]

This delineation underscores the versatility and dynamism inherent in plithogenic sets, mirroring the diversity and complexity of knowledge and phenomena they are intended to model. By accommodating a wide array of attributes and their corresponding values within a unified set, the plithogenic approach facilitates a more nuanced and comprehensive exploration of entities, fostering interdisciplinary dialogue and exploration that transcends conventional boundaries between disparate fields of study.

For each element $x \in P$, it is characterized by the entire range of potential values for the attributes contained within the set $V = \{v_1, v_2, \cdots, v_n\}$. An attribute's value has a degree of belonging $d(x, v)$ for an element x in set P

based on a specific criterion. This degree of belonging can manifest as fuzzy, intuitionistic fuzzy, or neutrosophic, among other types.[13]

This signifies that for every element x in the set P, there exists a function $d: PxV \rightarrow \wp([0,1]^z)$, as shown in equation (2), where $d(x,v) \subseteq [0,1]^z$ and $\wp([0,1]^z)$ represents the power set of $[0,1]^z$. Here, z indicates the degree of appurtenance, with $z = 1$ corresponding to the fuzzy degree, $z = 2$ to the intuitionistic fuzzy degree, and $z = 3$ to the neutrosophic degree of appurtenance.

$$\forall x \in P, d: PxV \rightarrow \wp([0,1]^z) \quad (2)$$

In this advanced exposition of plithogenic sets, a nuanced mechanism is introduced for evaluating the degree of contradiction between different attribute values within such sets. If we denote V as the value set with its cardinality being greater than or equal to 1, we define a specialized function $c: V \times V \rightarrow [0,1]^2$. This function, termed the attribute value contradiction degree function, is designed to quantify the level of contradiction between any pair of attribute values v_a, v_b. The operation of this function is guided by several key axioms: [14]

$c(v_a, v_a) = 0$, which asserts that there is no contradiction in an attribute value when compared with itself, encapsulating the principle of non-contradiction.

$c(v_a, v_b) = c(v_b, v_a)$, which underscores the symmetry in the degree of contradiction between any two distinct attribute values, suggesting that the contradiction is mutual and unaffected by the order of comparison.

The notation c is specifically chosen to highlight that this function operates within the realm of fuzzy logic, implying a continuum of contradiction degrees rather than binary or discrete states. Additionally, variations of this function, such as $c_{IF}: V \times V \rightarrow [0,1]^2$, are conceptualized to accommodate the framework of neutrosophic logic, thereby acknowledging and quantifying varying levels of certainty or contradiction inherent in the attribute values.

In the context of a Plithogenic Set, delineated as (P, a, V, d, c), this structure encompasses the principal set *P*, the attribute set *A*, the value set *V*, a membership function *m*, and the contradiction degree function *d*, which is conceptually aligned with *c*. This contradiction function plays a critical role in analyzing and quantifying the extent of contradiction present across the attributes, particularly in relation to a primary attribute, if such an attribute is identified as being of paramount importance relative to others. This analytical framework thus provides a robust tool for dissecting and understanding the complex interplay of attributes within a Plithogenic Set, offering insightful perspectives into the dynamics of contradiction and harmony among the elements of the set.[15]

In contrast, (U, a, V, d, c) is designated as Plithogenic Probability, wherein E represents the event space. Plithogenic Probability is defined as the likelihood of an event's occurrence across all random variables that influence it, each random variable may adhere to classical, T, I, F-neutrosophic, I-neutrosophic, T, F-intuitionistic fuzzy, T, N, F-picture fuzzy, T, N, F-spherical fuzzy, or other fuzzy extensions distribution functions. Thus, Plithogenic Probability extends the classical concept of multivariate probability.[16]

Moreover, Plithogenic Statistics extends the concept of traditional multivariate statistics by incorporating the principles of Plithogenic Probability, which in turn, is characterized by its ability to dissect and analyze probabilities into nuanced components of truth, indeterminacy, and falsehood. Specifically, it breaks down probabilities into detailed segments represented as $T_1, T_2, \ldots, T_p$ for truths; $I_1, I_2, \ldots, I_q$ for indeterminacies; and $F_1, F_2, \ldots, F_r$ for falsehoods. This granular approach ensures that at least one set among the truths, indeterminacies, or falsehoods is comprised of more than one element, indicating the multifaceted nature of probabilities within the plithogenic framework.

