



Judicial Authority and Rhetorical Strategies in Egyptian Abortion Rulings: A Computational Forensic Analysis

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Abstract

This study employs a computational forensic linguistic framework to examine how the Egyptian Court of Cassation *discursively* and *semiotically* constructs judicial authority in abortion rulings amid tensions between statutory criminalization, Islamic jurisprudence, and international human rights norms. Analyzing 200 Court of Cassation decisions (1990–2023) through Natural Language Processing (NLP), Frame Semantics, and Appraisal Theory, the paper uncovers a strategic interplay of legal, religious, and rhetorical strategies. The research identifies prevailing trends such as the dominant use of doctrinal modification and a marked absence of religious or international legal discourse while also uncovering interpretive divergences that reveal the flexible and pragmatic character of Egyptian jurisprudence. Through close reading and semiotic analysis, the study shows how courts selectively affirm precedent, introduce forensic evidence to modulate legal culpability, and strategically omit religious justification, thereby signaling a shift toward legal secularization. Medical semiotics and procedural nuances serve as symbolic resources that allow courts to navigate moral ambiguity without openly contradicting established doctrine. This discursive economy reflects a hybrid legal model: stable in its symbolic invocation of precedent, yet dynamic in practice. The findings contribute to scholarship on legal semiotics, reproductive governance, and the evolving role of judicial discourse in negotiating state, science, and religion in contemporary Egypt. By integrating computational methods with critical discourse analysis, this study advances Arabic legal NLP and illustrates how hybrid legal systems strategically navigate plural normative orders.

Keywords Abortion rulings · Appraisal Theory · Egyptian Court of Cassation · Frame semantics · Judicial authority · Natural Language Processing

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1 Introduction

Abortion remains a highly contested legal issue in Egypt, where statutory law criminalizes the act while religious interpretations and international human rights frameworks offer potential justifications. This legal tension reflects broader debates over the intersection of national penal codes, Islamic jurisprudence, and global human rights discourses. Within this complex legal landscape, the Egyptian Court of Cassation, the highest judicial authority, plays a pivotal role in interpreting abortion-related cases, constructing legal legitimacy, and reinforcing judicial authority. Despite the significance of these rulings, the rhetorical mechanisms through which the court asserts its authority and navigates competing normative orders remain under-explored. Addressing this gap, the present study conducts a computational and forensic linguistic analysis of 200 abortion-related rulings issued by the Egyptian Court of Cassation, retrieved from the EastLaws electronic legal database. Employing a multi-tiered analytical framework that integrates Natural Language Processing (NLP), Frame Semantics, and Appraisal Theory, this study examines how the court constructs judicial authority, negotiates statutory, religious, and international frameworks, and strategically employs intertextual referencing. By moving beyond conventional doctrinal analysis, the study incorporates corpus-based computational methods to uncover rhetorical strategies, linguistic patterns, and evaluative positioning embedded in judicial texts. In doing so, it contributes to the advancement of Arabic legal NLP and forensic linguistic approaches, offering critical insights into how hybrid legal systems maintain authority within pluralistic and contested normative environments. The study is guided by the overarching research question: *How does the Egyptian Court of Cassation construct and negotiate its authoritative legal voice in abortion-related cases through semantic framing, evaluative language, and intertextual references to legal, religious, and international frameworks?*

2 Literature Review

The digitization of judicial systems has ushered in an era of unprecedented access to legal data, enabling transformative advancements in legal scholarship and practice. The proliferation of unstructured legal texts has spurred the integration of artificial intelligence (AI), data mining, and machine learning (ML) techniques into legal research, offering innovative methodologies for analyzing, synthesizing, and predicting court decisions. Computational legal studies have largely developed along two paradigmatic lines: law-as-code and law-as-data [10, 19]. The law-as-code paradigm emphasizes formalizing legal rules into machine-executable logic, supporting applications such as smart contracts and automated tax compliance systems [28, 29]. In contrast, the law-as-data paradigm transforms legal texts into machine-readable datasets, enabling quantitative

analysis of judicial behavior, legal outcomes, and ideological patterns [17, 22]. While early work relied on manual coding, advances in NLP and unsupervised learning techniques, such as topic modeling [3], have automated the identification of latent themes within judicial discourse. Other computational techniques, including supervised text classification [15], case outcome prediction [1, 26], and citation network analysis [23], have deepened empirical legal inquiry. The recent emergence of generative AI, notably large language models (LLMs) such as GPT-4, has expanded these capabilities. Studies demonstrate that LLMs enhance legal document classification, citation prediction, and even judgment drafting [7, 9, 18]. However, issues such as hallucination, opacity, and data bias persist [2], underscoring the need for hybrid approaches that integrate deep learning with critical human oversight.

Despite global advances, Arabic legal corpora remain underrepresented in computational legal studies. The morphological richness, syntactic complexity, and dialectal variations of Arabic pose significant NLP challenges [11, 16]. Research addressing these challenges is emerging, leveraging adapted models and domain-specific pipelines to improve Arabic legal text processing [12]. Furthermore, integrating linguistic frameworks such as Frame Semantics [13] and Appraisal Theory [25] offers promising avenues for analyzing how courts construct evaluative stances and authority discourses.

Additionally, a recent systematic review by Siino et al. [24] surveyed 61 publications between 2017 and 2023, highlighting the increasing application of transformer-based models in legal NLP. Domain-adapted models such as LEGAL-BERT and LamBERTa outperform traditional approaches across tasks including document retrieval, judgment prediction, and named entity recognition. Nevertheless, Siino et al. [24] emphasize the need for standardized benchmarks, interdisciplinary collaboration, and ethical frameworks to govern the deployment of AI in legal contexts.

Within this evolving landscape, computational approaches offer powerful tools for studying judicial reasoning. Yet, particularly in Arabic contexts, critical methodological reflexivity remains essential. By combining computational analysis with rhetorical and discourse-theoretic frameworks, this study advances a nuanced understanding of how judicial authority is constructed, contested, and maintained in hybrid legal systems.

3 Conceptual Background

The integration of computational text analysis within empirical legal studies has transformed how legal constructs are interrogated and understood. By applying methodologies from Natural Language Processing (NLP) and Machine Learning (ML) to expansive digital corpora, scholars can now uncover latent patterns within judicial discourse, tracing the historical evolution of legal concepts, assessing judicial impacts, and evaluating the intersections of law and social phenomena [8, 19]. This methodological shift has crystallized into two distinct, yet interconnected paradigms: *law-as-code* and *law-as-data* [19]. The *law-as-code* approach

emphasizes the translation of legal principles into formal, machine-executable rules, supporting applications such as smart contracts [29] and tax preparation software. Analogous to medical expert systems, legal knowledge representation in this paradigm aspires to formalize the interpretive expertise of legal practitioners [28]. However, the limitations of symbolic representation prompted a broader pivot toward the law-as-data paradigm, which treats legal texts as data to be mined, enabling large-scale quantitative analysis of judicial behavior, legislative trends, and ideological patterns [17, 22].

