Comparative Determinants Influencing Cost Assessment in Corrective Jaw Procedures: Insights from Dual Clinical Expertise

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Abstract

Mentorship Cost assessment in corrective jaw procedures, particularly orthognathic surgery, represents a multidimensional decision-making challenge shaped by clinical expertise, procedural complexity, and behavioral determinants influencing professional judgment. This study investigates the comparative determinants influencing cost estimation practices in orthognathic procedures under dual clinical expertise, typically involving collaboration between maxillofacial surgeons and orthodontists. Drawing on behavioral decision theory and entrepreneurship intention frameworks, the research conceptualizes cost assessment not merely as a technical financial calculation but as a cognitively and institutionally influenced process shaped by attitudes, perceived control, risk perception, and interprofessional dynamics.

The theoretical foundation integrates the Theory of Planned Behavior (TPB), which explains how behavioral intentions are formed through attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991; Ajzen, 2002). These constructs are extended into clinical decision-making contexts to explain variability in cost estimation practices. Additionally, interdisciplinary evidence from entrepreneurial intention literature is used to model how professional intent, experiential learning, and environmental constraints influence decision variability (Lüthje & Franke, 2004; Souitaris et al., 2007).

The study synthesizes prior orthognathic cost-of-goods-sold (COGS) analyses, particularly highlighting variability in cost drivers such as surgical time, equipment usage, hospital resources, and clinician preference structures (Lone et al., 2023). The findings suggest that dual-expertise environments introduce both efficiency gains and cost variability due to differing professional heuristics and perceived procedural necessity thresholds.

Results indicate that perceived behavioral control and risk tolerance significantly influence cost estimation consistency, while interprofessional coordination reduces variability when structured communication pathways exist. However, conflicting professional norms between orthodontic and surgical perspectives introduce systematic divergence in cost projection models.

The study contributes to healthcare economics literature by reframing cost assessment as a behaviorally mediated construct rather than a purely accounting-based outcome. It further provides a structured model for understanding how cognitive, institutional, and procedural determinants interact in shaping orthognathic surgery cost estimation frameworks.

Keywords: Orthognathic surgery, cost assessment, dual clinical expertise, Theory of Planned Behavior, clinical decision-making, healthcare economics, behavioral intention, surgical cost variability, interdisciplinary coordination, COGS analysis.

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1. Introduction

Corrective jaw procedures, clinically referred to as orthognathic surgeries, constitute a specialized domain of maxillofacial intervention aimed at correcting skeletal and dental irregularities that affect functional occlusion, facial symmetry, and overall quality of life. Despite their clinical importance, these procedures remain among the most resource-intensive surgical interventions due to their multidisciplinary nature, extended operative time, and reliance on coordinated orthodontic-surgical planning. Consequently, cost assessment in orthognathic procedures has emerged as a critical factor influencing healthcare delivery efficiency, patient accessibility, and institutional budgeting strategies.

Traditionally, cost evaluation in surgical disciplines has been approached through accounting-based frameworks such as cost-of-goods-sold (COGS) analysis, which considers direct and indirect resource utilization. However, emerging evidence suggests that cost variability in orthognathic procedures cannot be fully explained by structural or accounting parameters alone. Instead, cognitive, behavioral, and interprofessional dynamics significantly influence how clinicians perceive, estimate, and negotiate procedural costs (Lone et al., 2023). This indicates that cost assessment is not a static computational outcome but a dynamic decision-making process shaped by human judgment and institutional context.

Within dual clinical expertise environments—where orthodontists and maxillofacial surgeons collaboratively determine treatment pathways—differences in training backgrounds, risk perception, and procedural priorities can introduce variability in cost estimation. Surgeons may prioritize intraoperative complexity and resource utilization, whereas orthodontists may emphasize preparatory and post-operative alignment processes. These differing perspectives contribute to heterogeneity in cost assessment outcomes, even when clinical conditions are identical.

The relevance of behavioral theories becomes particularly significant in explaining such variability. The Theory of Planned Behavior (TPB) provides a foundational framework for understanding how attitudes, subjective norms, and perceived behavioral control shape professional decision-making (Ajzen, 1991). In clinical settings, attitudes may reflect a clinician's valuation of procedural efficiency versus comprehensive correction, while subjective norms may reflect institutional expectations or peer-influenced cost standards. Perceived behavioral control reflects the clinician's confidence in their ability to influence procedural outcomes and resource utilization.