This sophisticated subdivision allows Plithogenic Statistics to capture the complexity of real-world phenomena more accurately than classical methods. By acknowledging and quantifying the degrees of truth, the potential for indeterminacy, and the possibility of falsehood in any given situation, Plithogenic Statistics provides a richer, more dimensional view of statistical analysis. This methodological advancement enables researchers and analysts to account for the inherent uncertainties and ambiguities in data, offering a more refined and nuanced understanding of statistical outcomes. [17]

3. METHOD

The study (Figure 1) conducted employs a quantitative approach to investigate the perception of objectivity and legal security among judges, prosecutors, and defenders in the context of the abbreviated procedure. The methodology focuses on the application of phylogenetic statistics and indeterminate Likert scales to capture the complexity and multidimensionality of the participants' perceptions.

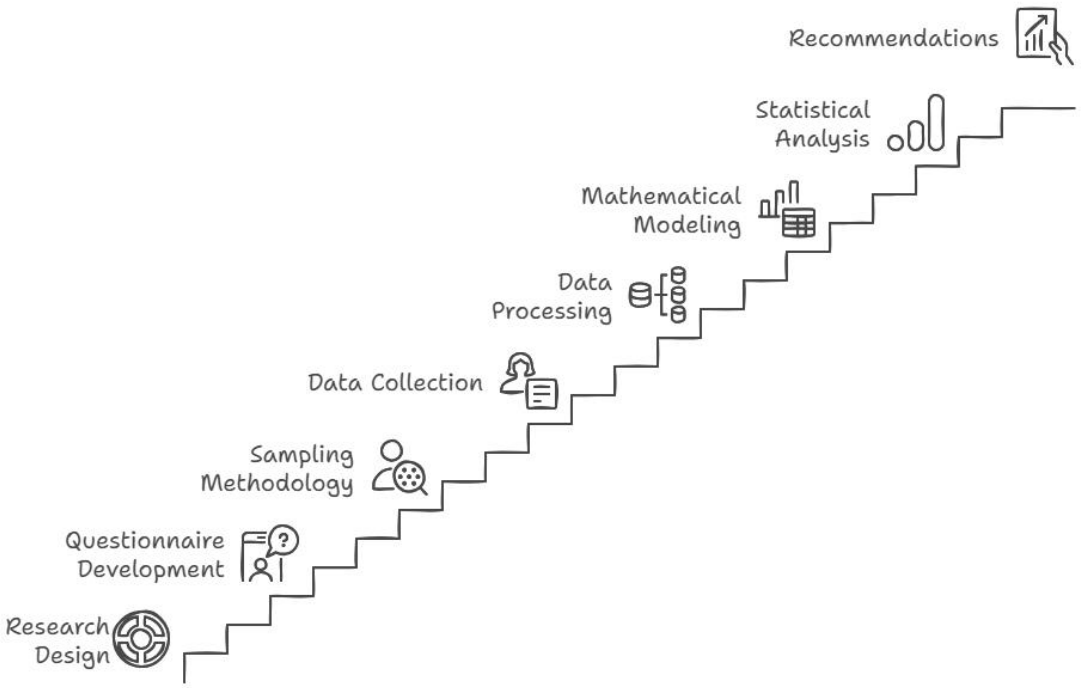

Figure 1. Research process steps

The research design is cross-sectional and is based on data collection through questionnaires specifically designed for each interest group. The surveys include questions that address the perception of impartiality, predictability, transparency of the procedure, and personal experiences related to the principle of objectivity. Indeterminate Likert scales of 1 to 5 are implemented, where 1 represents "total disagreement" and 5 "total agreement".

The sample is selected through an intentional non-probabilistic approach, ensuring the representativeness of the three interest groups within the total population of legal professionals involved in abbreviated procedures. In this sense, the final sample of the study consisted of 24 judges, 27 prosecutors, and 21 defense lawyers. Surveys are distributed using electronic and paper methods, depending on the accessibility and preferences of the participants, to maximize the response rate and the diversity of the sample.

After obtaining the results, the TRINS matrix is constructed for each respondent, categorizing each rating by statement on an indeterminate Likert scale ranging from (1) negative membership to (5) positive membership. This will allow determining the degree of acceptance of the statements by the students, expressing the responses in the form of TRINS, denoted as G_x.