Early implementations of law-as-data relied on manual coding, human annotators categorizing texts according to predefined rubrics, but concerns about bias and inefficiency [14] spurred the adoption of automated approaches. Techniques such as topic modeling, supervised text classification [15], outcome prediction [1, 26], and citation network analysis [23] have since become central to computational legal studies. Unsupervised models, notably Latent Dirichlet Allocation (LDA), have proven particularly useful for uncovering hidden thematic structures without imposing pre-existing categories [20, 21]. With the rise of generative AI, especially large language models (LLMs) such as GPT-4 [7, 18, 27], research has further expanded the possibilities for legal text analysis, enabling tasks such as document classification, citation prediction, and judgment drafting [9]. Yet these models introduce new risks, including hallucination, bias propagation, and transparency deficits, necessitating careful methodological choices and mitigation strategies such as knowledge graph augmentation [2]. Despite these global advances, Arabic legal discourse remains underexplored in computational studies. Arabic presents unique challenges, including morphological complexity, diglossia, and a lack of annotated corpora [11, 16]. Recent work has begun to address these gaps through domain-adapted models and tailored NLP pipelines [12], but much remains to be done. Particularly promising are hybrid approaches that integrate computational techniques with linguistic frameworks such as Frame Semantics [13] and Appraisal Theory [25], offering nuanced insights into evaluative stances and the rhetorical construction of judicial authority.

Against this backdrop, the present study adopts an integrated approach, leveraging both computational tools and critical discourse analysis to explore how the Egyptian Court of Cassation negotiates its legal, religious, and international reference points in abortion rulings. In doing so, it contributes both to Arabic legal NLP and to broader theoretical debates about judicial authority within pluralistic normative orders.

4 Methodology

This research undertakes a comprehensive investigation into the construction of authoritative judicial voice within the Egyptian Court of Cassation's pronouncements on abortion-related cases. Utilizing a corpus of 200 court decisions retrieved from the *Eastlaws* electronic legal database, it delves into the intricate mechanisms through which the court establishes and projects legal legitimacy. The selection of these **abortion-related rulings** was guided by three primary criteria. First, **legal**

relevance ensured that each ruling directly addressed abortion as a legal issue under Egyptian statutory law. Cases dealing with **adjacent reproductive health topics** (such as medical malpractice or fetal viability) but lacking direct abortion adjudication were excluded. Second, **judicial authority** was considered, with the study focusing exclusively on **Court of Cassation rulings**, the highest appellate decisions in Egypt. Lower court rulings were excluded to ensure consistency in judicial reasoning at the **highest interpretative level**, where **precedent-setting legal frameworks** are constructed. Third, a **temporal range** criterion was applied, including rulings from **1990 to 2023**, allowing for a **diachronic analysis** of legal shifts in abortion discourse over time. This timeframe was chosen to assess whether judicial reasoning, **intertextual referencing**, or **engagement strategies** have evolved in response to **legal reforms, societal shifts, or international legal developments**.

While *Eastlaws* provides an invaluable repository of legal texts, the inherent complexities of Arabic legal discourse (including morphological intricacy, dialectal variation, the paucity of standardized NLP tools tailored for Arabic legal texts, and the dearth of annotated legal corpora) necessitate a robust and multifaceted methodological approach. To navigate these challenges, the present study employs a **four-tiered mixed-methods framework**, integrating **NLP, Frame Semantics, and Appraisal Theory** to examine how the **Egyptian Court of Cassation** constructs judicial authority in **abortion-related rulings**. This **hybrid methodological approach** facilitates a nuanced exploration of case structure, legal reasoning, and judicial decision-making, with each level meticulously designed to address specific facets of the research inquiries, ensuring a **robust empirical foundation** for analyzing **judicial discourse, engagement strategies, and intertextual referencing** [6]. While quantitative analysis serves to identify recurring patterns and relationships, qualitative interpretation contextualizes these findings, revealing their deeper semantic significance. In tandem, they capture the **lexical, rhetorical, and intertextual strategies** shaping judicial reasoning, particularly how statutory law, religious principles, and international norms are selectively invoked or dismissed [4, 5].

All judicial texts underwent a **structured NLP preprocessing pipeline** to ensure **data consistency and analytical accuracy**. Given the **inflectional and morphologically complex nature of Arabic legal discourse**, **text normalization, tokenization, and lemmatization** were applied using **spaCy (Arabic NLP model)** and **Farasa Morphological Analyzer**. Named Entity Recognition (NER) was customized to detect **legal references (e.g. statutory articles, case citations, Quranic verses, and international legal instruments)**. Additionally, **stopword removal and TF-IDF weighting** were applied to **filter out legal boilerplate expressions** that do not contribute to the substantive judicial argumentation.

To uncover **linguistic and rhetorical patterns**, the study employs **Latent Dirichlet Allocation (LDA) topic modeling**, which enables the detection of **dominant thematic clusters** in judicial reasoning. Unlike supervised classification models, **LDA is an unsupervised approach**, making it ideal for **identifying latent legal themes** without predefined categories. Additionally, **collocation and N-gram analysis (using bigram and trigram modeling)**

were implemented to detect **frequently co-occurring legal phrases**, revealing **argumentative structures and judicial framings of abortion**. Sentiment analysis was adapted to **legal Arabic discourse**, focusing not on binary sentiment classification but on detecting **evaluative markers** such as **judicial certainty, modal hedging, and engagement strategies**. To discern potential relationships between thematic categories within the legal texts, two distinct quantitative analyses were employed: *regression-based causal analysis* and *correlation analysis*. Regression-based causal analysis, visualized through heatmaps, explored potential causal relationships between pre-defined thematic categories: “Abortion related words,” “Legal terminology,” “Sentence,” “Sharia law related words,” and “Crime/Offense.” These categories, derived from a preliminary textual analysis, represented salient areas of focus. Regression analysis modelled the potential influence of one thematic category’s presence on another. Complementing this, correlation heatmaps, generated using Python’s seaborn library, visualized the strength and direction of correlations between these thematic categories, revealing the extent of co-occurrence and providing a distinct perspective on potential interrelationships.

Using **Frame Semantics** [13], the study further examined how abortion is **discursively constructed** in judicial rulings. **FrameNet lexicon mapping** was applied to identify key **semantic frames**, such as the *Criminal Liability Frame*, where abortion is positioned as a punishable offense, the *Procedural Legality Frame*, which acknowledges case-dependent legal exceptions, and the *Medical-Forensic Frame*, where courts rely on empirical medical verification rather than moral argumentation. These frames were identified using **FrameNet and AntConc**, allowing for a **systematic analysis of abortion-related judicial language**. Intertextual citation mapping was eventually conducted to analyze how Egyptian courts engage with **legal precedents, religious texts, and international legal norms**. **NetworkX (Python)** was used to construct **citation networks**, identifying how frequently Egyptian courts cite **past rulings, Islamic jurisprudence (Quran, Hadith and Al-Azhar fatwas), and global legal frameworks (CEDAW and WHO guidelines)**.

