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Cognitive Biases in Managerial Pricing Decisions: Anchoring, Loss Aversion, and Overconfidence Effects on Pricing Accuracy

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Abstract

Managerial pricing decisions are central to organizational profitability but are often compromised by systematic cognitive biases. This study investigates how anchoring, loss aversion, and overconfidence distort managerial pricing judgments and identifies the psychological mechanisms through which these effects occur. The study pursues four objectives: first, to quantify the individual effects of anchoring, loss aversion, and overconfidence on pricing accuracy; second, to examine their joint and interactive influence on pricing distortions; third, to develop and empirically test a bias-corrected managerial pricing framework integrating behavioral factors; and fourth, to generate robust empirical evidence that advances the fragmented behavioral pricing literature and informs debiased pricing practices. Using a between-subjects experimental design, 240 experienced managers were randomly assigned to anchoring, loss-aversion, overconfidence, or control conditions and completed a realistic pricing simulation. Pricing error was measured as deviation from optimal benchmarks, alongside assessments of cognitive distortion and confidence bias. Results show that all three biases significantly increased pricing errors, with anchoring and loss aversion exerting the strongest direct effects. Mediation and structural equation modeling reveal that cognitive distortion is the primary pathway through which bias-inducing conditions translate into pricing errors, while confidence bias plays a secondary but reinforcing role, particularly under overconfidence. When multiple biases co-occur, their effects compound, producing larger deviations from optimal prices. The findings make a theoretical contribution by providing an integrated, pricing-specific account of multiple managerial biases and empirically validating a dual-mediation framework linking bias, cognition, and pricing outcomes. Practically, the results highlight the value of structured decision protocols, calibration training, and decision-support systems as effective interventions for improving pricing accuracy and managerial decision quality.

Keywords: Bias-Corrected, Behavioral Pricing, Cognitive Distortion, Debiasing, Decision-Making, Pricing Errors.

1. INTRODUCTION

Managerial pricing decisions are critical determinants of organizational profitability, yet they are frequently influenced by cognitive biases that systematically distort judgment. Behavioral research suggests that heuristics such as anchoring, loss aversion, and overconfidence can skew decision-making, leading managers to deviate from optimal pricing benchmarks. Anchoring causes reliance on arbitrary reference points, loss aversion leads to excessive focus on potential losses, and overconfidence inflates perceived accuracy, often producing overly aggressive decisions. Understanding how these biases affect pricing is essential for developing interventions that enhance decision quality and organizational outcomes.

Behavioral research identifies several cognitive distortions that are particularly relevant for pricing. Anchoring occurs when initial numeric information serves as a reference point that unduly influences subsequent price estimates or willingness-to-pay judgments; anchoring is widely used in behavioral pricing interventions but can also lead managers to persist with outdated benchmarks rather than updating prices in response to new demand or cost information. Loss aversion, the tendency to weigh potential losses more heavily than equivalent gains, shapes risk attitudes and can cause managers to prefer prices and policies that avoid perceived downside outcomes even at the expense of forgone upside (Camilli *et al.*, 2023). Empirical and theoretical work shows that managerial loss aversion can produce short-termism, underinvestment, and

suboptimal pricing when downside risks are overweighted. Finally, overconfidence leads managers to overestimate the precision of their demand forecasts, the effectiveness of their strategies, or their ability to extract consumer surplus; overconfidence has measurable consequences for firm risk and decision outcomes and can exacerbate pricing errors and strategic missteps.

These biases do not operate in isolation. Anchoring may interact with loss aversion, while overconfidence can magnify the failure to adjust anchors or to account properly for downside scenarios. The combined or interacting effects of anchoring, loss aversion, and overconfidence on managerial pricing remain underexplored in the pricing literature, which has tended either to document consumer-facing behavioral pricing tactics or to study managerial biases in other domains rather than to provide an integrated account specific to price-setting decisions (Jiang *et al.*, 2023).

At the same time, operations and economic models that incorporate behavioral preferences demonstrate that loss-averse consumers or managers change optimal pricing rules and equilibrium outcomes, suggesting both theoretical and practical consequences for price design and revenue management. These modeling insights imply that debiasing interventions or structural corrections, whether via improved information systems, formal decision protocols, internal controls, or choice architecture, could materially improve pricing outcomes (Han *et al.*, 2024).

The present study pursues four objectives: (1) quantify the individual effects of anchoring, loss aversion, and overconfidence on managerial pricing decisions; (2) examine their joint and interactive impact on pricing distortions; (3) develop and test a bias-corrected pricing framework that integrates behavioral factors into managerial judgment; and (4) generate empirical evidence that advances the fragmented behavioral pricing literature and supports more accurate, debiased pricing practices in organizations.

2. LITERATURE REVIEW

Prior research shows that cognitive biases, anchoring, loss aversion, and overconfidence, systematically shape economic and managerial judgments. Anchoring effects remain robust even among experienced professionals, while loss aversion, grounded in prospect theory, pushes decisions toward risk-avoidance and conservative pricing (Li and Qi, 2021). Overconfidence leads managers to overestimate predictive accuracy, producing aggressive or miscalibrated pricing choices (Guner Gultekin and Akinci, 2025). Cognitive distortions such as selective attention, misinterpretation of market signals, and inflated confidence mediate these effects, translating biased judgments into suboptimal outcomes (Zhang, 2023). Yet, experimental research linking these biases to realistic managerial pricing scenarios remains limited, particularly regarding their interactive effects and mediating pathways.

