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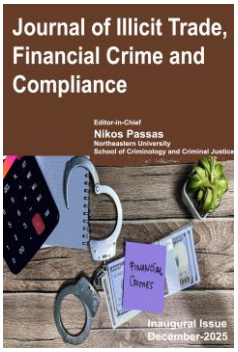

Does Creativity Affect Fraud Assessment and judgment? An Experimental Analysis

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ABSTRACT

This study examines how creative potential and loss aversion influence fraud risk assessments under uncertainty and outcome feedback. Because audit evidence is persuasive rather than conclusive, fraud detection inherently involves ambiguity, judgment, and professional skepticism. We argue that individual differences in creative potential may influence how auditors interpret uncertain information and maintain alternative fraud hypotheses, while loss aversion may shape fraud judgments through competing concerns about audit failure and false fraud allegations. Using a controlled experiment that systematically varies outcome probabilities in a Rock-Paper-Scissors task, we compare the judgments of 61 experienced auditors with those of more than 200 non-professional investors. The results show that realized outcomes are the primary determinant of fraud risk assessments, indicating that judgments are mainly evidence-driven. Among auditors, higher creative potential is associated with higher fraud risk assessments, whereas no comparable relationship is observed among non-professional investors. However, we find no evidence that creative potential moderates the integration of outcome information into fraud judgments. Loss aversion exhibits statistically significant but comparatively small effects across the analyses. Overall, the findings suggest that creativity functions as an individual-level cognitive resource that supports the interpretation of ambiguous information, while observable evidence ultimately dominates fraud risk judgments as more diagnostic information becomes available.

JEL Classification: M40, M42, M48.

Introduction

Fraud risk assessment represents one of the most challenging forms of professional judgment in auditing. Auditors are required to evaluate whether financial statements are free from material misstatement, whether due to fraud or error (ISA 200.11), such assurance is inherently limited (ISA 200.5). Audit evidence is persuasive rather than conclusive, and residual uncertainty cannot be fully eliminated (ISA 200.A47). Consequently, auditing standards, such as the International Auditing and Assurance Standards Board's International Standards on Auditing (ISAs)[1], emphasize the importance of professional skepticism, requiring auditors to maintain a questioning mindset and critically evaluate evidence that may indicate intentional misstatement (ISA 200.13(i); ISA 240) [1–3].[2] However, despite extensive guidance regarding audit procedures and documentation requirements, professional skepticism ultimately depends on individual judgment. Auditors must interpret ambiguous signals, evaluate competing explanations, and decide whether unusual patterns represent random variation, operational difficulties, reporting errors, or potential fraud.

This inherent uncertainty creates substantial variation in fraud risk assessments. Prior auditing research has primarily examined situational factors influencing auditor judgments, including fraud cues, management incentives, internal control weaknesses, and task characteristics [4, 5] Although this research has significantly advanced our understanding of professional skepticism, comparatively less attention has been devoted to explaining why individual auditors respond differently to identical information. Understanding these individual differences is particularly important because fraud detection frequently involves situations in which evidence is incomplete and multiple interpretations remain plausible.

One cognitive characteristic that may influence how auditors interpret ambiguous evidence is creativity. Creativity is commonly defined as the ability to generate ideas that are both novel and useful [6, 7]. In contrast to its common association with artistic or entrepreneurial activities, creativity in professional contexts reflects cognitive flexibility: the ability to consider alternative explanations, integrate diverse information sources, and adapt interpretations when new evidence emerges [8]. These characteristics closely correspond to the demands of fraud risk assessment. When auditors encounter unexpected financial patterns, effective judgment requires moving beyond predetermined explanations and procedures and considering whether observed outcomes may reflect intentional manipulation [9, 10].

Despite this conceptual connection, creativity remains relatively unexplored in auditing research. Existing literature has primarily focused on creativity in relation to audit brainstorming and fraud brainstorming effectiveness [11], while less is known about whether individual creative potential systematically influences fraud risk judgments. This gap is important because creativity may represent a double-edged cognitive resource. On the one hand, creative auditors may be better able to identify unusual relationships and generate alternative fraud explanations [12]. On the other hand, creativity may also facilitate the construction of compelling but inaccurate narratives, potentially leading auditors to overinterpret ambiguous evidence [13]. Therefore, creativity may not necessarily increase fraud suspicion but may instead influence how auditors process and integrate uncertain information.

In addition to cognitive flexibility, fraud risk judgments may also depend on individuals' motivational orientations toward potential losses. Prospect theory suggests that individuals generally assign greater weight to potential losses than equivalent gains [14]. Within auditing, loss aversion may influence how individuals evaluate potential fraud consequences. Concern about litigation, reputational damage, or audit failure may increase sensitivity toward fraud indicators, whereas concerns about damaging client relationships or making incorrect accusations may encourage

[1]In Germany, these standards are adopted and translated verbatim by the Institute of Public Auditors (IDW), including national particularities marked as ISA [DE].
[2]Similar responsibility exists in the United States, where the American Institute of Certified Public Accountants (AICPA) provides guidelines for auditors conducting audits for non-issuers, which refer to private (nonpublic) companies. Conversely, issuers are obligated to file or register their financial statements with the Securities and Exchange Commission (SEC). For audit engagements of issuers, adherence to standards set by the Public Company Accounting Oversight Board (PCAOB) is mandatory. The PCAOB has adopted and augmented the AICPA's auditing standards, restructuring them into a unified numbering system. Section 240 AICPA addresses the auditor's responsibilities relating to fraud in an audit of financial statements. Specifically, it expands on how sections 315A AICPA and 330 AICPA are to be applied regarding risks of material misstatement due to fraud.

more conservative judgments. However, the extent to which loss aversion affects fraud risk assessment may depend on professional experience and institutional context, as auditors operate within a framework of accountability and professional responsibility.

This study investigates how creativity and loss aversion influence fraud risk assessments under uncertainty and following outcome feedback. Using a controlled experimental design that varies outcome probabilities while maintaining a consistent decision environment, we examine how individuals form and revise fraud risk judgments when confronted with uncertain performance information. Importantly, we compare experienced auditors with non-professional participants to examine whether professional expertise influences the relationship between individual characteristics and fraud-related judgments.

Our study contributes to the auditing and behavioral decision-making literature in three ways. First, we extend research on professional skepticism by introducing creativity as an individual-level cognitive characteristic that may influence fraud risk assessment under uncertainty. Whereas prior research has primarily emphasized skepticism as a professional attitude or behavioral tendency, we demonstrate that cognitive flexibility may influence how individuals interpret ambiguous evidence and generate alternative explanations.

Second, we contribute to research on fraud judgment by adopting a dynamic perspective. Rather than examining fraud risk assessments as static responses to individual cues, we investigate how judgments evolve as individuals receive additional outcome information. This approach provides insights into whether creativity influences initial interpretations of uncertainty, subsequent updating processes, or both.

Third, we examine whether behavioral tendencies operate differently across professional contexts. Specifically, we show that loss aversion is not uniformly associated with fraud risk judgments but depends on the decision environment and the characteristics of the decision maker. These findings highlight the importance of considering both individual dispositions and professional context when studying audit judgment.

Overall, this study advances understanding of the cognitive and behavioral foundations of fraud risk assessment. By integrating creativity research with behavioral decision theory, we demonstrate that effective fraud detection depends not only on the presence of fraud indicators but also on how individuals interpret and respond to uncertain information.