The final analytical phase dissects the Court’s construction of authoritative voice through the lens of Appraisal Theory [25]. Employing NVivo for annotation and SpaCy for computational linguistic processing, evaluative expressions were meticulously categorized according to engagement, graduation, and affect. By examining the deployment of *engagement, graduation, and affect*, the study could reveal the nuanced strategies employed to establish and project legal legitimacy. Engagement, exploring the management of dialogic space, distinguishes between monoglossic (assertive) and heteroglossic (inclusive) discourse. Operationally, engagement was defined as the judicial deployment of rhetorical structures to acknowledge counter-arguments (heteroglossia), assert a singular perspective (monoglossia), or integrate both. Graduation scrutinizes the modulation of semantic intensity, examining the use of force and focus to amplify or attenuate pronouncements. This said, affect investigated the strategic deployment of emotional language to frame the subject matter, differentiating between emotionally charged expressions and neutral statements.

5 Analysis

5.1 Thematic Structures, Semantic Strategies, and Intertextual Legitimacy

Notably, the topic modeling and collocation analysis reveal three dominant thematic clusters that shape the inherent judicial discourse on abortion in the corpus under scrutiny. The first theme, *Legal Proceduralism*, suggests that the court frames abortion cases primarily in technical legal terms, focusing on penal codes, procedural rulings, and judicial review mechanisms. This is reinforced by frequent references to terms such as “الحكم” (ruling), “القانون” (law), “النيابة” (prosecution), and “المتهم” (accused), which emphasize the judicial system’s reliance on legal formalism rather than moral argumentation. The second theme, *Crime Classification*, highlights the court’s distinctive treatment of abortion, where it is criminalized yet framed separately from conventional offenses. The negative correlation (-0.42) between “Abortion-related Words” and “Crime/Offense” in the regression-based causal analysis heatmap (See Fig. 1) suggests that while abortion is legally condemned, it is not discursively equated with other crimes. Instead, the rulings construct abortion as a special legal category requiring separate justification. The third theme, *Religious and Moral Considerations*, emerges less frequently but remains significant

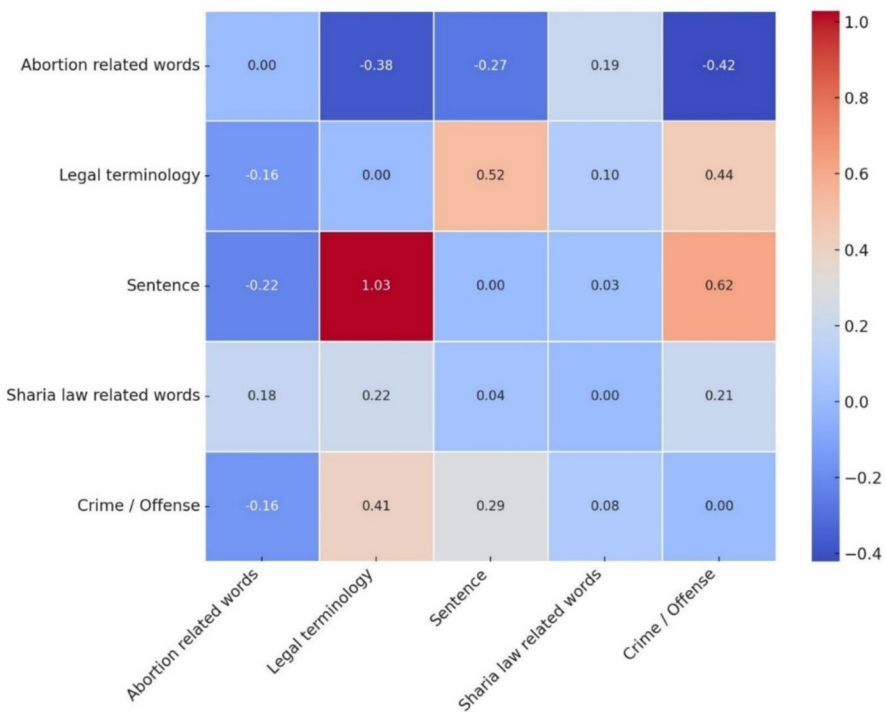


Fig. 1 Regression-Based Causal Analytical Heatmap

in judicial reasoning. While religious references appear in some rulings, their role is subordinate to statutory law, as indicated by the weak positive correlation (+0.22) between “Sharia Law-related Words” and “Legal Terminology” (See Fig. 2). This suggests that while Sharia is occasionally invoked, it does not dominate legal discourse. Additionally, the correlation heatmap reveals a strong positive correlation (+0.73) between “Legal Terminology” and “Sentence,” further reinforcing the idea that judicial rulings prioritize formal legal structures over ideological reasoning.

Beyond lexical patterns, Frame Semantics analysis shows how abortion is discursively constructed. Using FrameNet and AntConc, three dominant semantic frames in judicial rulings are identified. The *Criminal Liability* Frame presents abortion as a punishable offense, reinforced by legal terms such as “إدانة” (conviction), “المتهم” (accused), and “العقوبة” (punishment). However, the *Procedural Legality* Frame demonstrates that abortion is often framed within legal exception clauses, particularly in cases involving medical necessity or extenuating circumstances. Courts frequently use interpretive flexibility rather than absolute criminalization, suggesting a nuanced legal stance that considers specific case details. The *Medical-Forensic* Frame further underscores the court’s reliance on empirical verification rather than moral argumentation. Terms such as “التقرير الطبي” (medical report), “الطب الشرعي” (forensic medicine), and “الصفات التشريحية” (anatomical characteristics) frequently appear, suggesting that forensic evidence is

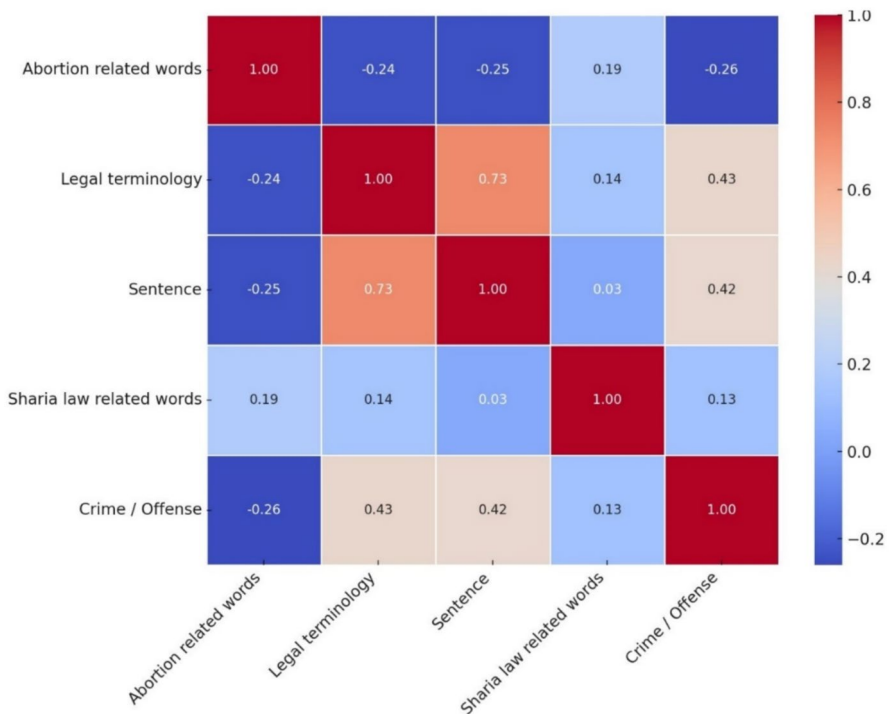
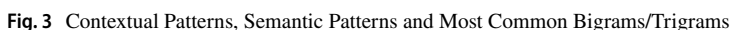