For each student, their evaluation is represented by a vector in $[0,1]^5$, where each component of the vector reflects an evaluation category from "Very High" to "Very Low". The function $\gamma(V) = 2v_1 + v_2 + 0.5v_3 - v_4 - 2v_5$ is used to analyze these data, calculating their relative frequency in percentages.

Frequency values are converted into Neutrosophic Phylogenetic Probabilities to express the overall behavior of the studied dimensions. This is done using equation (3), representing the probabilities of each variable and their dimensions with values of the type (T, I, F), where T indicates the "strongly sure" probability that the dimension occurs adequately, I represents the "indeterminate" probability, and F the "totally sure" probability that the dimension does not occur adequately.

$$PNP = p_1 + p_2, pI, np_2 + np_1 \tag{3}$$

This methodological approach captures the complexity and indeterminacy inherent in students' perceptions and satisfactions regarding the use of the case method as a pedagogical tool, using the framework of phylogenetic logic and neutrosophic probabilities for a deeper and more nuanced analysis of the collected data.

Data preprocessing includes encoding of indeterminate responses. For statistical analysis, phylogenetic statistics are applied through neutrosophic and phylogenetic probabilities to compare perceptions between groups. This approach allows detecting patterns, similarities, and significant differences in perceptions of objectivity and legal security.

The interpretation of the results focuses on comparing perceptions of objectivity and legal security among the groups of judges, prosecutors, and defenders. Areas of high and low perception are identified, as well as those of

high indeterminacy, relating them to the study's objective. Conclusions are drawn from the data analysis, offering a comprehensive view of how these professionals perceive objectivity and legal security within the framework of the abbreviated procedure. Based on the findings, practical recommendations are offered to improve the perception of objectivity and legal security.

4. RESULTS

The surveys were conducted strictly respecting the confidentiality of the information provided by the participants. For the analysis of the collected data, it was decided to create frequency tables that facilitated the interpretation of the results. Additionally, a TRINS matrix was prepared for each participant, allowing for the visualization of the acceptance of the statements through a Likert scale with degrees of indeterminacy. The valuation of the responses was specified through vectors within the interval $[0,1]^5$, providing a quantitative framework for the analysis.

With the purpose of synthesizing and better understanding the collected data, the function $\gamma(V) = 2v_1 + v_2 + 0.5v_3 - v_4 - 2v_5$ was applied to each response. This methodology allowed the generating a global index that facilitated the classification of the responses. Under this scheme, the category "Very High" was assigned to those responses whose score was equal to or higher than 2, the "High" category corresponded to scores equal to or higher than 1, the term "Indeterminate" was applied to scores ranging between -1 and 1, "Low" for those between -2 and -1, and finally "Very Low" for scores lower than -2.

This approach enabled the detailed structuring of the frequency tables for each variable under study, distributed across Tables 1-3, thereby facilitating a comprehensive and precise analysis of the perceptions and attitudes of respondents about the analyzed variables of interest.

	Perception of Impartiality		Sense of Predictability		Transparency of the Procedure		Personal Experiences with the Principle of Objectivity	
Strongly disagree	0	0%	0	0%	0	0%	0	0%
Disagree	0	0%	0	0%	0	0%	0	0%
Undefined	4	17%	7	29%	4	17%	2	8%
Agree	14	58%	11	46%	13	54%	13	54%
Strongly Agree	6	25%	6	25%	7	29%	9	38%

Table 1: Results obtained for the evaluated group of judges

	Perception of Impartiality		Sense of Predictability		Transparency of the Procedure		Personal Experiences with the Principle of Objectivity	
Strongly disagree	0	0%	0	0%	0	0%	0	0%
Disagree	0	0%	1	4%	0	0%	0	0%
Undefined	6	22%	4	15%	3	11%	3	11%
Agree	17	63%	12	44%	13	48%	16	59%
Strongly Agree	4	15%	10	37%	11	41%	8	30%

Table 2: Results obtained for the evaluated group of prosecutors

	Perception of Impartiality		Sense of Predictability		Transparency of the Procedure		Personal Experiences with the Principle of Objectivity	
Strongly disagree	1	5%	0	0%	0	0%	0	0%
Disagree	0	0%	1	5%	0	0%	0	0%
Undefined	8	38%	4	19%	3	14%	2	10%
Agree	10	48%	10	48%	9	43%	12	57%
Strongly Agree	2	10%	6	29%	9	43%	7	33%

Table 3: Results obtained for the evaluated group of defense attorneys

After examining the results tables for the evaluated groups of judges, prosecutors, and defense attorneys regarding the study variables, it can be observed that all groups showed a significantly positive perception of impartiality, with a notable 83% of judges and 78% of prosecutors agreeing or strongly agreeing with the statement. Defense attorneys presented greater variability, with 38% of indeterminate responses, although 58% agreed or strongly

agreed. This suggests that, in general, there is a favorable perception of impartiality in the abbreviated procedure, albeit with more uncertainty among defense attorneys.