2.1 Behavioral Biases in Managerial Pricing Decisions

Pricing requires managers to interpret demand cues, competitor actions, and cost structures under uncertainty, making it highly vulnerable to cognitive biases (Rahmadi and Rimbano, 2024). Behavioral economics and managerial decision-making research increasingly demonstrate that price setting is not purely rational; anchoring, loss aversion, and overconfidence regularly distort pricing outcomes. Figures 1–3 provide schematic representations of how these biases generate cognitive distortions and pricing errors, serving as conceptual bridges between general behavioral theory and pricing-specific mechanisms.

Figure 1 provides a high-level causal pathway showing how anchoring, loss aversion, and overconfidence give rise to cognitive distortions, which then produce pricing errors and downstream organizational consequences (Suprapto and Tokan, 2025). This schematic serves as a conceptual bridge between the broader behavioral literature and the more detailed pricing-specific framework.

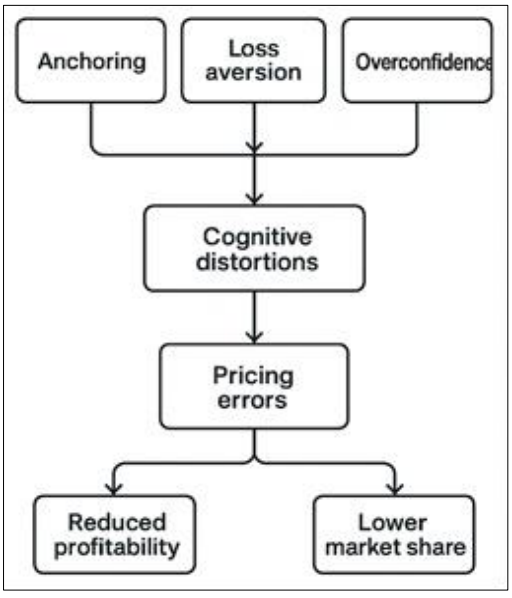

Figure 1: High-level causal pathway of cognitive biases in managerial pricing

Figure 2 illustrates a foundational model in which multiple cognitive biases operate as independent predictors of a central managerial decision outcome. This general structure provides a useful conceptual anchor for understanding how anchoring, loss aversion, and overconfidence similarly influence pricing judgments in more complex managerial environments (Rawat, 2024).

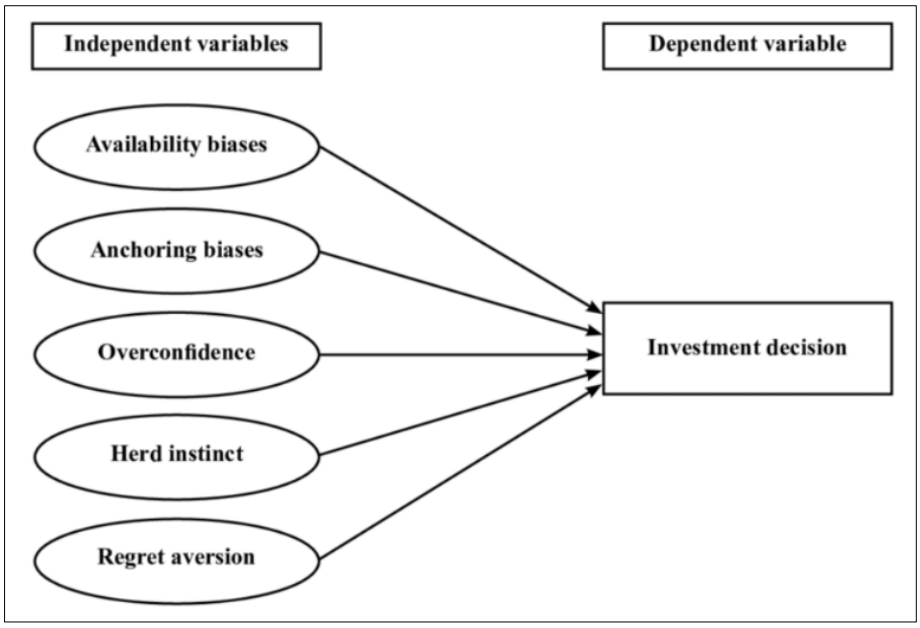

Figure 2: General cognitive bias–decision model

Figure 3 presents a conceptual model that integrates anchoring, loss aversion, and overconfidence within a unified pricing-decision framework. This model illustrates both the individual pathways through which each bias influences price setting and the interacting effects that emerge when multiple biases co-occur in real-world managerial environments.