Beyond its theoretical contributions, this study is relevant to multiple stakeholders involved in audit practice and oversight. For audit firms, understanding how individual cognitive characteristics influence fraud risk judgments can inform the composition of audit teams, the design of professional development programs, and the identification of situations in which additional review or consultation may be warranted. For standard setters and regulators, our findings highlight that professional skepticism is not only a procedural requirement but also a judgment process shaped by individual differences among auditors. Finally, for researchers in auditing and behavioral decision-making, this study provides insights into how cognitive flexibility and behavioral tendencies jointly influence professional judgments under uncertainty.

The remainder of the paper proceeds as follows. Section 2 reviews prior literature on creativity, professional judgment, and behavioral decision-making and develops our hypotheses. Section 3 describes the experimental design and methodology. Section 4 presents the results, and Section 5 discusses the implications. Section 6 summarizes the main findings, limitations, and avenues for future research.

Prior Research and Hypotheses Development

Creativity and Flexible Information Processing in Judgment and Decision Making

Creativity has been extensively studied in psychology since Guilford's [15] pioneering work, yet researchers continue to struggle with its precise definition.[3] Although often treated as an intuitive construct, creativity is widely

[3]An analysis of 90 peer-reviewed articles published from 1996 to 2002 reveal that only 38% of authors explicitly define creativity (16).

recognized as a critical human capacity for solving complex problems and generating novel and valuable ideas [7, 16, 17]. This capacity involves two complementary cognitive processes: divergent thinking, which enables individuals to generate multiple possible interpretations or solutions, and convergent thinking, which allows individuals to evaluate and select among competing alternatives [15, 18]. Thus, creativity does not merely involve producing unusual ideas but also requires the ability to restructure information, identify relationships among seemingly unrelated elements, and develop meaningful explanations from incomplete information.

These characteristics make creativity particularly relevant for judgment and decision-making contexts characterized by ambiguity and uncertainty. Creative individuals tend to demonstrate greater cognitive flexibility, openness to alternative perspectives, and tolerance for incomplete information [19–22]. Rather than prematurely committing to an initial interpretation, creative individuals are more likely to explore multiple explanations and revise their judgments when additional information becomes available [23, 24]. Accordingly, creativity represents not only an ability to generate novel ideas but also a cognitive orientation toward flexible information processing. Importantly, however, cognitive flexibility represents a potential cognitive process through which creative potential may influence judgment. Furthermore, creative potential is not solely a fixed trait; it can be nurtured through supportive environments and tasks that encourage flexible thinking [25, 26].

Creativity can be assessed using different approaches, including performance-based measures and personality-based instruments. Performance-based measures evaluate creative output through structured tasks, whereas personality-based measures capture characteristics associated with creative potential, such as curiosity, openness, and unconventional thinking [18]. One widely applied personality-based measure is the Creative Personality Scale (CPS), originally developed by Gough [27] for the Adjective Check List [28]. The CPS identifies self-reported personality characteristics associated with creative potential rather than directly measuring creative performance or task-specific cognitive flexibility.

Creativity in the Auditing Context

Auditing represents a professional environment in which flexible information processing may be particularly valuable. Although auditing is traditionally characterized by standardized procedures, documentation requirements, and compliance with professional standards [10], auditors frequently encounter situations in which available evidence is incomplete and multiple interpretations remain possible. This is especially true in fraud risk assessment, where auditors must evaluate whether unusual financial patterns represent random fluctuations, operational problems, accounting errors, or intentional misstatements.

Professional skepticism requires auditors to maintain a questioning mindset and critically evaluate audit evidence rather than relying solely on management explanations or routine expectations (ISA [DE] 200.13(l), .15). However, effective skepticism extends beyond procedural compliance. When standard audit procedures do not provide clear answers, auditors must engage in problem finding and hypothesis generation, processes closely related to creativity research [29, 30]. Identifying unusual relationships, recognizing inconsistencies, and considering alternative explanations are central components of both creative cognition and fraud risk assessment.

This perspective challenges the assumption that creativity is inconsistent with auditing's structured nature. Rather, creativity may complement audit procedures by enabling auditors to adapt standardized approaches to complex and non-routine situations. For example, auditors frequently rely on established approaches such as the "same as last year" (SALY) approach, which may reduce cognitive effort but can also limit attention toward emerging risks [31–33]. A greater propensity to consider alternative perspectives may help auditors move beyond routine expectations when evaluating unusual or ambiguous information.

Prior auditing research provides initial evidence that creative processes can enhance fraud-related judgments. Brainstorming approaches that encourage the generation of multiple fraud hypotheses improve auditors' ability to identify potential fraud risks and design responsive audit procedures [11, 34, 35]. Similarly, innovation-oriented audit environments appear to facilitate more adaptive responses to complex and evolving audit situations [36, 37]. However, existing research has primarily focused on creativity at the task or team level, leaving open the question of whether individual creative potential systematically influences auditors' fraud risk assessments.

Loss Aversion and Fraud Risk Assessment

Fraud risk assessments are shaped not only by cognitive processing but also by individuals' motivational orientations toward potential consequences. Prospect theory suggests that individuals generally evaluate losses more strongly than equivalent gains [14]. In auditing contexts, loss aversion may influence how auditors respond to potential fraud indicators because audit failures can result in substantial professional consequences, including litigation risk, reputational damage, and regulatory scrutiny.

On the one hand, heightened sensitivity to potential losses may increase auditors' attention toward fraud risks and encourage more conservative judgments. Prior research suggests that risk-averse auditors may demonstrate greater diligence and fraud detection ability because they are more motivated to avoid audit failure [38, 39]. On the other hand, excessive loss aversion may discourage auditors from deviating from established procedures or pursuing unconventional explanations, because doing so may entail additional audit procedures, escalation to supervisors or clients, and potential professional or reputational consequences if the resulting judgment proves incorrect [33, 40, 41]. Consequently, similar to creativity, loss aversion is unlikely to have a simple directional relationship with fraud risk assessment. Instead, its influence may depend on the professional context and the way individuals interpret uncertainty and potential consequences.

Hypotheses Development

Although prior research demonstrates that creative approaches can enhance fraud-related audit procedures, less is known about whether individual differences in creative potential influence auditors' fraud risk assessments [11, 34, 35]. Individuals with higher creative potential may be more inclined to consider multiple explanations, restructure available information, and remain open to alternative interpretations when confronted with uncertainty [6, 15]. In auditing, this tendency may be relevant when analytical procedures reveal deviations between unaudited financial information and the auditor's expectations, requiring the auditor to develop and evaluate alternative explanatory hypotheses. Accordingly, auditors with higher creative potential may be more inclined to consider a broader set of both fraud and non-fraud explanations rather than immediately attributing an unusual observation to a single cause.

Importantly, creative potential does not necessarily imply greater suspicion or a general tendency to assess fraud risk more highly. Rather, considering a broader set of plausible explanations may reduce the likelihood that auditors prematurely dismiss a fraud hypothesis when evidence is ambiguous. Considering both fraud and non-fraud explanations could, in principle, also lead to more accurate or better-calibrated judgments. However, professional skepticism requires auditors to maintain a questioning mindset and appropriately consider the possibility of fraud when evaluating ambiguous evidence. In this context, a broader consideration of competing hypotheses may result in somewhat higher fraud risk assessments under conditions of uncertainty. Accordingly, we expect auditors with higher creative potential to report slightly higher fraud risk assessments under conditions of uncertainty.