Predictability was positively assessed among judges (71%) and prosecutors (81%), but a higher level of indeterminacy was observed among judges (29%). Defenders showed more divided opinions with 19% indeterminacy and 77% agreement or strong agreement. This indicates that the predictability of the procedure is generally well perceived, albeit with some reservations.

On the other hand, regarding the transparency of the procedures, it was highly valued by judges (83%) and prosecutors (89%), with a significant portion of defense attorneys also in agreement (86%). Indeterminacy was notably lower for this item, reflecting a generally positive perception of transparency across all groups. Personal experiences with objectivity showed high levels of agreement among judges (92%) and prosecutors (89%), and also among defense attorneys (90%). Likewise, indeterminacy was lower in this area, indicating that personal experiences with the principle of objectivity tend to be positively valued.

These results reflect a generally positive outlook on the perception of objectivity and legal security in the abbreviated procedure among the evaluated legal professionals, albeit with notable differences in terms of indeterminacy, especially among defense attorneys. The evidence suggests the importance of addressing and clarifying the aspects that contribute to the perception of indeterminacy to further strengthen confidence in these fundamental principles of the judicial system.

Achieving these results enables the anticipation of trends in the perceptions of the evaluated groups regarding the considered dimensions. Table 4 presents both the Refined Phylogenetic Probabilities (RPP) and the Neutrosophic Phylogenetic Probabilities (NPP), derived by converting percentages to RPP and the subsequent calculation of NPP according to equation (3). This methodology allows for a detailed and nuanced approach to analyzing perceptions, offering a framework to interpret the complexity inherent in the participants' responses.

Variables	Judges		Prosecutors		Lawyers	
	RPP	NPP	RPP	NPP	RPP	NPP
Perception of Impartiality	(0; 0; 17; 58; 25)	(83; 17; 0)	(0; 0; 22; 63; 15)	(78; 22; 0)	(5; 0; 38; 48; 10)	(58; 38; 5)
Sense of Predictability	(0; 0; 29; 46; 25)	(71; 29; 0)	(0; 4; 15; 44; 37)	(81; 15; 4)	(0; 5; 19; 48; 29)	(77;19;5)
Transparency of the Procedure	(0; 0; 17; 54; 29)	(83; 17; 0)	(0; 0; 11; 48; 41)	(89; 11; 0)	(0; 0; 14; 43; 43)	(86; 14; 0)
Personal Experiences with the Principle of Objectivity	(0; 0; 8; 54; 38)	(92; 8; 0)	(0; 0; 11; 59; 30)	(89; 11; 0)	(0; 0; 10; 57; 33)	(90; 10; 0)

Table 4: Refined Phylogenetic Probabilities (RPP) and Neutrosophic Phylogenetic Probabilities (NPP) for each evaluated group

Transforming percentages into RPP and calculating NPP not only enriches the understanding of attitudes and opinions within the studied groups but also provides a robust quantitative basis for projecting future trends in their perceptions. By employing these analysis techniques, a deeper exploration of the dynamics of perceptions is facilitated, allowing for more accurate identification of areas of consensus, divergence, and ambiguity in the evaluations of the various aspects assessed.

As shown in Figure 1, the analysis revealed that study participants showed a significant predisposition to perceive the evaluated dimensions positively. In particular, it was identified that both judges and prosecutors had probabilities over 70% of having positive perceptions in these areas. However, it was observed that defense attorneys, despite largely sharing these positive perceptions, adopted a more reserved stance regarding impartiality in judicial processes.

Judges showed a greater inclination to recognize impartiality in judicial procedures and expressed more favorable attitudes regarding their personal experiences related to the principle of objectivity. This finding suggests that judges, in their role as arbiters of the judicial process, have a sharper perception of these aspects, possibly due to their direct involvement and responsibility in maintaining such principles during the procedures.