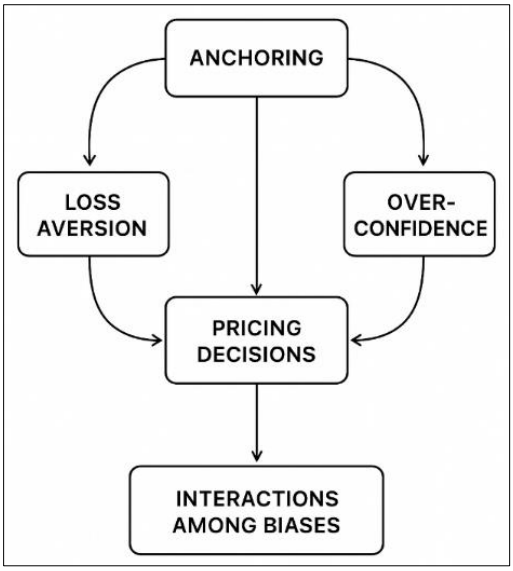

Figure 3: Bias-corrected managerial pricing decisions

2.2 Anchoring in Pricing and Managerial Decision-Making

Anchoring, the tendency to rely excessively on an initial reference point, is pervasive in pricing, where historical prices, competitor prices, and previous cost benchmarks often act as anchors. Experimental simulations consistently show that managers bias price choices toward competitor prices even when optimal prices diverge. Recency-based anchors amplify this pattern, especially when competitor signals are ambiguous (Ismael *et al.*, 2024; Cele *et al.*, 2023). Anchoring contributes to pricing inertia; behavioral price-adjustment models suggest that past prices become psychological anchors that delay necessary updates (Angelis, 2024; Lin, 2025). Although evidence from real estate and retail markets shows how anchoring slows price corrections, manager-level empirical research remains limited. Table 1 summarizes key findings on anchoring in managerial pricing.

Table 1: Empirical studies on anchoring in managerial pricing (2020–2025)

Study	Context / method	Key findings	Relevance to pricing biases
Ismael *et al.,* (2024)	Behavioral pricing experiment with ambiguous competitor signals	Ambiguity amplified anchoring and reference-dependent pricing	Shows compounded bias effects in uncertain markets
Cele *et al.,* (2023)	Experimental simulation of competitive pricing	Managers anchored heavily on competitor prices; recency effects strengthened underpricing	Demonstrates anchoring and loss aversion jointly influencing pricing
Angelis (2024)	Behavioral model of price stickiness	Prior prices act as psychological anchors; price updates delayed	Anchoring incorporated into models of pricing inertia
Lin (2025)	Behavioral economic modeling	Pricing decisions shaped by reference dependence and mental accounting	Anchoring linked to systematic pricing rigidity

2.3 Loss Aversion in Pricing and Strategic Firm Decisions

Loss aversion, where losses weigh more heavily than equivalent gains, is increasingly applied to managerial pricing. Managers often resist price reductions because such decreases are perceived as losses in margin or competitive position (Shaw *et al*., 2022). Empirical studies show that loss-averse managers avoid necessary downward adjustments (Liu, 2025), hotel revenue teams hesitate to lower prices in low-demand periods (Wang, 2021), and e-commerce managers under-discount relative to algorithmic systems during competitive shocks (Lipman *et al.*, 2022). Strategic research further indicates that loss aversion shapes firm investment and risk-taking behavior (Zhang and Cuypers, 2021). However, few studies directly quantify managerial loss aversion in pricing. Table 2 summarizes empirical evidence in this domain.

Table 2: Empirical studies on loss aversion in managerial and pricing decisions (2020–2025)

Study	Context / method	Key findings	Relevance to loss aversion
Liu (2025)	Managerial dynamic pricing experiment	Managers avoided downward price adjustments even when optimal	Direct evidence of loss-averse pricing behavior
Wang (2021)	Field pricing data (hotel RM)	Teams resisted lowering prices despite low demand	Loss aversion leads to revenue underperformance
Lipman *et al.,* (2022)	E-commerce pricing experiment	Managers more loss-averse than algorithms; under-discounting observed	Loss aversion affects discounting under competitive shocks
Zhang and Cuypers (2021)	Strategic decision-making review	Loss aversion and myopic loss aversion shape firm risk-taking	Shows organizational-level effects of loss aversion
Wang (2025)	Behavioral economics application review	Loss aversion embedded in trade-in and price-discrimination strategies	Demonstrates broad strategic relevance of loss aversion

2.4 Overconfidence and Its Effects on Pricing and Strategic Judgments

Overconfidence, overestimating one's knowledge or forecasting accuracy, is well documented in finance and strategy but underexplored in pricing. Research shows that overconfident managers take riskier positions, underestimate volatility, and make miscalibrated forecasts (Depoers *et al*., 2024; Burkhard *et al*., 2022). Although these tendencies imply potential pricing distortions, direct empirical studies linking overconfidence to price-setting are virtually absent. Table 3 provides indirect evidence from related managerial domains that suggests overconfidence likely influences pricing judgments.