H1: Auditors' creative potential is positively associated with fraud risk assessments under uncertainty.

Although prior research provides evidence that risk preferences influence audit-related judgments, less is known about whether individual differences in loss aversion translate into systematic differences in fraud risk assessments. From a prospect-theoretic perspective, loss-averse auditors may place greater weight on potential losses associated with audit failure and therefore perceive uncertain fraud-related situations as more consequential. At the same time, greater sensitivity to losses may make auditors more reluctant to increase their fraud risk assessments when doing so could entail additional audit procedures, escalation to supervisors or clients, or professional and reputational consequences if suspicions are not substantiated [33, 38, 39, 41]. Thus, loss aversion may influence fraud risk assessments, although the direction of this relationship remains theoretically ambiguous. Accordingly, we hypothesize that auditors with different levels of loss aversion exhibit systematic differences in fraud risk assessments.

H2: Auditors' loss aversion is systematically associated with differences in fraud risk assessments.

Fraud risk judgments, however, are not static. Rather, they evolve as auditors receive additional information over

the course of an engagement. During initial task execution, judgments are formed under uncertainty and rely heavily on interpretive processing and expectations [42]. Once outcome feedback becomes available ambiguity is reduced and judgments become more strongly anchored in audit outcome information. Prior behavioral decision research suggests that realized outcomes exert disproportionate influence on evaluations under uncertainty [43, 44]. Accordingly, fraud risk judgments should depend more strongly on realized performance after outcome feedback than during ongoing task execution.

H3: Fraud risk assessments are more strongly influenced by realized outcomes after outcome feedback than during ongoing task execution.

Although outcome feedback reduces uncertainty, auditors must still interpret whether realized outcomes reflect randomness, operational conditions, or intentional manipulation. This interpretive step requires the generation of alternative causal explanations. Creative potential may facilitate such cognitive reframing by enabling flexible reinterpretation and the integration or generation of alternative explanations [6, 15]. This ability is particularly relevant for auditors, whose domain expertise enables more sophisticated contextualization of outcome information [45, 46]. In contrast, less cognitively flexible individuals may rely more directly on outcome information without extensive reinterpretation. Accordingly, creative potential is expected to moderate how realized outcomes are integrated into fraud risk judgments after outcome feedback.

H4: Creative potential moderates the relationship between realized outcomes and fraud risk assessments, such that outcome information is integrated differently across levels of creative potential, particularly among auditors.

Experimental Design

To test our hypotheses, we employed a within-subject design, with one measured independent variable (creative potential) and one manipulated variable (GROUP). GROUP was manipulated at three levels by varying participants' win probabilities in a Rock-Paper-Scissors (RPS) game. Specifically, participants' win probabilities were set to 33% (normal), 25% (manipulated) and 17% (strongly manipulated) per round. Importantly, GROUP captures the ex-ante probability structure assigned to each condition, while IV_Wins captures the ex-post outcomes realized by participants during the task. This distinction is important because participants may experience different numbers of wins within the same probability condition.

The RPS task is designed as an abstract cognitive paradigm, not as a direct simulation of a professional audit. Its purpose is to isolate a basic inferential process relevant to fraud risk assessment: interpreting observed outcomes that deviate from an expected probability structure under uncertainty. Participants form expectations about the outcome distribution and assess whether realized outcomes are consistent with this expected process or suggest an alternative explanation, such as manipulation. In auditing, unexpected deviations in evidence or performance indicators may similarly prompt auditors to consider alternative explanations and reassess available evidence. Such deviations, however, do not constitute evidence of fraud by themselves.

The RPS paradigm operationalizes this process in a controlled setting. The assigned win probability establishes an expected outcome structure, while realized outcomes provide information for assessing whether the observed pattern reflects fair play or manipulation. Importantly, a low win rate does not represent fraud, nor does a loss correspond to a financial misstatement. Therefore, the focus is not on competitive success per se, but on interpreting deviations from expected outcomes and considering alternative explanations.

This abstraction allows us to examine whether individual differences in creative potential are associated with the interpretation of ambiguous and increasingly adverse outcome information while holding task structure constant and removing domain-specific accounting knowledge and audit complexity. Thus, the RPS task captures a specific cognitive component that may contribute to fraud risk assessment rather than reproducing the full complexity of professional audit judgment.

To ensure comprehension and proper functioning of the manipulations, we conducted pretests with over 100 undergraduate students. Based on their feedback, we revised the task descriptions and questions for brevity and clarity. The pretest results also confirmed that the three game versions produced distinct outcomes overall. All experimental materials were developed and administered in German. The study protocol received approval from the institutional review board of the authors' university.

Participants

In May 2025, we distributed 2,093 email invitations to auditors and audit firms across Germany, targeting various professional groups[4]. Participants were invited to complete an online experiment. Within six weeks, due to vacation time, we obtained 61 responses (a 2.91% response rate)[5] from auditors. On average, participants spent approximately 10 minutes completing the experiment.

To supplement the professional sample, we also recruited at least 200 non-professional investors via the online research platform Prolific, which is widely used for academic data collection. Prior research indicates that Prolific yields participant quality comparable to or higher than other platforms (47, 48). We restricted our sample to participants who have already invested in shares and residing in Germany to ensure a consistent cultural and economic context. The inclusion of non-professional investors further enables us to assess whether the observed judgment patterns are specific to professional auditors or reflect broader cognitive processes that also emerge in financially experienced non-experts.

Participants recruited over prolific were compensated with 1.75 Great Britain Pounds (GBP) for completing the study, with the possibility of earning an additional bonus of up to 0.30 GBP (0.10 GBP per Rock-Paper-Scissors game) if they won five or more rounds in any game. This incentive was disclosed in advance to promote competitive engagement. [6] Data collection via Prolific occurred in spring 2025.

Task and Procedure

At the beginning, participants were informed about adherence to the German Research Foundation guidelines, privacy policy, and participant rights. After that, the participants received an overview of the three parts of the experiment. In the first part, the participants made the CPS assessment and performed a loss aversion task, based on prospect theory [14]. The task was hypothetical and did not involve real monetary consequences. In the second part, the participants played the three Rock-Paper-Scissors games, each consisting of 15 rounds. After each round they receive information, who won the round and what was chosen by each player. Additionally, the participants had to answer an attention check during each game. After 15 rounds, the participants classified the fraud risk for the game. To minimize order effects, the sequence of the three game versions was counterbalanced across participants. They subsequently were explicitly informed about their total number of wins and draws across each game and gave a new fraud risk assessment for each game, allowing participants to update their fraud risk assessments based on their realized outcomes rather than on expectations formed during the task. In part three, participants provided demographic information. The experimental case materials are presented in the Appendix.

Independent Variables

Our manipulated independent variable GROUP has three levels reflecting different win probabilities in the Rock-Paper-Scissors game (i.e., strongly manipulated version, manipulated version and normal version). We varied the win probability across these three game versions, while keeping the draw probability constant at 33%. Specifically, participants' win probabilities were set to 17% (strongly manipulated), 25% (manipulated), and 33% (normal) per round.