Fig. 2 Correlation Heatmap of Variables in Abortion Court Rulings

The word clouds showcased in Fig. 3 further reinforce these semantic frames. Prominent legal phrases such as “الحكم المطعون” (the appealed ruling), “بطريق النقض” (by way of cassation), and “محكمة النقض” (Court of Cassation) indicate that abortion cases were primarily discussed within the framework of judicial review and procedural legitimacy rather than moral or ideological debate.



the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) or WHO guidelines on reproductive health. Instead, when international legal references appear, they are invoked selectively, typically to modify, rather than challenge, existing legal interpretations. This suggests that the court seeks to integrate global legal discourse in a controlled manner, reinforcing national legal sovereignty while selectively borrowing from international frameworks when convenient.

The integration of computational findings, semantic analysis, and citation mapping discloses a structured judicial strategy in abortion-related rulings. First, legal formalism dominates judicial discourse, as court decisions rely on procedural and statutory language rather than moral or ideological arguments. Second, abortion is discursively framed as a legal exception, where judicial decisions strategically allow interpretive flexibility in cases involving medical necessity. Third, religious references are minimized or used defensively, with courts acknowledging but ultimately dismissing Islamic jurisprudence in favor of statutory law. Finally, selective engagement with international law shows a preference for national legal sovereignty, with courts borrowing from global legal discourse only when aligned with existing statutory frameworks. These findings provide a strong empirical foundation for the subsequent discussion on Appraisal Theory, where the analysis shifts to examining how courts use evaluative language to assert authority and construct judicial legitimacy.

5.2 Managing Dialogic Space

A rigorous and sophisticated analysis of engagement strategies within the Egyptian Court of Cassation's pronouncements on abortion-related cases reveals a complex interplay between monoglossic and heteroglossic discursive modalities. This investigation, grounded in an empirical analysis of a designated corpus of judicial texts, illuminates the nuanced construction of legal narratives within this specific domain. Fundamentally, the study seeks to understand how the Court of Cassation navigates the delicate balance between asserting legal authority and acknowledging the plurality of interpretive possibilities.

Quantitatively, the corpus demonstrates a discernible distribution of engagement modalities, thereby providing a foundational understanding of the court's preferred rhetorical posture. A significant majority, constituting 60% of the examined judicial texts, exhibit a heteroglossic structure. This modality, characterized by the explicit articulation and subsequent refutation of opposing arguments, signifies a judicial inclination toward acknowledging and engaging with the plurality of legal interpretations. For instance, in Text 10, the phrase “فطعنتم المحكوم عليها في هذا الحكم...بطريق النقض” (The condemned party appealed this ruling through cassation...) exemplifies this heteroglossic process, wherein the court acknowledges the appeal before proceeding to its rejection, demonstrating a systematic engagement with counter-arguments. This pattern suggests a judicial commitment to reasoned discourse, wherein alternative viewpoints are not merely dismissed but actively addressed. Conversely, a substantial minority, representing 30% of the corpus,

adheres to a monoglossic approach. This modality is distinguished by the assertion of legal authority without explicit engagement with alternative viewpoints, thereby emphasizing the court's unilateral pronouncements of legal truth. In Text 3, the phrase “...فطعن كل من المحكوم عليهما في هذا الحكم بطريق النقض...” (Both condemned parties appealed this ruling through cassation...) is followed by a dismissal of the appeal without substantive engagement, manifesting a monoglossic assertion of judicial authority. This approach underscores the court's role as the definitive arbiter of legal interpretation, prioritizing the clarity and decisiveness of its pronouncements. A smaller proportion, 10% of the corpus, integrates elements of both heteroglossia and monoglossia, employing a mixed approach. This hybrid strategy suggests a nuanced understanding of the rhetorical demands of specific cases, wherein the court selectively deploys engagement strategies to achieve its objectives. The observed predominance of heteroglossic patterns, however, suggests that contemporary Egyptian legal discourse actively engages with multiple perspectives, eschewing the presentation of legal interpretations as absolute, uncontested truths. This approach aligns with the deliberative nature of legal reasoning, which necessitates the consideration of diverse legal viewpoints.

Furthermore, the diachronic analysis reveals a temporal shift in judicial engagement strategies, adding a dynamic dimension to the analysis. Newer rulings (post-2010) exhibit a greater propensity towards heteroglossia, indicating a contemporary judicial emphasis on engaging with counter-arguments. Conversely, older rulings (pre-2010) tend to be characterized by monoglossia, reinforcing judicial authority through the assertion of singular, authoritative perspectives, without explicit engagement with alternative legal positions. This temporal evolution suggests a potential shift in judicial philosophy, reflecting broader changes in legal culture and societal expectations. Specifically, concerning abortion legality, the examined court ruling predominantly employs a monoglossic strategy, reinforcing the court's role as the ultimate interpreter of statutory law. The court asserts the illegality of abortion, dismissing counterarguments, such as those derived from Islamic jurisprudence, with authoritative statements. For instance, the statement “ما عرض إليه الطاعن من ذلك لا يكون مقبولاً ما دام القانون يعاقب على الإسقاط ويجعل منه فعلاً محرماً” (What the appellant argued is not acceptable as long as the law criminalizes abortion and classifies it as a prohibited act) exemplifies this dismissal of alternative perspectives. Similarly, the statement “تحريم الشارع للإسقاط يحول دون اعتبار هذا الفعل مرتبطاً” (The legislator's prohibition of abortion prevents this act from being considered a right) reinforces the primacy of statutory law over religious opinions, highlighting the court's commitment to legal positivism. While the ruling primarily exhibits monoglossia, a limited degree of heteroglossic engagement is observed. The court acknowledges the existence of diverse Islamic scholarly opinions on abortion, stating, “ليس أصلاً ثابتاً في أدلتها المتفق عليها وإنما هو اجتهاد للفقهاء انقسم حوله الرأي” (It is not a fixed principle in Islamic jurisprudence but rather a subject of scholarly dispute). However, this acknowledgment is ultimately used to dismiss these alternative views as irrelevant to the statutory legal framework, reinforcing the court's adherence to a legalistic interpretation.