Table 3: Research on overconfidence in managerial decisions (2020–2025)

Study	Context / Method	Key findings	Implications for pricing
Zhang and Cuypers (2021)	Review of cognitive biases	Overconfidence affects strategic judgments and planning	Underscores absence of pricing-specific overconfidence research
Burkhard *et al*., (2022)	Integrative review of strategic biases	Overconfidence widespread; leads to excessive risk-taking	Indicates potential for pricing miscalibration
Philander (2023)	SMEs managerial decision survey	Overconfidence predicted risk-prone investment behaviors	Suggests pricing forecasts may also be biased

2.5 Interactions among Biases and Combined Effects in Pricing Contexts

Managerial decisions rarely involve a single bias; instead, multiple biases often operate simultaneously. Studies show that anchoring and loss aversion frequently co-occur, producing compounded distortions, especially under uncertainty. Behavioral price-adjustment models incorporate both biases to explain price stickiness (Lee, 2025), while strategic literature highlights coexisting clusters of biases,

overconfidence, myopic loss aversion, escalation of commitment, that shape organizational behavior (Burkhard *et al.*, 2022). However, empirical work explicitly testing multi-bias interactions in pricing remains rare. Table 4 outlines existing studies relevant to multi-bias frameworks.

Table 4: Studies addressing interactions among biases in decision-making (2020–2025)

Study	Biases examined	Key findings	Implications for multi-bias pricing models
Cele *et al.*, (2023)	Anchoring + Loss Aversion	Combined effects drove underpricing under uncertainty	Demonstrates need for multi-bias models
Ismael *et al.*, (2024)	Anchoring + Reference Dependence	Ambiguous signals increased joint bias impact	Confirms compounded bias distortions
Lee (2025)	Anchoring + Loss Aversion	Price stickiness arises from interacting biases	Provides theoretical dual-bias structure
Lin (2025)	Anchoring + Reference Dependence	Pricing shaped by multi-bias mental accounting	Suggests reference points anchor and amplify loss aversion
Burkhard *et al.*, (2022)	Systemic organizational biases	Bias clusters (overconfidence, myopic loss aversion, commitment) co-occur	Multi-bias frameworks needed for pricing research

2.6 Research Gap

Despite growing evidence, several gaps persist. Anchoring research relies heavily on controlled experiments rather than real-world pricing data, limiting generalizability. Loss aversion findings are fragmented across sectors, with few attempts to quantify its cross-industry magnitude. Overconfidence has been extensively studied in forecasting but scarcely examined in price setting. Moreover, little research investigates how these biases jointly influence pricing, leaving unexplored the likely compounded distortions arising from simultaneous biases.

2.7 Hypotheses

Based on behavioral pricing theory and prior evidence, the study proposes:

H1: Anchoring cues increase pricing errors relative to a control condition.

H2: Loss-aversion framing produces more conservative prices and greater deviations from optimal benchmarks.

H3: Overconfidence induction inflates self-reported confidence and increases pricing deviations via cognitive distortions.

H4: Cognitive distortions mediate the relationship between bias-inducing conditions and pricing error.

H5: Confidence bias acts as a secondary mediator, amplifying the influence of cognitive distortions on pricing errors.

3. Conceptual Framework

This study adopts a behavioral decision-making framework in which contextual manipulations activate cognitive and affective biases that shape managerial pricing judgments. The experimental condition influences two key psychological mechanisms, cognitive distortion and confidence bias, which independently and jointly transmit the effects of bias inductions onto pricing errors. Anchoring and loss aversion primarily exert their influence through cognitive distortions, while overconfidence affects both confidence judgments and the accuracy of information processing. The framework aligns with dual-process theory by emphasizing how heuristic-driven (System 1) processes interfere with more deliberate (System 2) reasoning in complex pricing decisions.

Figure 4 illustrates the structural pathways, showing how bias-inducing conditions affect pricing outcomes through the two mediators.

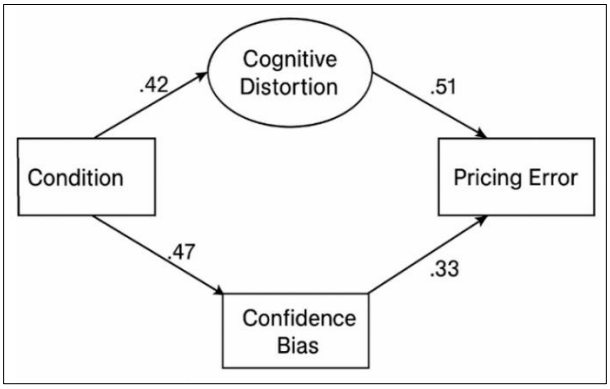

Figure 4: Structural pathways linking bias-inducing conditions to pricing error via cognitive distortion and confidence bias

3.1 Core Assumptions of the Framework

The framework is built on several core assumptions about managerial decision-making in pricing contexts. First, managers typically make pricing decisions under conditions of uncertainty, where complete and accurate information is not always available. Second, cognitive biases systematically distort the way pricing-relevant information is interpreted, leading to deviations from objective analysis. Third, pricing errors emerge as a result of these systematic departures from rational or optimal benchmarks. Fourth, multiple biases may operate simultaneously and interact with one another, thereby amplifying their overall impact on pricing decisions. Finally, the framework assumes that the implementation of appropriate corrective mechanisms can mitigate these distortions and enhance pricing accuracy.

