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titleAssessing the Relationship Between Auditor Professional Skepticism and
Detection of Fraudulent Activities
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authorChase Harper, Gage Simmons, Natalie Banks
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sectionIntroduction
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The critical role of professional skepticism in auditing has been extensively acknowledged in both academic literature and professional standards, yet the precise nature of its relationship with fraud detection effectiveness remains inadequately understood. Traditional research approaches have predominantly relied on self-reported survey data and experimental simulations that capture only limited dimensions of this complex psychological construct. This study introduces an innovative computational framework that transcends these methodological limitations by employing machine learning techniques to analyze the multi-faceted nature of professional skepticism and its impact on fraud detection performance.

Professional skepticism represents a cornerstone of audit quality, embodying the auditor's questioning mind and critical assessment of audit evidence. Regulatory bodies and standard setters consistently emphasize its importance, particularly in the context of fraud detection where cognitive biases and time pressures can compromise judgment quality. However, the auditing profession faces persistent challenges in effectively cultivating and measuring appropriate levels of skepticism, as evidenced by continuing audit failures and regulatory criticisms.

Our research addresses several fundamental gaps in the existing literature. First, we move beyond the simplistic treatment of skepticism as a unidimensional construct by developing a comprehensive measurement framework that captures its cognitive, behavioral, and affective components. Second, we employ computational methods that enable the analysis of complex, non-linear relationships that traditional statistical approaches may overlook. Third, we investigate how different manifestations of skepticism influence various types of fraud detection, recognizing that skepticism may operate differently depending on the nature of the fraudulent activity.

The primary research questions guiding this investigation are: How can professional skepticism be quantitatively measured using computational methods? What is the nature of the relationship between skepticism levels and fraud detection effectiveness? Do different types of professional skepticism exhibit distinct patterns in fraud detection performance? How do contextual factors moderate the skepticism-fraud detection relationship?

This study makes several original contributions to auditing research. Methodologically, we pioneer the application of machine learning techniques to analyze auditor judgment processes in fraud detection contexts. Theoretically, we develop a typology of professional skepticism that explains variations in audit effectiveness. Practically, our findings inform the design of training programs and quality control systems that can enhance audit quality through optimized skepticism deployment.

sectionMethodology

subsectionResearch Design and Data Collection

Our research employed a mixed-methods approach combining quantitative performance measurement with qualitative process analysis. We developed a novel audit simulation platform that presented participants with complex, multi-period financial statements embedded with various types of fraudulent activities. The simulation incorporated realistic audit evidence, including documents, confirmations, analytical procedures, and management representations.

Data collection involved 247 practicing auditors from three international accounting firms, representing diverse experience levels from staff auditors to partners. Participants completed the audit simulation during normal working hours, with their interactions comprehensively logged by our custom-developed software. The simulation captured both outcome measures (fraud detection accuracy) and process measures (time spent, evidence examined, questions asked, hypotheses generated).

In addition to the simulation data, we collected multiple measures of professional skepticism through: (1) a refined version of the Hurtt Professional Skepticism Scale, (2) natural language processing of participants' audit documentation and inquiry responses, (3) behavioral coding of their evidence evaluation patterns, and (4) psychometric assessments of cognitive styles and decision-making approaches.

subsectionComputational Framework Development

We developed a multi-layered computational framework to analyze the relationship between professional skepticism and fraud detection. The framework comprised three main components: a skepticism quantification engine, a fraud detection performance analyzer, and a relationship modeling module.

The skepticism quantification engine employed natural language processing techniques to extract linguistic features from audit documentation, including tentativeness markers, certainty expressions, questioning frequency, and hypothesis diversity. We trained a recurrent neural network to classify skepticism levels based on these linguistic patterns, validated against expert ratings of audit workpapers.

Behavioral pattern analysis involved clustering algorithms to identify distinct skepticism archetypes based on evidence examination patterns, hypothesis generation frequency, confirmation bias tendencies, and alternative consideration behaviors. We used k-means clustering with silhouette analysis to determine the optimal number of skepticism archetypes.

The fraud detection performance analyzer employed precision-recall metrics adapted for the audit context, accounting for both correct fraud identifications and false positives. We developed weighted detection scores that reflected the materiality and sophistication of different fraud types, recognizing that detecting a complex earnings management scheme represents a different level of audit effectiveness than identifying a basic embezzlement.

subsectionRelationship Modeling Approach

To model the relationship between professional skepticism and fraud detection, we employed several machine learning techniques. We used random forest regression to identify non-linear patterns and interaction effects, gradient boosting machines to handle the complex feature interactions, and neural networks to capture deep relationships in the data.

Our modeling approach incorporated moderation analysis to examine how contextual factors influenced the skepticism-fraud detection relationship. These factors included time pressure, client cooperation level, engagement complexity, and auditor experience. We used hierarchical regression with interaction terms and machine learning interpretation techniques to understand these moderating effects.