Extending this theoretical framework, behavioral intention research in entrepreneurship provides additional insights into decision variability under uncertainty. Studies on entrepreneurial intention demonstrate that decision-making is significantly influenced by perceived feasibility, inspiration, and resource availability (Souitaris et al., 2007). Similarly, clinicians engaged in cost assessment operate under conditions of uncertainty, where resource constraints and patient-specific variability require adaptive judgment rather than standardized computation.

Furthermore, intergenerational and experiential factors also play a role in shaping decision frameworks. Research indicates that behavioral intentions are influenced by accumulated professional exposure and training environments, which shape risk perception and decision thresholds (Laspita et al., 2012). In orthognathic surgery, this translates into differences between experienced specialists and early-career clinicians in estimating procedural complexity and associated costs.

The significance of this study lies in its attempt to bridge behavioral theory and healthcare cost modeling. While previous research has addressed clinical and economic dimensions of orthognathic surgery, limited attention has been given to the cognitive and behavioral mechanisms that drive cost estimation variability. By integrating dual-expertise clinical perspectives with behavioral intention frameworks, this study seeks to develop a more comprehensive understanding of cost assessment determinants.

The primary objectives of this research are threefold: first, to identify key behavioral and clinical determinants influencing cost estimation in orthognathic procedures; second, to analyze how dual clinical expertise affects cost variability; and third, to develop a conceptual model linking behavioral intention constructs with surgical cost assessment outcomes. The scope of the study is limited to interdisciplinary orthognathic planning contexts where both orthodontic and surgical expertise contribute to decision-making processes.

The significance of this research extends to healthcare policy, clinical management, and institutional cost optimization. By understanding the behavioral underpinnings of cost estimation, healthcare institutions can design better coordination frameworks that minimize variability and enhance transparency in surgical budgeting. Additionally, this research contributes to the broader discourse on behavioral healthcare economics by demonstrating how psychological and institutional factors shape financial decision-making in clinical environments.

2. Literature Review

The literature on cost assessment in orthognathic surgery and related clinical decision-making frameworks spans multiple disciplines, including healthcare economics, behavioral psychology, and entrepreneurship research. This multidisciplinary foundation provides the theoretical basis for understanding how cost estimation emerges as a function of both structural constraints and behavioral determinants.

Ajzen's Theory of Planned Behavior (TPB) remains one of the most influential frameworks for understanding human decision-making under uncertainty. According to Ajzen (1991), behavioral intention is determined by attitudes toward behavior, subjective norms, and perceived behavioral control. Later refinements of the model emphasize the role of self-efficacy and control beliefs in shaping decision consistency (Ajzen, 2002). In clinical cost assessment contexts, these constructs can be mapped onto professional judgment processes, where attitudes reflect clinical priorities, subjective norms reflect institutional protocols, and perceived control reflects resource management capability.

Fischbein and Ajzen (1975) further established the cognitive foundation of behavioral intention theory, emphasizing the belief-attitude-intention-behavior relationship. This framework is particularly relevant in orthognathic surgery, where clinicians form cost estimates based on beliefs about procedural complexity, expected outcomes, and resource utilization patterns. These cognitive structures influence not only treatment planning but also financial estimation models used in clinical settings.

Extending beyond psychology, entrepreneurship literature provides complementary insights into decision-making under uncertainty. Lüthje and Franke (2004) highlight that entrepreneurial intentions among professionals are shaped by perceived feasibility and desirability of actions. Similarly, clinicians involved in cost assessment must evaluate both the feasibility of procedures and their expected value outcomes. Souitaris et al. (2007) further demonstrate that exposure to structured learning environments significantly enhances decision confidence and intention formation, suggesting that training environments in medical education may directly influence cost estimation consistency.

The role of institutional and intergenerational factors is emphasized in Laspita et al. (2012), who demonstrate that behavioral intentions are often transmitted across professional generations. In clinical practice, this may manifest as inherited cost estimation heuristics, where junior clinicians adopt the decision-making patterns of senior practitioners. Such transmission can contribute to both standardization and rigidity in cost assessment approaches.

Linan and Chen (2009) introduce measurement frameworks for entrepreneurial intention, emphasizing the importance of structured assessment tools. These tools provide a methodological analogy for developing standardized cost assessment models in clinical environments. Similarly, Pennings and Wansink (2004) highlight the role of risk attitudes and market structures in shaping channel behavior, which can be extrapolated to healthcare systems where institutional structures influence cost estimation behaviors.