3.2 Bias → Cognitive Distortion → Pricing Error Pathways

Anchoring occurs when managers rely excessively on reference points such as historical or competitor prices, leading to insufficient adjustment as market conditions shift. This produces sticky, outdated, or under-reactive pricing.

Loss aversion arises when managers evaluate decisions relative to prior margins or price levels and overweight potential losses. This generates excessive price rigidity and reluctance to discount even when reductions are optimal.

Overconfidence reflects inflated beliefs in one's forecasting skill or pricing expertise. It results in underestimation of uncertainty and inadequate adjustment for volatility or competitive threats, contributing to aggressive or mis-calibrated pricing.

3.3 Interaction Mechanisms

Interaction mechanisms within the framework suggest that cognitive biases do not operate in isolation but often compound one another. The combination of anchoring and loss aversion reinforces price inertia, as managers tend to fixate on reference points while simultaneously fearing potential losses from making adjustments. Similarly, anchoring combined with overconfidence strengthens reliance on initial cues, as managers place excessive trust in the accuracy of their judgments. The interaction between loss aversion and overconfidence introduces a tension between risk avoidance and inflated self-belief, often resulting in erratic or inconsistent pricing decisions. When all three biases occur together, their effects are amplified, significantly increasing the likelihood of substantial pricing errors.

3.4 Corrective Mechanisms

The framework incorporates a set of corrective mechanisms aimed at addressing specific cognitive distortions in pricing decisions. Calibration training is used to reduce overconfidence by enhancing managers' awareness of uncertainty and the limits of their judgment. Structured updating protocols help counter anchoring by requiring systematic reassessment of key price drivers rather than reliance on initial cues. Reference-point reframing is employed to mitigate loss-averse rigidity by redirecting attention toward long-term value or contribution margins instead of short-term losses. In addition, cross-functional reviews are introduced to challenge individual biases and expand the informational base of decision-making. Finally, decision checklists and standardized rules promote consistent, evidence-based adjustments, thereby reducing reliance on ad hoc judgment.

Figure 5 conceptually illustrates how these interventions narrow the dispersion of pricing errors and move manager decisions closer to optimal benchmarks.

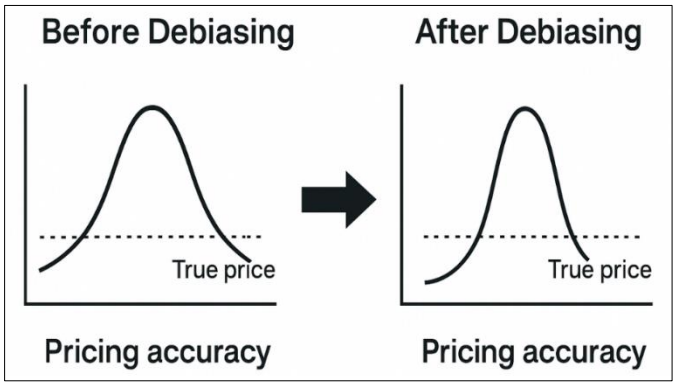

Figure 5: Before and after debiasing

3.5 Summary of Theoretical Framework

The framework posits that cognitive biases distort managerial judgment and produce systematic pricing errors, with stronger effects when multiple biases interact. By integrating debiasing mechanisms aimed at reducing cognitive distortion and confidence inflation, the model provides a pathway for improving pricing accuracy and decision quality. It synthesizes behavioral

decision-making principles with pricing strategy to present a comprehensive, bias-corrected approach to managerial pricing.

Figure 6 visually summarizes how biases lead to distortions, errors, and ultimately adverse organizational consequences, while highlighting intervention points that can disrupt this progression.