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[4]This included 83 auditors from Big 4 firms, 646 auditors from non-Big 4 firms, and 1,364 general email addresses associated with audit firms of all sizes (except the Big 4).

[5]Overall, we received 61 responses. Five responses from Big 4 auditors (6.02%), 19 responses from the non-Big 4 auditors (2.94%), and 37 responses from the audit firms (2.71%).

[6]This procedure is recommended by Buchheit *et al.* (49) because such a payment is particularly important for participants from participant pools.

We assessed creativity using the CPS scale an established measure. The CPS consists of 30 adjectives, 18 indicative of creativity and 12 contraindicative. According to Gough's scoring protocol, 1 point is given each time one of the 18 positive items is checked, and 1 point is subtracted each time one of the 12 negative items is checked. The theoretical range of scores is therefore from –12 to +18.[7]. We use the continuous scores in all analysis.

Dependent Variables

The dependent variable is the perceived risk of manipulation of the game to the participants' disadvantage. Therefore, we asked the participants about their perceptions of the manipulation risk (*Fraud_RISK*: "How likely do you think is it that the Rock-Paper-Scissors game was manipulated to your disadvantage?") in the Rock-Paper-Scissors game. Finally, we gave the participants the chance to update their fraud risk assessment after they played all three games, based on the summary information of each game. (*Fraud_RISK_after*: "How likely do you think is it that the Rock-Paper-Scissors game X was manipulated to your disadvantage?"). The dependent variables *Fraud_RISK* and *Fraud_RISK_after* are measured on a scale from 0 to 100 (from 0% to 100% risk).

Results

Attention Check and Final Sample

In total, we obtained 61 responses from auditors and 201 responses from non-professional investors, acquired via Prolific to supplement our sample. The experiment included an attention check (AC) embedded in each round of the Rock-Paper-Scissors game to assess whether participants paid attention during the task.[8] Thirteen auditor participants and 17 non-professional investors failed the attention check at least once. To avoid unnecessary loss of statistical power, we excluded only the affected rounds in which participants failed the attention check, rather than removing entire participants. This results in a final dataset comprising 165 valid rounds from auditors and 583 valid rounds from non-professional investors.[9]

Descriptive Statistics

Table **1** reports demographic characteristics of the study participants. The auditor sample (Table **1**, Panel A) is characterized by a high level of professional seniority. Most participants are between 56 and 65 years old, and the sample is predominantly male. Educational attainment is high, with the majority holding a diploma or master's degree and a non-negligible proportion holding a PhD. Most participants are employed by non-Big 4 audit firms and primarily audit small and medium-sized enterprises. Auditors report substantial professional experience. On average, participants have 27.46 years of experience in the auditing industry (*EXP_Audit*; SD = 7.71; median = 30) and have been qualified as public accountant more than 20.93 years ago (*EXP_Auditor*; SD = 8.57; median = 22). Loss aversion, measured as the minimum gain (€X) required to accept a 50/50-coin toss with a potential loss of €10, shows considerable variation (mean = 26.93; median = 20), indicating heterogeneity in loss attitudes. The CPS score averages 3.80 (SD = 2.82), suggesting moderately elevated creative cognitive tendencies in the auditor sample.

Table **1**, Panel B, shows that the non-professional investors are younger and more diverse in terms of age and educational background. The largest age group is between 26 and 35 years, with a substantial share of participants below 26 years of age. The gender distribution is more balanced than in the auditor sample, although male participants still constitute the majority. Educational attainment of the non-professional investors is broadly distributed across high school, bachelor's, and master's degrees, with relatively few participants holding a PhD. The mean level of loss aversion is 25.66 (SD = 28.26; median = 20), which is comparable to the auditor sample but shows greater dispersion, indicating higher heterogeneity in individual loss attitudes. The CPS score averages 1.95 (SD = 3.35), indicating lower but still heterogeneous creative cognitive tendencies compared to the auditor sample. One

[7]The internal consistency of the CPS ranged from an alpha of 0.73 to 0.81 across four samples, with convergent validity indices of 0.14 to 0.40 (27). More recent studies report an alpha of 0.85, but with weak convergent validity and a unifactorial structure (50), while other studies found alphas between 0.59 and 0.64 and a culture-dependent multifactor structure (51).

[8]Participants received the order to press paper in this round during the game, and received direct feedback if they failed or passed the attention check,

[9]Including the games with AC failures in the analysis does not change the results. Excluding all games of participants who failed the AC at least once in a game does not change the results either.

possible explanation for the higher CPS scores among auditors may relate to selection and socialization effects. Individuals entering the auditing profession may already differ in cognitive characteristics associated with creative potential, while the cognitively demanding nature of auditing may further reinforce abilities such as identifying inconsistencies, considering alternative explanations, and solving complex problems. Thus, the observed difference may reflect a combination of pre-existing individual characteristics and professional experiences rather than greater creativity in a behavioral sense.

Table 1: Demographic information.

Panel A: Demographic information of the auditor participants						
AGE in years	≤ 25	26-35	36-45	45-55	56-65	≥ 66
N	0	3	5	18	29	4
GENDER	Male	Female	Diverse			
N	48	10	1			
SCHOOL	Middle School	High School	Bachelor's	Diploma, Master's	PhD	
N	0	1	6	46	8	
Audit firm	Big 4	Next 7	Other			
N	5	0	56			
Clients firm	Small & Medium		Big	Stock Exchange Listing		
N	40		20	1		
Variable	N	Mean	SD	Min	Max	Median
EXP_Audit	59	27.46	7.71	10	40	30
EXP_Auditor	61	20.93	8.57	0	35	22
Loss_Aversion	61	26.93	21.64	0	100	20
CPS_Score	61	3.80	2.82	-2	10	4
Panel B: Demographic information of the non-professional investors						
AGE in years	≤ 25	26-35	36-45	45-55	56-65	≥ 66
N	29	86	50	23	12	1
GENDER	Male	Female	Diverse			
N	128	72	1			
SCHOOL	Middle School	High School	Bachelor's	Diploma, Master's	PhD	
N - Prolific	18	52	61	61	9	
Variable	N	Mean	SD	Min	Max	Median
Loss_Aversion	201	25.66	28.26	0	200	20
CPS_Score	201	1.95	3.35	-9	9	2

Notes: *AGE* is the age of the participants (1 ≤ 25, 2 = 26-35, 3 = 36-45, 4 = 46-55, 5 = 56-65, 6 ≥ 66); *GENDER* is the gender of the participant (1 = female, 2 = male, 3 = diverse); *SCHOOL* is the highest level of education (1= middle school, 2 = high school, 3 = bachelor's, 4 = diploma, master's, 5 = PhD); *Audit firm* is the size of the firm where they work (1 = Big 4, 2 = Next 7, 3 = any other firm); *Clients firm* is the majority size of the companies audited (1 = Stock Exchange listing, 2 = Big , 3 = Small and Medium); *EXP_Audit* is the number of years the participants are in the auditing industry; *EXP_Auditor* is the number of years the participants holding the auditor title; *Loss_Aversion* is measured as the self-assessed minimum gain (€X) required to accept a 50/50 coin toss with a potential loss of €10, capturing aversion to losses relative to gains; *CPS_Score* is measured on a range of scores from -12 to + 18. Based on Gough's scoring protocol, 1 point is given each time one of the 18 positive items is checked, and 1 point is subtracted each time one of the 12 negative items is checked.