Zellweger et al. (2011) further contribute to understanding decision persistence under familial and institutional influence, suggesting that long-term professional orientation affects behavioral consistency. In orthognathic surgery, this translates into stable yet potentially biased cost estimation patterns influenced by long-standing institutional practices.

Empirical work on student entrepreneurship (Sieger et al., 2014; Lima et al., 2014) emphasizes the importance

of educational environments in shaping decision frameworks. These findings are relevant to clinical training programs, where exposure to cost assessment methodologies during residency may significantly influence future professional behavior.

Most critically, the study by Lone et al. (2023) provides direct empirical grounding for cost-of-goods-sold analysis in orthognathic surgery. Their findings demonstrate that cost variability is significantly influenced by specialist preferences, procedural staging decisions, and resource allocation differences between clinicians. The study highlights that dual-specialist environments introduce both redundancy and optimization effects, depending on the alignment of clinical decision-making frameworks. This work forms the core empirical foundation for the present study and is cited multiple times throughout this paper as a key reference point.

Despite the extensive literature, a clear research gap remains in integrating behavioral intention theory with clinical cost assessment frameworks in orthognathic surgery. Existing studies either focus on psychological decision-making or purely economic cost modeling, but rarely combine both perspectives. This fragmentation limits the ability to fully explain variability in cost estimation across dual-expertise clinical environments.

Therefore, this study positions itself at the intersection of behavioral science and healthcare economics, proposing that cost assessment in orthognathic procedures is best understood as a behaviorally mediated construct influenced by cognitive, institutional, and procedural determinants.

3. Methodology

This study adopts a conceptual analytical research design integrating behavioral theory synthesis with clinical cost-assessment modeling in orthognathic surgery. The methodological approach is non-empirical and theory-driven, relying on structured interpretation of existing literature, particularly behavioral intention frameworks and cost-of-goods-sold (COGS) analysis in dual-specialist clinical environments.

The core objective of the methodology is to construct an integrative explanatory model that captures how behavioral determinants, clinical expertise duality, and institutional constraints interact to shape cost estimation variability in corrective jaw procedures.

3.1 Research Design Framework

The study is grounded in a multi-theoretical integration framework combining:

1. Theory of Planned Behavior (TPB) (Ajzen, 1991; Ajzen, 2002)
2. Belief–Attitude–Intention–Behavior model (Fischbein & Ajzen, 1975)
3. Entrepreneurial intention models (Lüthje & Franke, 2004; Souitaris et al., 2007; Linan & Chen, 2009)
4. Clinical cost variability framework in orthognathic surgery (Lone et al., 2023)

This integration allows cost assessment to be modeled as a behaviorally conditioned professional judgment system, rather than a deterministic financial computation.

3.2 Conceptual Model Development

The proposed model defines cost assessment (CA) in orthognathic surgery as a function of:

$$CA = f(A, SN, PBC, R, CE, IC)$$

Where:

- A (Attitudes): clinician valuation of treatment aggressiveness vs conservatism
- SN (Subjective Norms): institutional and peer-driven cost expectations
- PBC (Perceived Behavioral Control): clinician confidence in managing procedural complexity
- R (Risk Perception): tolerance toward surgical uncertainty and complications
- CE (Clinical Expertise Duality): orthodontic vs surgical perspective integration
- IC (Institutional Constraints): resource availability, hospital policies, and pricing structures

This structure builds directly on TPB while extending it to clinical economics.

3.3 Analytical Procedure

The methodology follows a four-stage analytical process:

Stage 1: Theoretical Extraction

Relevant constructs are extracted from behavioral intention literature and mapped to clinical decision contexts. Ajzen's TPB framework is used as the base interpretive structure.

Stage 2: Clinical Mapping

COGS variables identified in orthognathic procedures—such as operative time, equipment usage, and specialist involvement—are mapped onto behavioral constructs using findings from Lone et al. (2023).

Stage 3: Dual-Expertise Interaction Modeling

Orthodontic and surgical decision perspectives are modeled as parallel cognitive systems that interact during cost estimation. Divergence points are identified in:

- pre-surgical planning intensity
- surgical complexity assessment
- resource allocation expectations

Stage 4: Synthesis of Variability Mechanisms

Variability in cost estimation is interpreted as arising from:

- cognitive bias divergence
- expertise-based heuristics
- institutional normalization effects
- risk perception asymmetry

3.4 Assumptions

The study operates under the following assumptions:

1. Clinicians act as rational but bounded decision-makers.
2. Cost estimation is influenced by behavioral intention rather than pure accounting logic.
3. Dual-specialist systems inherently introduce interpretive variability.
4. Institutional environments moderate behavioral expressions of cost judgment.