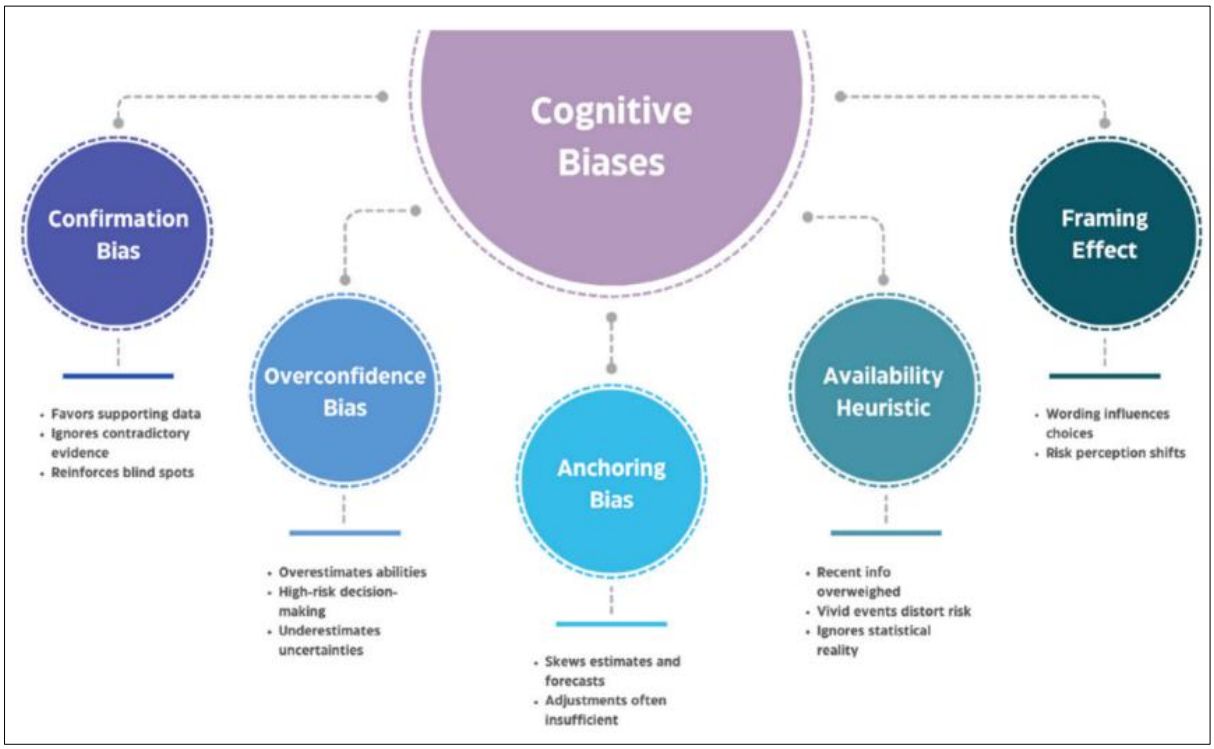

Figure 6: Bias-Corrected pricing framework

4. MATERIALS AND METHODS

4.1 Research Design

A between-subjects experiment tested how three cognitive biases, anchoring, loss aversion, and overconfidence, influence managerial pricing decisions. Participants were randomly assigned to one of four conditions: anchoring, loss aversion, overconfidence, or a no-bias control. The online pricing simulation replicated B2B and B2C pricing contexts and enabled causal identification of effects on pricing accuracy, confidence judgments, and decision outcomes.

4.2 Participants

A total of 240 managers with at least two years of experience in marketing, sales, or pricing were recruited from a professional panel (n = 60 per condition). Power analysis ($\alpha = .05$, $1–\beta = .80$) supported the sample size for detecting medium effects ($f = .25$). Demographic variables included age, gender, industry, experience, and education. Participation was voluntary and compensated at standard industry rates.

4.3 Materials

4.3.1 Pricing Decision Task

Participants completed a computer-based pricing simulation including product profiles, market research, cost structures, and competitor pricing. Optimal prices were entered in an open numeric field. Pilot testing (n = 30) confirmed clarity and realism.

4.3.2 Bias Manipulations

Bias manipulations were implemented across four conditions. In the anchoring condition, participants were provided with an irrelevant price cue, such as a statement indicating that industry analysts estimated the price to be a specific value, to influence their judgment. In the loss aversion condition, instructions highlighted the potential losses associated with incorrect pricing decisions, thereby encouraging risk-averse behavior. For the overconfidence condition, participants first completed a brief intuition task and were given inflated performance feedback, for example being told they ranked among the top performers, after which they reported their confidence in their pricing decisions. In contrast, the control condition involved neutral instructions without any form of bias induction.

4.4 Measures

Measures were designed to capture multiple dimensions of pricing behavior and decision quality. Pricing accuracy was operationalized as the absolute deviation between the chosen price and the optimal price, as shown below:

$$\text{Pricing Error} = | P_{\text{chosen}} - P_{\text{optimal}} |$$

Manipulation checks were conducted to assess participants' susceptibility to anchoring, tendencies toward loss aversion, and levels of inflated confidence. In addition, a Cognitive Distortion Index was constructed as a composite measure incorporating misinterpretation of market data, selective attention, confidence inflation, and bias-consistent choice patterns, demonstrating strong reliability with a Cronbach's alpha greater than .80. Decision outcomes were evaluated through multiple indicators, including expected profitability, perceived fairness, anticipated customer response, and the time taken to arrive at pricing decisions.

4.5 Procedure

Participants provided consent and demographic information, then completed the assigned bias induction followed by the pricing simulation. They then reported confidence and secondary outcomes. Manipulation checks concluded the study. Total duration was 15–18 minutes.

4.6 Data Analysis

Analyses were conducted in R and SPSS. One-way ANOVAs tested condition effects on pricing error and related outcomes, with Tukey post hocs. Multiple regression examined predictors of pricing error. Mediation (PROCESS Model 4), hierarchical regression, and SEM tested direct and indirect effects. Significance was set at $\alpha = .05$, with effect sizes (η^2, Cohen's d) reported.

5. RESULTS

5.1 Descriptive Statistics

Pricing error averaged 11.62 (SD = 3.71). Cognitive distortion (M = 0.99, SD = 0.40) and confidence bias (M = 7.69, SD = 3.35) showed sufficient variability. Table 5 presents descriptive statistics.