Table **2** reports descriptive statistics for realized wins, initial fraud risk assessments (*FRAUD_RISK*), and updated fraud risk assessments (*FRAUD_RISK_after*) across the three experimental conditions and both samples. In both samples, realized wins decline monotonically across conditions, indicating that the experimentally assigned win probabilities translated into systematic differences in the outcomes experienced by participants. Thus, GROUP captures the ex-ante probability structure, whereas realized wins capture the ex-post outcome information available to participants. Fraud risk assessments exhibit the inverse pattern: perceived manipulation increases as win probability decreases. This pattern persists for *FRAUD_RISK_after*, assessed after outcome feedback.

Table 2: Descriptive Statistics

	Wins		Fraud_Risk		Fraud_Risk_after	
	Auditors	**Non-professional investors**	**Auditors**	**Non-professional investors**	**Auditors**	**Non-professional investors**
Normal version	4.855 (1.985)	4.963 (1.977)	N=51 44.436 (29.874)	N=191 42.220 (28.138)	N=51 34.673 (29.290)	N=191 34.337 (28.045)
Manipulated version	3.929 (1.757)	3.617 (1.668)	N=56 47.625 (34.055)	N=196 56.776 (28.396)	N=56 39.982 (32.044)	N=196 50.051 (28.512)
Strongly manipulated version	2.796 (1.522)	2.745 (1.484)	N=54 64.148 (29.468)	N=196 67.658 (25.746)	N=54 60.185 (30.375)	N=196 61.561 (28.985)

Notes: This table reports the mean and standard deviation for each experimental cell for IV_Wins, the dependent variable Fraud_RISK and Fraud_RISK_after. Fraud_ RISK: "How high do you estimate the probability or risk of fraud in the company's balance sheet and income statement?" is measured on a scale from 0 to 100 (from 0 = "0% risk" to 100 = "100% risk"). Fraud_ RISK_after: "How likely do you think is it that the Rock-Paper-Scissors game was manipulated to your disadvantage?" is measured on a scale from 0 to 100 (from 0 = "0% risk" to 100 = "100% risk") after outcome feedback.

Table **3** presents pairwise t-tests comparing the three experimental conditions. For wins, all pairwise comparisons are highly significant for both non-professional investors and auditors (all $p < 0.010$), confirming that realized success differs systematically across conditions.

For fraud risk assessments, non-professional investors show highly significant differences between all three conditions for both *FRAUD_RISK* and *FRAUD_RISK_after* (all $p < 0.001$). In contrast, for auditors, differences in fraud risk are more selective. While comparisons involving the strongly manipulated condition are consistently significant (e.g., normal vs. strongly manipulated and manipulated vs. strongly manipulated), the difference between the normal and manipulated versions is not statistically significant for either *FRAUD_RISK* ($p > 0.60$) or *FRAUD_RISK_after* ($p > 0.36$). These patterns confirm successful manipulation and provide justification for the multivariate analyses reported in Tables **4** and **5**.

Table 3: T-test Results.

		Wins		Fraud_Risk		Fraud_Risk_after	
		Non-professional investors	**Auditors**	**Non-professional investors**	**Auditors**	**Non-professional investors**	**Auditors**
t-value (p-value)	Normal vs Manipulated	7.230 (<0.001***)	2.604 (0.011**)	-5.064 (<0.001***)	-0.524 (0.601)	-5.451 (<0.001***)	-0.911 (0.364)
t-value (p-value)	Manipulated vs Strongly Manipulated	5.472 (<0.001***)	3.608 (<0.001***)	-3.975 (<0.001***)	-2.724 (0.008***)	-3.963 (<0.001***)	-3.391 (<0.001***)
t-value (p-value)	Normal vs Strongly Manipulated	12.461 (<0.001***)	6.067 (<0.001***)	-9.272 (<0.001***)	-3.468 (<0.001***)	-9.373 (<0.001***)	-4.464 (<0.001***)

Notes: This table reports the t-test results between all cells for IV_Wins, the dependent variable Fraud_RISK and Fraud_RISK_after. Fraud_ RISK: "How high do you estimate the probability or risk of fraud in the company's balance sheet and income statement?" is measured on a scale from 0 to 100 (from 0 = "0% risk" to 100 = "100% risk"). Fraud_ RISK_after: "How likely do you think is it that the Rock-Paper-Scissors game was manipulated to your disadvantage?" is measured on a scale from 0 to 100 (from 0 = "0% risk" to 100 = "100% risk") after outcome feedback. *, **, and *** denote two-tailed significance levels of 10%, 5%, and 1%, respective.

Hypothesis Testing

To address our hypotheses, we examine the impact of creativity on the fraud risk assessment. We initially computed the correlations between the dependent variables and the individual difference and demographic variables. The correlation analysis reveals that only Loss_Aversion is significantly associated with *Fraud_RISK* ($r = -0.119$, $p = 0.001$) and *Fraud_RISK_after* ($r = -0.115$, $p = 0.002$). The negative coefficient suggests that more loss-averse participants tend to report slightly lower perceived fraud risk. Therefore, Loss_Aversion was included in the General

Linear Model (GLM) analyses (Table **3**, **4**). We refrained from including further covariates due to lack of significant correlations.

Table **4** reports the results of the General Linear Model (GLM) with covariates (i.e., an ANCOVA framework), separately for auditor participants (Panel A) and non-professional investor participants (Panel B), with *Fraud_Risk* as the dependent variable.

Table 4: Results of the GLM for the dependent variable *FRAUD_RISK*

Panel A Results of the auditor participants						
FRAUD_RISK	**df**	**F-value**	**p-value**	**partial η^2**	**B**	**95% CI for B**
IV_Wins	1	16.786	<0.001***	0.097	-6.074	[−9.002, −3.146]
IV_Draws	1	1.327	0.251	0.008	-1.777	[−4.824, 1.270]
Loss_Aversion	1	3.347	0.069*	0.021	-0.203	[−0.421, 0.016]
GROUP	2	0.682	0.507	0.009		
GROUP 1 vs. 3					-2.054	[−19.623, 15.515]
GROUP 2 vs. 3					-6.628	[−19.984, 6.727]
CPS_Score	1	3.822	0.052*	0.024	3.552	[0.561, 6.543]
GROUP *CPS_Score	2	1.289	0.278	0.016		
GROUP 1*CPS_Score					-2.736	[−6.762, 1.290]
GROUP 2*CPS_Score					-3.050	[−7.170, 1.069]
N = 165; Adjusted R^2 = 0.169						
Panel B Results of the non-professional investors						
FRAUD_RISK	**df**	**F-value**	**p-value**	**partial η^2**	**B**	**95% CI for B**
IV_Wins	1	131.998	<0.001***	0.187	-7.791	[−9.123, −6.460]
IV_Draws	1	10.115	0.002***	0.017	-2.142	[−3.465, -0.819]
Loss_Aversion	1	6.459	0.011**	0.011	-0.091	[−0.161, -0.021]
GROUP	2	0.167	0.847	0.001		
GROUP 1 vs. 3					-1.922	[−9.547, 5.702]
GROUP 2 vs. 3					-1.491	[−6.905, 3.923]
CPS_Score	1	0.296	0.587	0.001	-0.002	[-1.048, 1.044]
GROUP *CPS_Score	2	0.812	0.445	0.003		
GROUP 1*CPS_Score					0.205	[−1.271, 1.6810]
GROUP 2*CPS_Score					-0.694	[−2.157, 0.769]
N = 583; Adjusted R^2 = 0.302						