We validated our models through k-fold cross-validation and out-of-sample testing, ensuring that our findings were robust and generalizable. Model interpretation techniques, including SHAP values and partial dependence plots, helped us understand the drivers of the relationships we identified.

sectionResults

subsectionSkepticism Measurement and Archetypes

Our computational framework successfully quantified professional skepticism across multiple dimensions, revealing four distinct skepticism archetypes among practicing auditors. The analytical skeptics demonstrated systematic evidence

evaluation, extensive hypothesis testing, and methodical documentation patterns. The intuitive skeptics relied more on pattern recognition, experience-based judgments, and holistic assessment approaches. The procedural skeptics emphasized compliance with auditing standards, checklist completion, and formal inquiry processes. The contextual skeptics adapted their skepticism levels based on client-specific risk factors, industry considerations, and engagement circumstances.

These archetypes exhibited significantly different behavioral patterns in the audit simulation. Analytical skeptics spent the most time on evidence examination but generated the highest quality audit documentation. Intuitive skeptics achieved similar detection rates with less time investment but showed higher variance in performance. Procedural skeptics demonstrated consistent but sometimes superficial engagement with evidence, while contextual skeptics showed the most adaptive approach to different fraud types.

subsectionSkepticism-Fraud Detection Relationship

Contrary to conventional wisdom, we found a non-linear relationship between professional skepticism and fraud detection effectiveness. The relationship followed an inverted U-shape pattern, with optimal fraud detection occurring at moderate skepticism levels rather than at the extremes. Auditors with very low skepticism scores missed subtle fraud indicators due to insufficient questioning of management representations. However, auditors with extremely high skepticism scores also showed diminished performance due to excessive time spent on low-risk areas and difficulty distinguishing between legitimate business variations and fraudulent activities.

The optimal skepticism level varied by fraud type. For complex financial statement fraud involving earnings management, higher skepticism levels correlated with better detection up to a point, after which returns diminished. For asset misappropriation schemes, moderate skepticism achieved the best balance between detection and efficiency. For corruption-related frauds, contextual skepticism rather than uniform high skepticism proved most effective.

subsectionArchetype Performance Patterns

The four skepticism archetypes demonstrated distinct fraud detection patterns across different fraud types. Analytical skeptics excelled at detecting complex financial statement fraud that required detailed evidence examination and hypothesis testing. Intuitive skeptics performed best on frauds involving behavioral red flags and pattern anomalies that might escape systematic analysis. Procedural skeptics showed consistent performance across fraud types but rarely identified sophisticated schemes that deviated from expected patterns. Contextual skeptics adapted most effectively to novel fraud schemes and changing risk conditions.

Experience moderated these relationships, with senior auditors showing more nuanced application of skepticism regardless of archetype. However, the fundamental cognitive patterns associated with each archetype remained relatively stable across experience levels, suggesting that skepticism manifestations represent deep-seated cognitive styles rather than merely learned behaviors.

subsectionContextual Moderators

Several contextual factors significantly moderated the skepticism-fraud detection relationship. Time pressure diminished the effectiveness of analytical skepticism while having less impact on intuitive approaches. Client cooperation level influenced procedural skepticism effectiveness, with uncooperative clients triggering more appropriate skepticism application. Engagement complexity benefited analytical and contextual skeptics while challenging procedural approaches. These moderating effects highlight the importance of matching skepticism approaches to engagement circumstances.

sectionConclusion

This research makes several important contributions to our understanding of professional skepticism and its relationship with fraud detection. Methodologically, we demonstrated the value of computational approaches in studying complex auditing phenomena, moving beyond the limitations of traditional research methods. Our multi-dimensional measurement framework provides a more nuanced understanding of professional skepticism than previous unidimensional approaches.

Theoretically, our identification of four skepticism archetypes offers a new lens for understanding variations in audit quality. The non-linear relationship we discovered between skepticism and fraud detection challenges the simplistic "more skepticism is better" assumption prevalent in both academic literature and professional guidance. Instead, our findings suggest that audit effectiveness depends on deploying the right type and level of skepticism for specific engagement circumstances.

Practically, our results have significant implications for audit training, quality control, and professional standards. Audit firms could benefit from assessing auditors' natural skepticism archetypes and providing targeted development in complementary approaches. Quality control systems could be designed to encourage appropriate skepticism levels rather than uniformly high skepticism. Professional standards might emphasize the contextual application of skepticism rather than treating it as a generic requirement.

Several limitations warrant consideration. Our simulation, while comprehensive, cannot fully replicate the pressures and complexities of actual audit engagements. The participant sample, though diverse, came primarily from large international firms, potentially limiting generalizability to smaller practice set-

tings. Future research could extend our computational framework to longitudinal studies tracking how skepticism develops throughout auditors' careers and how it adapts to different organizational cultures.

In conclusion, this research reframes professional skepticism as a multi-dimensional, context-dependent construct that requires careful calibration rather than maximal application. By understanding the different ways skepticism manifests and the conditions under which each approach proves most effective, the auditing profession can enhance fraud detection while maintaining audit efficiency. Our computational methodology opens new avenues for researching complex judgment processes in auditing and other professional domains.

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