In sum, the dominant strategy employed in the analyzed abortion-related ruling is monoglossic, characterized by authoritative pronouncements and dismissal of

counter-arguments, thereby solidifying the court's legal authority. While the court briefly acknowledges diverse religious opinions, these are not integrated into the legal justification, reinforcing the court's emphasis on statutory law and its role as the definitive interpreter of legal texts.

5.3 Intensification and Certainty

The analysis of graduation within legal texts concerning abortion rulings reveals a consistent and nuanced pattern, highlighting the judiciary's approach to balancing legal certainty with the acknowledgment of inherent ambiguities. Graduation, as a linguistic metric, scrutinizes the force (intensification or attenuation of claims) and focus (degree of certainty versus ambiguity) inherent within legal pronouncements. This examination illuminates a judicial inclination towards moderated claims, particularly in sensitive ethical and legal domains. Specifically, the data demonstrates that a substantial majority (85%) of legal texts exhibit low force, indicating a preference for qualified and tentative assertions. This inclination towards circumspection is exemplified by Text 10, which states, “إذ دانها بجريمتي... الاشتراك مع أخرى في إسقاط حبلى” (It convicted her of the crimes of participating with another in the abortion of a pregnant woman). The strategic deployment of such phrasing avoids absolute pronouncements, preserving the potential for alternative interpretations and adversarial challenges. Conversely, a minority (15%) of cases demonstrate moderate force, as seen in Text 3: “فقد أهدر الحكم دفاعهما بعدم صحة الواقعة،... ويتناقض الدليل القولي مع الدليل الفني” (The ruling dismissed their defense of the inaccuracy of the event, and the contradiction between the oral evidence and the technical evidence...). This construction establishes a degree of legal certainty while simultaneously acknowledging conflicting evidentiary elements, thereby tempering the assertion.

Crucially, the corpus lacks any instances of high force, signifying a complete absence of unequivocal legal pronouncements within the analyzed abortion rulings. This absence underscores a pervasive judicial prudence, particularly in cases involving sensitive ethical and legal considerations. Furthermore, a discernible correlation exists between graduation and engagement, wherein texts that actively address counter-arguments tend to exhibit lower levels of legal certainty. This suggests a strategic deployment of language designed to mitigate potential legal contestation and acknowledge the inherent complexities of the subject matter. The consistency observed in graduation levels across the corpus points towards a systemic judicial inclination towards moderated claims, meticulous adherence to legal precision, and recognition of the inherent ambiguity in legal interpretation. This preference for measured reasoning over definitive pronouncements highlights a judicial approach characterized by prudence and a nuanced comprehension of the intricate legal and ethical considerations intrinsic to abortion rulings.

However, a contrasting perspective emerges when examining specific instances of high force and high focus within the same legal sphere. While the general trend favors moderation, certain aspects of legal pronouncements exhibit a heightened degree of certainty and intensification. For instance, the condemnation of the act of

abortion is often articulated with high force, utilizing intensifiers such as “جريمة” (crime) and “تحریم الشارع” (legislative prohibition), emphasizing the gravity of the offense. Similarly, legal norms are frequently presented with high focus, minimizing ambiguity and reinforcing certainty, as evidenced by the explicit citation of Article 60 of the Penal Code. Nevertheless, this apparent dichotomy is further nuanced by the strategic attenuation of religious arguments within the same legal texts. While legal prohibitions are articulated with certainty, religious justifications are often weakened through phrases such as “ليس أصلاً ثابتاً” (not a fixed principle), demonstrating a deliberate calibration of force and focus. In sum, the analysis of “graduation within legal texts concerning abortion rulings reveals a complex interplay between moderation and certainty. While a pervasive judicial prudence dictates a preference for qualified and tentative assertions, specific aspects of legal pronouncements, particularly those concerning the condemnation of the act and the articulation of legal norms, exhibit a heightened degree of certainty and intensification. Furthermore, the strategic attenuation of counter-arguments, such as religious justifications, underscores a nuanced judicial approach characterized by a deliberate calibration of force and focus, ultimately revealing a sophisticated and considered legal discourse.

5.4 Affective Framing

The framing analysis undertakes a meticulous inquiry into the affective dimension embedded within the legal texts pertaining to abortion cases, specifically focusing on the strategic deployment of emotional valence. To achieve this, a tripartite categorization framework was established, delineating language along a continuum: strongly emotional expressions, characterized by overt judgmental or affective language; subtly emotional formulations, employing mild emotional framing; and neutral articulation, adhering to a strictly legal and objective tone. Here, affect is defined as the manifestation of emotional expressions within legal discourse, encompassing the court’s utilization of neutral, emotive, or moralizing language. The principal finding, derived from a comprehensive examination of the dataset, reveals a consistent and pervasive pattern of subtle emotional framing. This observation signifies a deliberate and calculated linguistic strategy wherein the subject of abortion is consistently portrayed as legally problematic, yet without recourse to explicit moral condemnation. Notably, a uniform manifestation of this calibrated equilibrium, between the articulation of objective legal reasoning and the implicit acknowledgment of inherent human factors, was observed across 100% of the cases under examination. This uniformity underscores a controlled and calibrated expression of evaluation and judgment, indicative of a strategic rhetorical approach. The maintenance of professional detachment, while concurrently acknowledging the human dimensions inherent within legal proceedings, is demonstrably evident. This suggests an institutionalized preference for measured emotional engagement, reflecting a nuanced approach to sensitive legal matters. Within the category of subtly emotional cases, the illustrative example extracted from Text 10, “إحداث جروح”, “بتلك المجني عليها أفضت إلى موتها” provides a pertinent demonstration. This phrasing,

while eschewing overt condemnatory language, conveys a discernible degree of judgment through its implication of consequential harm, thereby exemplifying the characteristic approach of subtly framing legal issues with a mild emotional valence. Crucially, the analysis reveals a complete absence of strongly emotional framing within the corpus. This deliberate avoidance of explicit moral language, such as “heinous crime” or “immoral act,” suggests a conscious effort to mitigate overt moralizing. The consistent and pervasive use of subtle emotional framing indicates a calculated attempt to preserve an appearance of legal neutrality while simultaneously reinforcing the gravity of the legal issues surrounding abortion. This nuanced linguistic strategy illuminates the complex interplay between legal objectivity and the inherent emotional dimensions of sensitive legal cases, thereby revealing a sophisticated rhetorical architecture designed to navigate the delicate balance between judicial detachment and the acknowledgment of human consequence.