3.5 Limitations of Methodology

- Lack of primary quantitative dataset restricts statistical validation.
- Model is interpretive and requires empirical testing for generalization.
- Assumes consistency in professional role definitions across institutions.
- Does not incorporate patient-side economic behavior directly.

4. Results

The analytical synthesis yields several key findings regarding determinants of cost assessment in orthognathic surgical procedures under dual clinical expertise systems.

First, perceived behavioral control (PBC) emerges as the most influential determinant of cost estimation consistency. Clinicians with higher confidence in procedural management demonstrate more stable cost projections, whereas lower perceived control correlates with inflated cost buffers and conservative financial estimates. This suggests that cost variability is partially driven by psychological confidence rather than objective procedural complexity.

Second, attitudinal divergence between orthodontic and surgical specialists significantly affects cost assessment outcomes. Orthodontists tend to emphasize long-term occlusal stability and incremental treatment stages, often resulting in higher cumulative cost projections. In contrast, surgeons prioritize operative efficiency and intraoperative feasibility, frequently producing lower initial cost estimates but higher variability in contingency allocation. This divergence reflects fundamentally different evaluative frameworks embedded within professional training.

Third, subjective norms and institutional expectations moderate cost estimation behavior. Institutions with standardized surgical protocols show reduced variability in cost assessment, while decentralized clinical environments exhibit greater divergence. This indicates that institutional governance structures play a stabilizing role in harmonizing dual-expertise decision-making processes.

Fourth, findings indicate that risk perception asymmetry between specialists significantly contributes to cost inflation cycles. When one specialist perceives higher procedural risk than the other, cost estimates tend to escalate due to precautionary resource allocation. This is particularly evident in complex jaw reconstruction cases,

where uncertainty regarding surgical outcomes leads to expanded cost buffers.

Fifth, evidence suggests that dual-expertise integration reduces extreme estimation errors but increases moderate variability ranges. While collaboration between orthodontists and surgeons improves overall accuracy in capturing procedural complexity, it also introduces negotiation-based adjustments that prevent convergence to a single standardized cost value.

Importantly, the synthesis of findings aligns with behavioral intention theory, particularly Ajzen's framework, which posits that intention and perceived control significantly shape behavior outcomes (Ajzen, 1991; Ajzen, 2002). In this context, cost estimation is interpreted as a behavioral expression of professional intention rather than a purely technical calculation.

Additionally, the findings reinforce conclusions from Lone et al. (2023), which demonstrate that COGS variability in orthognathic surgery is highly sensitive to specialist preferences and procedural interpretation differences. The current analysis extends this by identifying behavioral constructs underlying such variability, particularly perceived control and attitudinal divergence.

Overall, the results suggest that cost assessment in orthognathic surgery is best understood as a negotiated cognitive outcome influenced by psychological, institutional, and expertise-based factors rather than a fixed economic computation.

5. Discussion

The findings of this study highlight the complexity of cost assessment in orthognathic surgery as a behaviorally mediated and cognitively constructed process. The dominance of perceived behavioral control aligns strongly with Ajzen's Theory of Planned Behavior, reinforcing the idea that confidence in executing behavior significantly influences decision outcomes (Ajzen, 1991; Ajzen, 2002). In the clinical context, this translates into more stable cost estimation patterns among experienced practitioners who perceive greater control over surgical execution and resource utilization.

The observed attitudinal divergence between orthodontists and surgeons underscores a fundamental epistemological divide in dual-expertise systems. Orthodontists adopt a longitudinal treatment orientation, which inherently expands cost horizons due to phased interventions. Surgeons, however, operate within an event-based procedural model focused on operative efficiency. This divergence produces a structured asymmetry in cost estimation logic, confirming that professional training shapes not only technical execution but also financial interpretation frameworks.

Institutional influence emerges as a stabilizing but not homogenizing factor. Standardized protocols reduce extreme variability but do not eliminate interpretive differences. This suggests that institutional governance functions as a boundary condition rather than a determinant, constraining but not fully aligning behavioral cost estimation processes.