Notes: This table reports the results of the GLM for the dependent variable Fraud_RISK. Fraud_ RISK: "How likely do you think is it that the Rock-Paper-Scissors game was manipulated to your disadvantage?" is measured on a scale from 0 to 100 (from 0 = "0% risk" to 100 = "100% risk"). Panel A reports the results of a GLM for Fraud_RISK among auditor participants. The model includes Group, CPS_Score, the interaction term (Group*CPS_Score), and IV_Wins, IV_Draws, and Loss_Aversion as covariates. The table reports Type III tests of between-subject effects (F-tests) for the overall effects of the predictors. Parameter estimates (B) and corresponding 95% confidence intervals are provided for individual model parameters. For categorical variables, such as Group, the overall effect is assessed using the omnibus F-test, whereas parameter estimates represent dummy-coded comparisons relative to the reference category (Group 3). Panel B reports the results for the non-professional investor sample using the same model specification. *, **, and *** denote two-tailed significance levels of 10%, 5%, and 1%, respectively. The results are robust to our exclusion and without the covariates.

For the auditor sample (Panel A), IV_Wins emerges as a statistically significant predictor of fraud risk judgments ($F = 16.786$, $p < 0.001$, partial $\eta^2 = 0.097$, Cohen's $f = 0.33$), indicating that a higher number of wins is associated with lower perceived fraud risk and reflecting a medium effect size according to Cohen [52].

Loss_Aversion exhibits a marginally significant effect ($F = 3.347$, $p = 0.069$, partial $\eta^2 = 0.021$), suggesting a weak tendency for more loss-averse individuals to report lower fraud risk perceptions, whereas IV_Draws is not statistically significant ($F = 1.327$, $p = 0.251$). Neither the main effect of GROUP ($F = 0.682$, $p = 0.507$) nor the interaction between GROUP and CPS_Score ($F = 1.289$, $p = 0.278$) reaches statistical significance. CPS_Score itself shows a marginally significant positive effect ($F = 3.822$, $p = 0.052$, partial $\eta^2 = 0.024$), suggesting that more creative auditors tend to report slightly higher fraud risk perceptions. Overall, the model explains a modest proportion of variance (Adjusted $R^2 = 0.169$).

For the non-professional investor sample (Panel B), IV_Wins again represents the strongest predictor of fraud risk judgments ($F = 131.998$, $p < 0.001$, partial $\eta^2 = 0.187$, Cohen's $f = 0.48$), indicating that more successful outcomes substantially reduce perceived fraud risk. IV_Draws ($F = 10.115$, $p = 0.002$, partial $\eta^2 = 0.017$) and Loss_Aversion ($F = 6.459$, $p = 0.011$, partial $\eta^2 = 0.011$) also significantly predict fraud risk perceptions, although with comparatively smaller effect sizes. In contrast, neither GROUP ($F = 0.167$, $p = 0.847$) nor CPS_Score ($F = 0.296$, $p = 0.587$) exerts a significant influence on fraud risk judgments. Likewise, the interaction between GROUP and CPS_Score is not statistically significant ($F = 0.812$, $p = 0.445$), providing no evidence that creativity moderates the relationship between the assigned probability condition and fraud risk assessments. The model explains a substantially larger share of variance than in the auditor sample (Adjusted $R^2 = 0.302$).

Table **5** reports the results of the General Linear Model (GLM) with covariates (i.e., an ANCOVA framework), separately for auditor participants (Panel A) and non-professional investor participants (Panel B), with FRAUD_RISK_after as the dependent variable, assessed after participants were informed about their total number of wins and draws.

For the auditor sample (Panel A), IV_Wins is the strongest predictor of fraud risk perceptions ($F = 34.804$, $p < 0.001$, partial $\eta^2 = 0.182$, Cohen's $f = 0.47$), indicating that a higher number of wins is associated with substantially lower perceived fraud risk and reflecting a large effect size according to Cohen (1988). IV_Draws also has a significant negative effect ($F = 4.493$, $p = 0.036$, partial $\eta^2 = 0.028$), suggesting that draws similarly reduce perceived fraud risk, albeit to a smaller extent, whereas Loss_Aversion is not statistically significant ($F = 2.360$, $p = 0.127$). Neither the main effect of GROUP ($F = 0.868$, $p = 0.422$) nor the interaction between GROUP and CPS_Score ($F = 0.502$, $p = 0.606$) reaches statistical significance, indicating that the experimental manipulation and its interaction with creativity do not influence auditors' fraud risk assessments. In contrast, CPS_Score shows a significant positive effect ($F = 4.958$, $p = 0.027$, partial $\eta^2 = 0.031$, Cohen's $f = 0.18$), suggesting that more creative auditors tend to report slightly higher fraud risk perceptions. Overall, the model explains a moderate proportion of variance (Adjusted $R^2 = 0.277$).

For the non-professional investor sample (Panel B), IV_Wins again represents the strongest predictor of fraud risk judgments ($F = 256.653$, $p < 0.001$, partial $\eta^2 = 0.309$, Cohen's $f = 0.67$), indicating that more successful outcomes substantially reduce perceived fraud risk. IV_Draws ($F = 12.679$, $p < 0.001$, partial $\eta^2 = 0.022$) and Loss_Aversion ($F = 6.495$, $p = 0.011$, partial $\eta^2 = 0.011$) also significantly predict fraud risk perceptions, although with comparatively small effect sizes. In contrast, neither GROUP ($F = 0.275$, $p = 0.760$) nor CPS_Score ($F = 1.899$, $p = 0.169$) exerts a significant influence on fraud risk judgments. Likewise, the interaction between GROUP and CPS_Score is not statistically significant ($F = 0.190$, $p = 0.827$), providing no evidence that creativity moderates the relationship between the experimental manipulation and fraud risk assessments. The model explains a substantially larger share of variance than in the auditor sample (Adjusted $R^2 = 0.421$).

Taken together, the results reported in Tables **4** and **5** reveal a highly consistent pattern across both measurements of fraud risk. In both samples, realized wins are by far the strongest predictor of fraud risk perceptions, whereas the experimental manipulation (GROUP) does not significantly influence participants' judgments. Because GROUP captures the ex-ante win probability structure and IV_Wins the ex-post outcomes actually realized by participants, this pattern suggests that fraud risk assessments were more closely associated with realized outcome information than with prior probability conditions. Likewise, no evidence is found that creativity moderates the effect of the experimental manipulation in either sample. The primary difference between the two participant groups concerns the main effect of creativity: CPS_Score is positively associated with fraud risk perceptions among auditors, whereas no comparable relationship is observed for non-professional investors. Moreover, the explanatory power of the models is consistently higher for non-professional investors than for auditors and increases for both samples when fraud risk is assessed after completion of the game.