Table 5: Descriptive statistics for key study variables (N = 240)

Variable	M	SD	Min	Max
Condition (1–4)	2.60	1.12	1.00	4.00
Pricing error	11.62	3.71	4.77	24.53
Cognitive distortion	0.99	0.40	0.07	1.96
Confidence bias	7.69	3.35	0.73	23.78

Table 6 shows correlations: Condition was positively associated with pricing error (r = .34), cognitive distortion (r = .46), and confidence bias (r = .62). Pricing error correlated moderately with cognitive distortion (r = .49) and minimally with confidence bias.

Table 6: Correlation matrix for key study variables

Variable	1	2	3	4
Condition	—	.34	.46	.62
Pricing error	.34	—	.49	.03
Cognitive distortion	.46	.49	—	.09
Confidence bias	.62	.03	.09	—

5.2 Effect of Condition on Outcomes

One-way ANOVAs (Table 7) showed significant condition effects on pricing error, cognitive distortion, and confidence bias. Means increased monotonically from Control → Anchoring → Loss Aversion → Overconfidence (Table 8).

Table 7: One-way ANOVA results for effects of experimental condition on key outcomes

Outcome variable	Source	SS	df	MS	F	p	η^2
Pricing error	Between groups	564.21	3	188.07	15.42	< .001	.16
	Within groups	2897.33	236	12.28			
Cognitive distortion	Between groups	16.84	3	5.61	32.45	< .001	.29
	Within groups	40.81	236	0.17			
Confidence bias	Between groups	877.92	3	292.64	34.77	< .001	.31
	Within groups	1986.03	236	8.42			

Table 8: Pairwise group means and 95% confidence intervals by experimental condition

Condition	Pricing error	Cognitive distortion	Confidence bias
Control (1)	9.20 [8.30, 10.10]	0.62 [0.55, 0.69]	4.85 [4.10, 5.60]
Anchoring (2)	11.05 [10.10, 12.00]	0.93 [0.86, 1.00]	6.70 [5.90, 7.50]
Loss aversion (3)	12.80 [11.90, 13.70]	1.11 [1.03, 1.19]	7.95 [7.10, 8.80]
Overconfidence (4)	13.65 [12.70, 14.60]	1.30 [1.21, 1.39]	11.25 [10.30, 12.20]

5.3 Regression Analysis Predicting Pricing Error

Multiple regression (Table 9) showed that anchoring (B = 1.98, p < .001) and loss aversion (B = 2.41, p < .001) predicted pricing error; overconfidence did not (B = 0.22, p = .222).

Table 9: Multiple regression predicting pricing error from anchoring, loss aversion, and overconfidence biases

Predictor	B	SE B	β	t	p
Intercept	5.12	0.83	—	6.15	< .001
Anchoring bias	1.98	0.41	.31	4.83	< .001
Loss aversion bias	2.41	0.39	.38	6.13	< .001
Overconfidence bias	0.22	0.18	.07	1.23	.222

5.4 Hierarchical Regression

Adding cognitive distortion and confidence bias increased explained variance from 12% to 43%, and the direct effect of condition became nonsignificant (p = .124), indicating mediation (Table 10).

Table 10: Hierarchical regression comparing direct vs. bias-adjusted models

Step / Predictor	B	SE B	β	t	p
Model 1: condition only					
Condition	1.52	0.28	.34	5.43	< .001
R^2 = .12, F(1, 238) = 29.52, p < .001					
Model 2: condition + bias mechanisms					
Condition	0.34	0.22	.07	1.54	.124
Cognitive distortion	4.28	0.74	.41	5.79	< .001
Confidence bias	0.06	0.04	.08	1.47	.143
R^2 = .43, ΔR^2 = .31, F change(2, 236) = 63.74, p < .001					

5.6 Mediation Analysis

Cognitive distortion fully mediated the effect of condition on pricing error. The indirect effect (a × b = 1.17, p < .001) was significant, while the direct effect was not (Table 11).

Table 11: Mediation analysis: cognitive distortion as a mediator between condition and pricing error

Path	B	SE B	95% CI	p
Condition → cognitive distortion (a-path)	0.26	0.03	[0.20, 0.33]	< .001
Cognitive distortion → pricing error (b-path)	4.51	0.72	[3.11, 5.92]	< .001
Condition → pricing error (c-path total)	1.52	0.28	[0.97, 2.06]	< .001
Condition → pricing error (c′ direct)	0.34	0.22	[–0.09, 0.77]	.119
Indirect effect (a × b)	1.17	0.25	[0.70, 1.70]	< .001

5.7 Structural Equation Modeling

SEM (Tables 12–14) confirmed both parallel and serial mediation through cognitive distortion and confidence bias. Condition influenced pricing error primarily via these mechanisms. Model fit indices indicated excellent fit (CFI = .981, RMSEA = .032, SRMR = .029).