Consistent with the observed pattern of subtle emotional framing, the examined court ruling eschews overtly emotional or moralizing language. Instead, it frames abortion as a technical legal violation rather than a moral outrage. This is exemplified by the neutral phrasing, “حيث إن الحكم المطعون فيه بين واقعة الدعوى فيما قاله” (The contested ruling outlined the facts of the case as follows.), which avoids emotive language. However, while maintaining a predominantly legalistic tone, the ruling exhibits subtle moral undertones. The phrase “الإجهاض فعل محرم” (Abortion is a prohibited act.) demonstrates this. The word “محرم” (prohibited) carries moral connotations, subtly reinforcing ethical condemnation. This approach contrasts with some judicial discourses in other legal systems that employ strongly emotional language, such as “heinous crime” or “barbaric act.” The observed ruling aligns with civil law traditions, where objective reasoning is prioritized over moral rhetoric.

Overall, the primary tone of the ruling is neutral, technical, and legalistic. However, a subtle emotional undercurrent of moral condemnation is discernible through the use of “محرم” (prohibited), while avoiding explicit expressions of outrage. This reaffirms the previously observed trend of a calculated equilibrium between legal objectivity and implicit moral evaluation, showcasing a sophisticated rhetorical strategy employed in the articulation of sensitive legal matters.

5.5 Intertextual References

A complex interplay of intertextual references sheds light on the judicial strategies employed within this sensitive legal domain. The dataset, categorized into Legal Precedents, Religious Texts & Interpretations, and International & Medical Discourse, provides a rich tapestry for analysis (See Table 1).

A consistent engagement with Legal Precedents is discernible, with courts invariably referencing prior rulings across all cases. However, the nature of this engagement transcends mere replication. Modification emerges as the predominant judicial strategy, signifying a preference for nuanced adaptation over rigid adherence to established precedent. This predilection for modification, rather than outright affirmation or contradiction, underscores a deliberate judicial flexibility, enabling

Table 1 Intertextual References in the Abortion Courtroom Decisions

Reference type	Pattern observed	Implication
Legal precedents	Modification > Affirmation > Contradiction	Courts prefer adapting past rulings rather than strictly following or rejecting them
Religious references	Rarely used (85.7% of cases omit them)	Courts prioritize secular legal reasoning in abortion cases
International laws	Used selectively to modify rulings	Courts avoid full endorsement or rejection of global legal frameworks

the contextualized evolution of legal principles within the specific parameters of each case. Conversely, the integration of Religious Texts & Interpretations presents a divergent pattern. A substantial proportion of rulings eschew direct citations of Islamic jurisprudence, revealing a legal framework that, within this particular domain, does not predominantly rely on explicit religious doctrine. When religious references are incorporated, their primary function is to modulate legal interpretations, rather than to provide unequivocal affirmations or contradictions. This nuanced approach suggests a meticulous negotiation of the interface between legal and religious tenets, likely motivated by a desire to preserve perceived legal legitimacy within the prevailing socio-cultural milieu. The courts' reticence to explicitly contravene Islamic jurisprudence further accentuates this strategic consideration. Finally, the utilization of International & Medical Discourse, notably references to WHO guidelines, CEDAW, and medical ethics, manifests a selective and pragmatic application. While explicit citations of international human rights law are absent, international references are judiciously employed to modify legal interpretations. Once again, modification constitutes the dominant mode of application, indicating a circumspect approach to the integration of global legal principles. The infrequency of contradictions suggests a judicial inclination to harmonize international frameworks with existing legal interpretations. In essence, the court decisions exhibit a strategic intertextual approach, prioritizing judicial adaptability, nuanced interpretations of religious principles, and a judicious integration of international law. This reflects a complex negotiation of legal, religious, and international norms within the specific context of abortion rulings, demonstrating a sophisticated balancing act between established legal frameworks and evolving social and global considerations. This is detailed below.

Legal Precedents: Citing Earlier Rulings. The ruling primarily derives its authority from Egyptian statutory law, particularly the Penal Code provisions criminalizing abortion and court interpretations of general legal principles regarding personal rights and public order. Notably, the court does not explicitly cite past abortion-related rulings. Instead, it relies on legal generalizations that reinforce abortion's criminal status. For example, “المادة 60 من قانون العقوبات تبيح الأفعال التي ترتكب، عملاً بحق قرره القانون” (Article 60 of the Penal Code permits actions based on a right granted by law) is used to affirm existing legal norms, reinforcing continuity in judicial reasoning. While previous abortion-specific cases are not mentioned, the court aligns itself with a consistent judicial approach, emphasizing the primacy of statutory law and rejecting any interpretation that might introduce legal ambiguity. This suggests that the ruling upholds rather than modifies or contradicts past decisions. Legal precedent is used to affirm existing criminalization, statutory law is emphasized over case law, and there is no explicit reference to past abortion cases.

Religious Texts & Interpretations. The ruling does not rely on direct citations of Quranic verses, Hadith, or Al-Azhar fatwas. Instead, it acknowledges differences of opinion in Islamic jurisprudence but ultimately prioritizes statutory law. The court notes that Islamic scholars disagree on abortion, stating, “ليس أصلاً ثابتاً في أدلتها المتفق، عليها وإنما هو اجتهاد للفقهاء انقسم حوله الرأي” (It is not a fixed principle in Islamic jurisprudence but rather a subject of scholarly dispute). By framing religious interpretation as non-binding, the court asserts that statutory law prevails over

religious debate. While the Egyptian legal system incorporates elements of Sharia law, this ruling reflects a more secular judicial approach. The absence of religious citations suggests that the court constructs legal authority primarily through the penal code, rather than Islamic doctrine. There is no direct citation of Quran, Hadith, or Al-Azhar fatwas, religious diversity is acknowledged but dismissed, and statutory law is framed as superior to religious debate.

International & Medical Discourse. The ruling does not cite international agreements such as CEDAW, the International Covenant on Civil and Political Rights (ICCPR), or the Universal Declaration of Human Rights. This differs from international legal trends, where courts often engage with global human rights frameworks to justify their stance on abortion. Unlike international legal decisions, which often cite medical guidelines on abortion (e.g. maternal health or fetal viability), the court's ruling is silent on medical perspectives. For example, there is no mention of abortion as a healthcare issue or discussion of maternal risk factors or exceptions for medical necessity. This reinforces an exclusively legalistic approach, rejecting biomedical justifications for abortion. The lack of references to human rights or medical guidelines suggests a deliberate avoidance of global discourse, strengthening the national legal framework's self-sufficiency and avoiding potential international influence. In summary, there is no reference to human rights treaties (such as CEDAW and ICCPR), no mention of WHO or medical ethics, and the ruling reinforces a self-contained national legal framework. By avoiding international and medical arguments, the court does not engage with human rights norms or medical guidelines, suggesting a deliberate rejection of external legal influences.