Table 5: Results of the GLM for the dependent variable *FRAUD_ RISK_ after*

Panel A Results of the auditor participants						
FRAUD_RISK_after	**df**	**F-value**	**p-value**	**partial η^2**	**B**	**95% CI for B**
IV_Wins	1	34.804	<0.001***	0.182	-8.185	[−10.926, −5.445]
IV_Draws	1	4.493	0.036**	0.028	-3.060	[−5.912, -0.208]
Loss_Aversion	1	2.360	0.127	0.015	-0.159	[−0.364, 0.046]
GROUP	2	0.868	0.422	0.011		
GROUP 1 vs. 3					0.560	[−15.883, 17.003]
GROUP 2 vs. 3					-5.659	[−18.158, 6.841]
CPS_Score	1	4.958	0.027**	0.031	2.792	[-0.007, 5.591]
GROUP *CPS_Score	2	0.502	0.606	0.006		
GROUP 1*CPS_Score					-1.253	[−5.021, 2.515]
GROUP 2*CPS_Score					-1.933	[−5.789, 1.922]
N = 165; Adjusted R^2 = 0.277						
Panel B Results of the non-professional investors						
FRAUD_RISK_after	**df**	**F-value**	**p-value**	**partial η^2**	**B**	**95% CI for B**
IV_Wins	1	256.653	<0.001***	0.309	-10.320	[−11.585, −9.055]
IV_Draws	1	12.679	<0.001***	0.022	-2.278	[−3.535, -1.021]
Loss_Aversion	1	6.495	0.011**	0.011	-0.086	[−0.153, -0.020]
GROUP	2	0.275	0.760	0.001		
GROUP 1 vs. 3					2.343	[−4.899, 9.585]
GROUP 2 vs. 3					0.257	[−4.885, 5.399]
CPS_Score	1	1.899	0.169	0.003	-0.536	[-1.529, 0.458]
GROUP *CPS_Score	2	0.190	0.827	0.001		
GROUP 1*CPS_Score					0.390	[−1.012, 1.7920]
GROUP 2*CPS_Score					0.023	[−1.366, 1.413]
N = 583; Adjusted R^2 = 0.421						

Notes: This table reports the results for the dependent variable Fraud_RISK. Fraud_ RISK: "How likely do you think is it that the Rock-Paper-Scissors game was manipulated to your disadvantage?" is measured on a scale from 0 to 100 (from 0 = "0% risk" to 100 = "100% risk"). Panel A reports the results of a GLM for Fraud_RISK among auditor participants. The model includes Group, CPS_Score, the interaction term (Group*CPS_Score), and IV_Wins, IV_Draws, and Loss_Aversion as covariates. The table reports Type III tests of between-subject effects (F-tests) for the overall effects of the predictors. Parameter estimates (B) and corresponding 95% confidence intervals are provided for individual model parameters. For categorical variables, such as Group, the overall effect is assessed using the omnibus F-test, whereas parameter estimates represent dummy-coded comparisons relative to the reference category (Group 3). Panel B reports the results for the non-professional investor sample using the same model specification. *, **, and *** denote two-tailed significance levels of 10%, 5%, and 1%, respectively. The results are robust to our exclusion and without the covariates

Robustness Analyses

To assess the robustness of our main findings, we conducted four additional analyses (untabulated). First, we re-estimated the model using only the two extreme manipulation conditions (17% vs. 33%) to maximize statistical power for detecting potential treatment effects. The results remain unchanged, as no significant differences in fraud risk perceptions emerge between these conditions, further supporting the absence of a treatment effect.

Second, we re-specified the experimental manipulation as an ordinal variable (0 = 17%, 1 = 25%, 2 = 33%) to test for a potential linear dose–response relationship between manipulation strength and fraud risk perceptions. The planned linear contrast does not reach statistical significance (F = 0.005, p = 0.946), indicating that fraud risk does

not vary systematically with increasing levels of manipulation. The estimated effect is close to zero, and the confidence interval includes zero, providing no evidence for a monotonic relationship between manipulation intensity and fraud risk judgments.

Third, we estimated an alternative model specification excluding covariates to assess whether the inclusion of control variables drives the main results. The pattern of results remains substantively unchanged, with no significant effects of the experimental manipulation observed across specifications.

Fourth, we estimated a repeated-measures mixed-effects model for the auditor sample to account for the non-independence of fraud risk assessments within participants and to jointly analyze assessments before and after outcome feedback.[10] Because the three games within each phase were presented in randomized order, we specified a compound-symmetry covariance structure rather than imposing a temporal correlation structure. The results were consistent with the main analysis: realized wins remained negatively associated with fraud risk assessments ($B = -5.069$, $F(1, 321.091) = 15.468$, $p < 0.001$), while neither the Case and IV_Wins interaction ($B = 0.774$, $F(1, 298.240) = 0.578$, $p = 0.448$) nor the IV_Wins and CPS_Score interaction ($B = -0.281$, $F(1, 326.370) = 1.542$, $p = 0.215$) was significant.

Taken together, these robustness checks consistently support the main conclusion that fraud risk perceptions are not systematically affected by the experimental manipulation, regardless of whether it is modeled as a categorical factor, a comparison of extreme conditions, or an ordered linear trend.

Discussion

The most robust finding of this study is that realized outcomes dominate fraud risk judgments once they become available. Across both participant groups and the main model specifications, the number of realized wins consistently emerges as the strongest predictor of both initial and updated fraud risk assessments. However, the additional mixed-effects analysis provides no evidence that the association between realized outcomes and fraud risk assessments differs before versus after summary feedback. Thus, while realized outcomes are an important determinant of fraud risk judgments, the evidence does not support a differential effect of realized outcomes following feedback, and H3 is not supported.

These findings are consistent with behavioral decision-making research suggesting that salient outcome information exerts a disproportionate influence on evaluative judgments under uncertainty [43, 44]. Importantly, the experimental manipulation established different ex ante probabilities of winning, which translated into systematic differences in the realized outcomes experienced by participants. However, fraud risk assessments were more strongly associated with these realized outcomes than with the experimentally assigned probability condition. This pattern suggests that, once outcome information becomes available, experienced performance may receive greater weight than prior probabilistic expectations in fraud risk judgments. Rather than indicating that participants ignored the underlying probability structure, the finding highlights the stronger explanatory role of salient, realized evidence in subsequent judgments. While outcome information explains the largest proportion of variance in fraud judgments, our findings also suggest that creativity contributes to fraud risk assessment, albeit in a more limited and context-dependent manner than initially expected. Creativity is positively associated with fraud risk assessments among auditors, particularly after outcome feedback, whereas no comparable relationship emerged among non-professional investors. Accordingly, H1 receives only partial support.

Rather than indicating that creative individuals are generally more suspicious, these findings support the view that creativity influences how ambiguous information is interpreted and integrated into fraud judgments. Creative auditors may generate a broader set of possible explanations when evaluating uncertain situations and therefore maintain greater sensitivity toward potential manipulation. However, the relatively small effect sizes indicate that

[10]We defined Case as an indicator distinguishing the three assessments made before summary feedback (Case = 0) from the three assessments made after summary feedback (Case = 1)

creativity complements rather than replaces the influence of observable evidence.