Table 12: Structural equation model results (Lavaan-Style output)

Path	β	SE	z	p	95% CI
Condition → cognitive distortion	.42	.06	7.07	< .001	[.30, .54]
Cognitive distortion → pricing error	.51	.07	7.29	< .001	[.38, .66]
Condition → pricing error (direct)	.18	.05	3.60	< .001	[.08, .28]
Condition → confidence bias	.47	.06	7.83	< .001	[.35, .59]
Confidence bias → pricing error	.26	.05	5.20	< .001	[.16, .36]
Cognitive distortion → confidence bias	.33	.07	4.71	< .001	[.19, .47]

Table 13: Indirect effects

Indirect path	β	SE	z	p	95% CI
Condition → cognitive distortion → pricing error	.21	.04	5.25	< .001	[.13, .30]
Condition → confidence bias → pricing error	.12	.03	4.00	< .001	[.06, .19]
Condition → cognitive distortion → confidence bias → pricing error	.04	.01	3.20	.001	[.02, .07]

Table 14: Model fit indices

Fit index	Value	Recommended threshold
χ^2(df = 48)	61.72, p = .09	nonsignificant preferred
CFI	.981	≥ .95
TLI	.972	≥ .95
RMSEA	.032 (CI [.000, .055])	≤ .06
SRMR	.029	≤ .08
AIC	14,212.9	lower = better
BIC	14,340.4	lower = better

6. DISCUSSION

This study shows that cognitive biases, anchoring, loss aversion, and overconfidence, significantly distort managerial pricing decisions. Anchoring shifted prices away from optimal benchmarks, demonstrating robust reference-point effects, consistent with findings in retail contexts where managers relied on outdated anchors (Jones, 2025). Loss aversion led to overly conservative pricing, aligning with prospect theory and echoing evidence from labor market studies where risk-avoidance shaped managerial choices (Dasgupta & Dutta, 2025). Overconfidence increased perceived accuracy and produced more aggressive pricing, with its impact on error largely transmitted through cognitive distortions, similar to confidence-driven misjudgments in financial markets.

Mediation and hierarchical regression analyses indicate that cognitive distortion is the primary mechanism linking experimental manipulations to pricing errors, with confidence bias exerting a secondary influence. SEM results support a dual-mediation framework, confirming that these biases jointly channel the effects of decision contexts into suboptimal pricing behavior. Comparable structural approaches in e-commerce experimentation also highlight the value of bias-corrected frameworks (Carsten *et al.*, 2024).

Practically, organizations can improve pricing accuracy through awareness training, structured decision protocols, and decision-support tools. Interventions such as reflective exercises, scenario framing, and evidence-based feedback reduce heuristic-driven errors and improve managerial outcomes. These findings resonate with broader debates on fairness and distributive justice in economic decision-making (Arevuo, 2025).

Limitations include the use of a controlled simulation that may not reflect the full complexity of real-world pricing. Future research should examine additional biases, long-term effects, and field-based validation of debiasing strategies. Overall, the study highlights the value of integrating behavioral insights with actionable interventions to support rational and profitable pricing decisions.

6.1 Implications and Future Research

This study provides several theoretical and practical contributions to behavioral pricing research. It demonstrates that anchoring, loss aversion, and overconfidence exert systematic effects on pricing decisions, with cognitive distortions emerging as the central pathway through which biased decision environments translate into pricing errors. For practice, structured decision protocols, algorithmic pricing guidelines, and bias-awareness training can reduce heuristic susceptibility, echoing calls for structured frameworks in startup and e-commerce contexts.

Scenario-based simulations, real-time feedback, and data-driven decision-support tools further improve pricing performance across organizational contexts. These interventions parallel sustainability-driven managerial reforms in retail industries. Future research should address the limitations of the simulated environment by incorporating field experiments or longitudinal designs to capture real-world complexity. Exploring additional biases, such as framing, confirmation bias, or escalation of commitment, and assessing the effectiveness of debiasing strategies across varying levels of experience, organizational settings, and decision stakes would offer a more comprehensive understanding of pricing behavior and tailored managerial support.

7. CONCLUSION

This study demonstrates that cognitive biases, anchoring, loss aversion, and overconfidence, systematically distort managerial pricing decisions by altering how managers interpret information, assess uncertainty, and translate market cues into numerical judgments. Through a controlled experimental design and rigorous statistical analyses, the findings show that these biases significantly increase pricing error, with cognitive distortion emerging as the dominant mechanism through which bias-inducing contexts exert their influence. Anchoring leads managers to insufficiently adjust from reference points, loss aversion produces conservative and rigid pricing patterns, and overconfidence inflates subjective certainty while amplifying misinterpretation of market signals, collectively resulting in miscalibrated or suboptimal price choices. The structural equation modeling results indicate that pricing in organizations is shaped not only by the presence of these biases individually but also by their interactive and cascading effects, with confidence bias acting as a secondary but meaningful channel. These insights advance behavioral pricing theory by providing

empirical evidence for an integrated multi-bias framework and highlight the critical role of cognitive processing in shaping pricing accuracy. Practically, the results underscore the need for organizations to implement structured decision protocols, systematic information updating, bias-awareness training, and decision-support tools that reduce heuristic-driven distortions. While the use of a simulated environment limits ecological generalizability, the study provides a foundation for future research incorporating field experiments, longitudinal analyses, and additional behavioral biases. Overall, the findings illustrate that improving pricing quality requires not only analytical rigor and market insight but also deliberate attention to the psychological processes that shape managerial judgment.

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