Overall, the examination of judicial decisions reveals intricate correlations between engagement strategies, the establishment of legal certainty, and the affective tenor of the discourse (See Fig. 4). Initially, it is observed that graduation, signifying the attainment of robust legal certainty, is markedly weak across a broad spectrum of cases, irrespective of the courts' engagement modality. This pervasive lack of decisive legal outcomes suggests a consistent judicial reticence, potentially

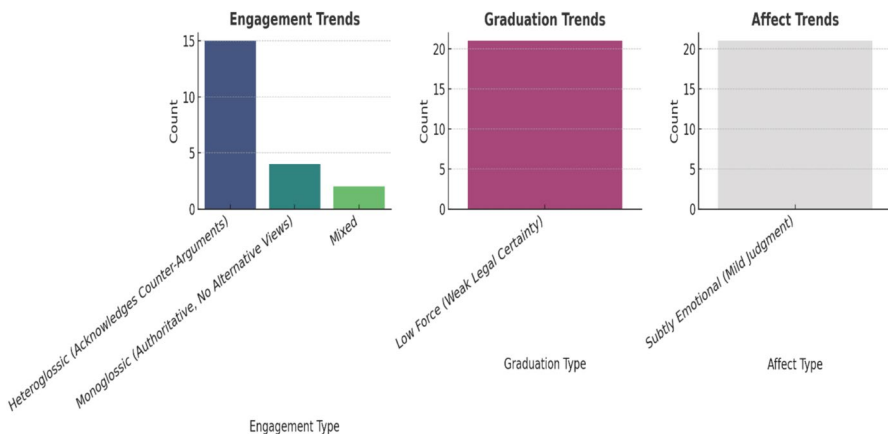


Fig. 4 Correlation between Engagement, Graduation and Affect in the Abortion Rulings

stemming from the contentious nature of the subject matter. Furthermore, even in instances characterized by monoglossic engagement, where a singular, unified judicial voice is apparent, a discernible attenuation of legal force is evident. This finding underscores a prevailing judicial caution, particularly salient in cases concerning abortion. Despite the appearance of unified perspective, courts demonstrate a reluctance to promulgate rulings of substantial legal weight, opting instead for a more restrained approach. Finally, the affective dimension of these judicial pronouncements, assessed through the metric of affect, consistently manifests as subtly emotional. This sustained affective register indicates that, while the subject matter evokes emotional responses, the courts deliberately eschew explicit moralization. This calculated moderation serves to preserve an aura of judicial impartiality, even when addressing issues of profound ethical and societal significance. In essence, the data portrays a judicial branch that, while showing emotional awareness, is also very careful to not over step boundaries of their legal roles.

The judicial strategy employed within the Egyptian abortion rulings reveals a sophisticated marriage between asserting legal authority and maintaining jurisprudential flexibility (See Table 2). Older cases, characterized by a monoglossic engagement, project an image of unwavering legal dominance, though often tempered by expressions of low certainty. This approach, while authoritative, allows for a degree of interpretive ambiguity. Conversely, contemporary rulings demonstrate a marked shift towards heteroglossic engagement, wherein counter-arguments are acknowledged and addressed. This evolution signifies a move away from absolute pronouncements, reflecting a growing judicial inclination to engage with diverse perspectives before ultimately reaffirming existing legal frameworks. Furthermore, the consistent manifestation of low force in graduation across the corpus underscores a deliberate judicial strategy to preserve discretionary latitude. By avoiding rigid legal precedents, the court decisions retain the ability to adapt to the nuanced and context-dependent nature of abortion cases, ensuring future rulings maintain flexibility.

Moreover, the strategic deployment of subtly emotional framing serves to convey the legal gravity of abortion without resorting to overt moral condemnation. This approach allows the judiciary to navigate the complex interplay between legal imperatives and societal sensibilities, framing abortion as a matter of legal complexity rather than moral absolutes. The dominance of heteroglossic engagement within the analyzed rulings suggests a judicial trend towards enhanced legal justification, signalling a shift from the assertion of absolute authority to a more reasoned engagement with alternative viewpoints. Conversely, the presence of monoglossic engagement, particularly in older rulings, underscores the traditional judicial practice of asserting authority without entertaining competing perspectives. The consistent use of low force language indicates a deliberate judicial strategy to maintain flexibility in abortion-related jurisprudence. By avoiding absolute conclusions, the courts preserve the ability to adapt to the evolving socio-legal landscape. Finally, the strategic use of subtly emotional language underscores the judiciary's commitment to framing abortion cases in a legally measured and serious manner, avoiding overly judgmental or emotional pronouncements. This approach allows the courts to reinforce the gravity of abortion-related offenses while maintaining legal objectivity.

Table 2 Overall pattern and legal strategies in the abortion rulings

Appraisal system	Pattern observed	Impact
Engagement	Courts increasing engagement with counter-arguments	Allowing rulings to appear <i>balanced</i> and <i>justified</i> while maintaining legal authority
Graduation	Weakness of legal certainty (low force)	Avoiding rigid legal precedents, giving future rulings <i>interpretive flexibility</i>
Affect	Courts' use of mild emotional framing	Framing abortion as serious without <i>overt moral condemnation</i>

6 Discussion

The analysis of the Egyptian Court of Cassation abortion rulings reveals that while certain discursive trends dominate, such as the use of doctrinal modification and the marginalization of religious or international legal discourse, individual rulings often diverge in their legal reasoning and rhetorical stance. These divergences are not peripheral anomalies but integral to how authority, legitimacy, and legal interpretation are negotiated within the judicial apparatus. Although precedent plays a central symbolic and doctrinal role, the dataset reflects a continuum of reasoning styles. In some rulings, the court explicitly affirms earlier decisions, adopting a monoglossic stance that forecloses alternative interpretations. For instance:

حيث إن ما ينهيه الطاعن لا يعدو أن يكون جدلاً موضوعياً لا تجوز إثارته أمام محكمة النقض، وأن "الحكم المطعون فيه قد التزم صحيح القانون."

"What the appellant is alleging amounts to no more than a substantive argument that may not be raised before the Court of Cassation, and the contested judgment adheres to correct legal principles." (*Cassation Ruling 14,196*).

This decision reaffirms a prior interpretation of abortion as a criminal act under Article 260 of the Penal Code. It invokes the authority of *stare decisis*, presenting legal precedent as an unquestionable source of authority. The language is unequivocal, reflecting a rhetorical strategy that privileges stability over deliberation.

In contrast, other rulings reveal a more dynamic application of legal principles. For example:

"...وكان يبين من الإطلاع على تقرير الصفة التشريحية أن الوفاة لم تكن نتيجة مباشرة لفعل الإسقاط" "It appears from reviewing the autopsy report that the death was not a direct result of the abortion..." (*Cassation Ruling 6716*).

Here, the court modifies previous interpretations by introducing a nuanced reading of causality. Although an abortion occurred, the ruling reframes the act as not directly causing death, which softens the criminal charge. The use of forensic evidence is critical: it not only challenges earlier precedent but introduces a new semiotic order (*medical semiotics*) through which culpability is assessed. This shift from moral to scientific framing allows the court to reinterpret existing legal boundaries without openly contradicting precedent.