One possible explanation is that the experimental task itself constrained the extent to which creative cognitive processes could meaningfully influence judgments. Although prior auditing research suggests that creativity facilitates the generation of alternative problem representations in relatively open-ended tasks, such as fraud brainstorming [37, 34], our experimental paradigm provided comparatively structured and sequential feedback. As participants accumulated increasingly diagnostic outcome information, there was less need for extensive cognitive reconstruction or the generation of competing explanations. Consequently, fraud judgments became progressively anchored in realized outcomes rather than in individual differences in cognitive flexibility. This interpretation is consistent with the strong and persistent effect of realized wins across all model specifications and helps explain why creativity exhibited only modest main effects and no significant interaction with the experimental manipulation.

Consistent with this interpretation, we find no evidence that creative potential moderates the integration of outcome information into fraud risk judgments (H4). The non-significant IV_Wins and CPS_Score interaction suggests that the association between realized outcomes and fraud risk assessments does not differ systematically across levels of creative potential. However, this null finding should be interpreted cautiously given the limited number of independent auditor observations. Although the mixed-effects model uses repeated observations within participants, the effective number of independent auditor units remains 61. We therefore conducted a post-hoc power analysis using G*Power [52, 53] for the hypothesized GROUP and CPS_Score interaction effect. Based on the observed effect size (partial $\eta^2 = 0.016$; $f^2 = 0.016$), $\alpha = .05$, and the model specification, the achieved power was 0.126. Thus, the study had limited power to detect small interaction effects, and smaller moderating effects of creative potential may have remained undetected. Future research using larger samples of professional auditors should further examine whether creative potential influences the integration of outcome information in uncertain judgment environments.

Our findings provide only limited evidence for H2. Although loss aversion is statistically associated with fraud risk assessments in several models, the observed effects are consistently small and economically modest. Interestingly, the association is negative, indicating that more loss-averse participants tend to report slightly lower fraud risk assessments.

This finding suggests that competing behavioral mechanisms may operate simultaneously. While prospect theory predicts increased sensitivity toward potential losses [14], greater loss aversion may also induce greater caution in audit judgments when auditors face potential liability and adverse consequences [39, 41]. A higher fraud risk assessment may, for example, trigger additional audit procedures and increase the auditor's exposure to professional responsibility and liability. More loss-averse auditors may therefore place greater weight on the potential costs of escalating fraud concerns, resulting in more cautious fraud risk assessments. Although this interpretation is consistent with the negative association, the underlying mechanism cannot be established with the present data. Overall, however, behavioral tendencies appear substantially less influential than realized outcome information.

Taken together, the findings contribute to the literature by emphasizing that fraud risk assessment should be understood primarily as an inferential judgment process under uncertainty. Rather than being determined solely by fraud cues or stable individual characteristics, fraud judgments emerge from the interaction between observable evidence and the cognitive processes through which that evidence is interpreted.

Our results further suggest that creativity functions as a cognitive resource supporting the interpretation of ambiguous information rather than as a trait that uniformly increases fraud suspicion. At the same time, the dominance of realized outcomes demonstrates that the influence of higher-order cognitive characteristics becomes substantially weaker once more diagnostic information becomes available. Given the limited number of independent auditor observations, however, conclusions regarding the absence of moderating effects should be interpreted cautiously. Consequently, the findings refine existing research on professional skepticism by highlighting that individual cognitive characteristic primarily matter during phases of uncertainty, whereas judgments become increasingly evidence-driven as additional information accumulates.

Conclusion

This study examined how creative potential and loss aversion influence fraud risk assessments under conditions of uncertainty and after outcome feedback. Using a controlled Rock-Paper-Scissors experiment, we investigated how experienced auditors and non-professional investors formed and updated fraud risk judgments as additional performance information became available. Drawing on creativity research, professional skepticism, and behavioral decision theory, we conceptualized fraud risk assessment as a dynamic inferential judgment process.

Our findings show that realized outcomes are the primary determinant of fraud risk assessments. Across both participant groups, fraud risk judgments were more strongly associated with realized outcome information than with the experimentally assigned probability conditions. This pattern suggests that experienced outcomes may receive greater weight than prior probabilistic expectations as uncertainty is reduced. Creativity played a more limited but meaningful role. Among auditors, higher creative potential was associated with slightly higher fraud risk assessments, whereas no comparable relationship emerged among non-professional investors. However, we found no evidence that creative potential moderates the integration of outcome information into fraud judgments. Loss aversion exhibited statistically significant but comparatively small effects, indicating that motivational tendencies play only a secondary role relative to observable evidence.

This study contributes to the auditing literature in three ways. First, it extends research on professional skepticism by introducing creativity as an individual-level cognitive characteristic that shapes the interpretation of ambiguous information. Second, it adopts a dynamic perspective by examining fraud risk judgments both before and after outcome feedback, thereby illustrating how judgments evolve as additional evidence becomes available. Third, our findings demonstrate that the influence of individual cognitive characteristics diminishes once more diagnostic information is available, highlighting the dominant role of observable evidence in fraud judgment formation.

These findings also have practical implications. For audit firms, they suggest that effective fraud risk assessment depends not only on technical competence but also on auditors' ability to consider alternative explanations when evaluating ambiguous information. Accordingly, training approaches that encourage critical thinking and structured fraud brainstorming may complement standardized audit procedures. For regulators and standard setters, the findings reinforce that professional skepticism is not merely a procedural requirement but also a cognitive process shaped by both individual characteristics and the available evidence.

Several limitations should be acknowledged. First, although the experimental paradigm isolates a specific cognitive process relevant to fraud risk assessment, it necessarily simplifies the complexity of real-world audit engagements. Unlike professional fraud risk assessment, the RPS task does not involve management concealment, financial statement information, or the evaluation of heterogeneous audit evidence. Instead, it provides relatively structured and sequential outcome information, reducing the complexity of cognitive reconstruction as information accumulates. This abstraction may limit the generalizability of our findings to professional audit judgments and may partly explain why creativity exhibited only modest effects and no moderating influence in our study. Future research should therefore examine creativity in richer and more open-ended audit settings, such as fraud brainstorming, complex financial statement analyses, or team-based audit judgments. Second, creativity was measured using the Creative Personality Scale, which captures dispositional creative potential rather than actual creative performance. Future studies could compare personality-based and performance-based creativity measures. Third, the relatively small auditor sample limits statistical power for detecting subtle interaction effects. Although the repeated-measures design provides multiple observations per auditor, these observations do not increase the number of independent auditor units. The absence of significant interaction effects should therefore not be interpreted as definitive evidence that no moderating relationship exists. Replication with larger professional samples, different institutional settings, and cross-country comparisons would further strengthen the generalizability of the findings.

Future research could also explore how creative potential interacts with other auditor characteristics, such as professional skepticism, ethical orientation, or time pressure, to shape fraud risk judgments. Additionally, longitudinal designs could examine how creative reasoning unfolds across multiple audit phases. Understanding these dynamics is essential for advancing theories of audit judgment and for designing institutional environments that support effective fraud detection under unavoidable uncertainty.

Overall, our findings suggest that fraud risk assessment evolves from a cognitively driven interpretation of ambiguous information toward an increasingly evidence-driven judgment process as more diagnostic information becomes available. Creativity appears to matter primarily during the earlier stages of uncertainty, whereas observable outcomes increasingly dominate judgment formation as evidence accumulates.

Conflict of Interest Statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author Contributions Statement

All authors contributed to the study conception and design, analysis and writing of the manuscript. This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of the Technical University of Darmstadt.

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