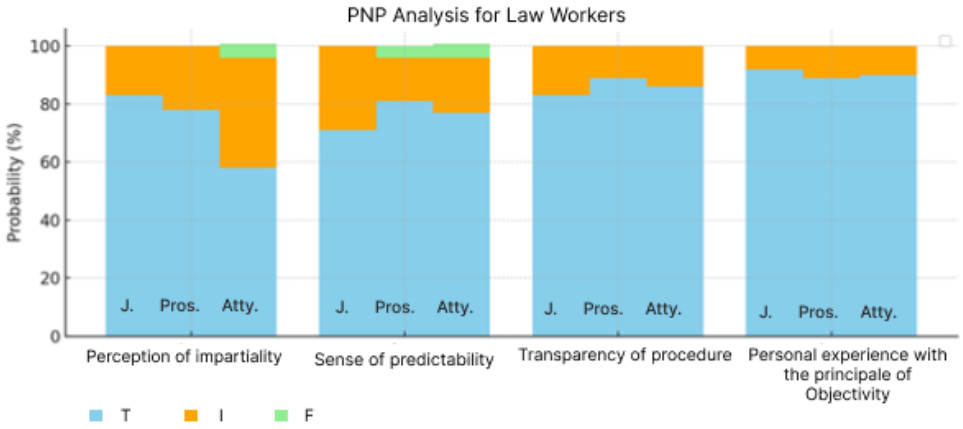

Figure 2: NPP values for each evaluated group in each studied variable

On the other hand, prosecutors showed more pronounced tendencies towards positive valuations in terms of the predictability and transparency of judicial procedures. This orientation may reflect the importance that these legal professionals place on the clarity and predictability of the processes on which they must base their cases and make strategic decisions. These results suggest that, although there is widespread consensus among different groups of legal professionals on the positive valuation of predictability, transparency, and objectivity in judicial procedures, there are subtle differences in the perception of these principles. These differences could be influenced by the different responsibilities, experiences, and expectations associated with each role within the judicial system.

Likewise, it was observed that defense attorneys lean towards indeterminacy or Neutrosophic in their perceptions, this phenomenon is particularly pronounced in relation to the impartiality of judicial procedures. This tendency indicates a significant ambiguity in their opinions, suggesting caution or uncertainty about the impartiality with which these processes are administered. Regarding the sense of predictability, defense attorneys demonstrated a combination of high certainty, showing a firm conviction in the predictability of the procedures, along with notable indeterminacy. This reveals that, despite the prevalence of positive perceptions, there is a significant proportion of attorneys who remain in a stance of ambiguity regarding predictability.

Concerning the transparency of the procedure, attorneys expressed the highest degree of assurance, indicating an almost unanimous perception of transparency in judicial procedures. The presence of moderate indeterminacy suggests, however, that there is still room for improvement in the clarity and openness of the processes.

These findings suggest predominant confidence in the dimensions of transparency and objectivity of judicial procedures among legal professionals. However, variability in perceptions, especially in terms of impartiality and predictability, highlights potential areas for development and improvement. Specifically, the presence of indeterminacy among defense attorneys regarding impartiality underscores the need to address and mitigate existing uncertainties and distrust.

5. CONCLUSION

In the framework of the study conducted, a quantitative approach was employed to investigate the perception of objectivity and legal security among judges, prosecutors, and defense attorneys in the context of abbreviated procedures. The adopted methodology focused on the application of phylogenetic statistics and the use of indeterminate Likert scales, aiming to capture the complexity and multidimensionality of the participants' perceptions involved.

The study's results revealed a general trend of high confidence among participants regarding the evaluated dimensions, particularly in terms of the transparency of the procedure and objectivity. However, variability in perceptions was observed, especially regarding impartiality and the sense of predictability, highlighting the existence of areas susceptible to improvement and the need to address uncertainty and distrust, especially among defense attorneys.

From a neutrosophic perspective, these results emphasize the inherent complexity in human perceptions and highlight the relevance of indeterminacy as a critical element in the analysis of behaviors and attitudes in the professional realm. The implementation of neutrosophic phylogenetic probabilities in this study provides an innovative and effective approach to capture complexity and offer deep insights into the underlying dynamics in legal and judicial environments.

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