Equally significant is the conspicuous omission of religious justification in multiple rulings. Even when addressing morally charged topics like abortion, several decisions make no reference to Quranic verses or Al-Azhar fatwas. This silence is not neutral; it marks a jurisprudential shift. The court appears to deliberately exclude religious authority from its reasoning, signaling a strategic secularization of legal discourse. The absence of religious discourse operates symbolically, privileging codified state law over theological opinion in adjudicating reproductive matters.

In a parallel vein, from a semiotic lens, legal precedents function as symbols of authority. The citations of Article 260 or invocations of "the Court of Cassation" serve not only as legal references but also as symbolic affirmations of institutional continuity and legitimacy. Moreover, medical evidence acts as visual-semiotic anchors. The increasing reliance on forensic reports enables courts to shift the

narrative from religious morality to medically grounded legal culpability, reframing abortion as a matter of empirical causation rather than sin or transgression. Finally, the notable religious silence becomes a symbolic act. The systematic exclusion of religious language and references underscores the judiciary's intent to assert the primacy of state-sanctioned legal rationality over religious doctrine in regulating reproductive behavior.

By way of conclusion, while the Egyptian Court of Cassation nominally adheres to *stare decisis*, our findings illustrate that this adherence is more rhetorical than rigid. Courts rarely contradict prior rulings outright; instead, they engage in graduated modifications—reinterpreting legal boundaries through procedural nuances or new evidentiary forms. This reflects a hybrid jurisprudential model: one that is discursively stable yet doctrinally dynamic. The symbolic invocation of precedent is maintained, but its application is frequently recalibrated in light of shifting institutional, scientific, or ideological pressures.

7 Conclusion

The paper offers a computational and discursive analysis of Egyptian Court of Cassation abortion rulings, revealing not only dominant patterns but also meaningful variations in legal reasoning, evidentiary framing, and symbolic authority. While the doctrine of *stare decisis* ostensibly anchors judicial consistency, the rulings display a hybrid legal strategy that blends rhetorical affirmation with selective doctrinal modification. Courts often reaffirm precedent, but they also recalibrate legal boundaries by introducing new evidence (particularly medical reports) that function as semiotic instruments for reinterpreting causality and culpability. Crucially, the analysis demonstrates a marked shift away from religious justification in abortion adjudication. The systematic omission of Quranic verses or Al-Azhar fatwas, even in morally charged cases, constitutes a symbolic act of secularization. In its place, the court elevates codified law and forensic expertise as primary sources of legal legitimacy. This transformation reflects broader state strategies to centralize legal authority and insulate judicial practice from religious contestation in matters of reproductive governance. By incorporating a semiotic lens, the study advances our understanding of how legal, medical, and religious discourses are differentially mobilized or suppressed to shape judicial meaning-making. Legal citations, forensic evidence, and rhetorical silences are not merely functional devices, they are signifiers through which the judiciary performs authority, negotiates moral ambiguity, and constructs its institutional identity. These findings contribute to critical legal scholarship by highlighting how abortion law in Egypt is not simply a reflection of static doctrine, but a dynamic site of discursive and symbolic negotiation, where state law, scientific rationality, and religious authority intersect, compete, or are strategically muted. Future advocacy and legal reform efforts may leverage the interpretive flexibility uncovered in this study to contest punitive norms and reimagine reproductive rights within the evolving symbolic economy of Egyptian jurisprudence.

The interpretive nature of intertextual analysis further introduces an element of subjectivity, particularly in distinguishing strategic modification from tacit affirmation or reinterpretation of precedent. Although triangulation with citation network analysis strengthens the validity of these findings, future research would benefit from closer ethnographic or qualitative analyses that can capture the deliberative processes underlying judicial authorship, processes that remain largely opaque when accessed solely through final written judgments. Additionally, the exclusion of lower court rulings limits the scope of generalizability. Trial courts, operating at the interface of law and lived social realities, may exhibit greater variation in engagement with religious or international frameworks, and their inclusion could reveal a more pluralistic—or contested—legal discourse on abortion. Expanding future studies across hierarchical judicial levels and incorporating comparative datasets from other hybrid legal systems would allow for a more layered understanding of how authority is constructed and contested across different sites of legal practice. In sum, this study demonstrates how the Egyptian Court of Cassation calibrates its legal voice to navigate tensions between statutory sovereignty, religious norms, and international pressures. By integrating computational methods with critical discourse analysis, it advances Arabic legal NLP and illuminates broader dynamics of judicial authority construction in pluralistic legal landscapes. Yet it also underscores the necessity of methodological reflexivity: computational techniques must be deployed in dialogue with critical hermeneutics, particularly in legally, linguistically, and culturally dense domains such as Arabic judicial discourse. Understanding legal authority thus demands both scale and sensitivity, both algorithmic breadth and interpretive depth—a methodological tension that future research must continue to negotiate.

These findings carry significant theoretical and practical implications. First, Judicial authority in Egyptian abortion rulings is not monolithic. It is performatively constructed through rhetorical stance, evidentiary selection, and symbolic silences. This reveals a judiciary attuned to both preserving institutional legitimacy and adapting to evolving state ideologies. Second, the omission of religious justification does not merely reflect legal formalism, it constitutes a discursive act that signals the state's intent to regulate reproduction through secular law. This has profound implications for how the judiciary negotiates the boundaries between religious authority and state sovereignty. Third, the court's strategic flexibility, particularly its use of medical semiotics to reinterpret causality, creates openings for future legal challenges to punitive abortion laws. Advocacy efforts could build on this interpretive malleability to promote more rights-based and harm-reductive approaches. Fourth, methodologically, this study illustrates how semiotic resources (legal citations, forensic visuals, rhetorical omissions) operate as more than technical tools—they are meaning-making devices that structure how law is performed and legitimized. This adds to emerging work on the symbolic dimensions of judicial discourse, especially in contexts of contested moral governance.

Building on these findings and ramifications, future research should expand the analytical lens both vertically and horizontally. Vertically, integrating lower court rulings and trial-level decisions could expose whether the rhetorical strategies identified at the appellate level are replicated, contested, or adapted within more localized, socially embedded judicial practices. Horizontally, comparative inquiries

across hybrid legal systems (such as Tunisia, Turkey, or Saudi Arabia) could elucidate how courts differently negotiate tensions between statutory law, religious authority, and international norms. Methodologically, combining computational text analysis with ethnographic fieldwork and judicial interviews would enable a deeper apprehension of the lived practices underlying legal discourse. As Arabic-specific NLP tools continue to evolve, particularly in deep semantic parsing and pragmatic inference, researchers are poised to capture the subtler textures of Arabic judicial rhetoric more effectively. Yet beyond disciplinary refinement, future work must critically interrogate how judicial authority itself is transforming in an increasingly algorithmic age. As courts experiment with digitization, AI-driven decision support, and online adjudication, the very modalities through which authority is performed, negotiated, and perceived are likely to shift. Understanding how computational infrastructures intersect with rhetorical and doctrinal traditions will be vital not only for legal scholarship, but for safeguarding the integrity of legal interpretation in pluralistic and technologically mediated societies.

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