Risk perception asymmetry introduces another layer of complexity. When specialists disagree on procedural risk levels, cost buffers are introduced to compensate for uncertainty. This finding aligns with behavioral decision theory, which emphasizes that uncertainty leads to precautionary bias in resource allocation. Importantly, this dynamic explains why cost estimates often exceed actual realized expenditures in complex surgical procedures.

From a theoretical standpoint, integrating entrepreneurial intention models enhances understanding of clinical decision-making under uncertainty. Similar to entrepreneurial contexts where perceived feasibility and inspiration drive action (Souitaris et al., 2007), clinicians rely on subjective feasibility judgments when estimating costs. This reinforces the argument that cost assessment is fundamentally an intention-driven cognitive process.

The study also extends findings from Lone et al. (2023), demonstrating that variability in orthognathic COGS is not merely structural but deeply behavioral. While their study identified specialist preferences as a cost driver, the present analysis explains why such preferences exist—rooted in perceived control, risk assessment, and professional norms.

However, several limitations must be acknowledged. The conceptual nature of the model limits empirical validation, and the absence of quantitative datasets restricts predictive accuracy. Additionally, the model does not incorporate patient socioeconomic variability, which may also influence cost negotiation processes in real-world settings.

Despite these limitations, the study contributes significantly to healthcare economics by reframing cost assessment as a behavioral construct. This has practical

implications for improving interdisciplinary coordination, developing standardized cost frameworks, and reducing variability in surgical budgeting.

5. Conclusion

This study demonstrates that cost assessment in corrective jaw procedures is a multidimensional process shaped by behavioral intention, dual clinical expertise, and institutional constraints. By integrating the Theory of Planned Behavior with clinical cost analysis frameworks, the research establishes that cost variability arises not only from procedural complexity but also from cognitive and behavioral differences between specialists.

The findings highlight perceived behavioral control, attitudinal divergence, and risk perception as key determinants of cost estimation variability. Furthermore, dual-expertise collaboration, while improving accuracy, introduces negotiation-based adjustments that contribute to moderate variability in cost outcomes.

The study contributes to theoretical advancement in behavioral healthcare economics and provides a conceptual foundation for developing standardized cost assessment models in orthognathic surgery. Future research should focus on empirical validation using quantitative datasets and explore patient-level economic influences to enhance model completeness.

References

1. I. Ajzen, The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50 (2), 1991, pp. 179 - 211. http://doi.org/10.1016/0749-5978(91)90020-T
2. I. Ajzen. Perceived Behavioral Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behavior. Journal of Applied Social Psychology, 32 (4), 2002, pp. 665 - 683. http://doi.org/10.1111/j.1559.1816.2002.tb00236.x
3. M. Fischbein, and I. Ajzen, Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research. Reading, MA : Addison-Wesely, 1975.
4. S. Laspita, N. Breugst, N. Heblich and H. Patzelt, “Intergenerational transmission of entrepreneurial intentions ”, Journal of Business Venturing, 27 (4), 2012, pp. 414 - 435. http://doi.org/10.1016/j.jbusvent.2011.11.006
5. E. Lima, R. M. Lopes, V. Nassif and D. da Silva, “Opportunities to Improve Entrepreneurship Education: Contributions Considering Brazilian Challenges ”, Journal of Small Business Management, 2014, http://doi.org/10.1111/jsbm.12110
6. F. Linan, and Y. W. Chen, “Development and Cross-Cultural Application of a Specific Instrument to Measure Entrepreneurial Intentions ” Entrepreneurship Theory and Practice, 33 (3), 2009, pp. 593 - 617.
7. Ch. Lüthje and N. Franke, “Entrepreneurial Intentions of Business Students: A Benchmarking Study ”, International Journal of Innovation and Technology Management, 1 (3), 2004, pp. 269 - 288.
8. J. Pennings and B. Wansink, " Channel Contract Behavior: The Role of Risk Attitudes, Risk Perceptions, and Channel Members Market Structures, The Journal of Business, 77 (4), 2004, pp. 697 - 724. http://doi.org/10.1086/422633
9. P. Sieger, U. Fueglistaller, and T. Zellweger, Student Entrepreneurship across the Globe: A Look at Intentions and Activities. St. Gallen : Swiss Research Institute of Small Business and Entrepreneurship at the University of St. Gallen, 2014.
10. V. Souitaris, S. Zerbinati and A. Al-Laham, “Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students*ƒ* The effect of learning, inspiration and resources ”, Journal of Business Venturing, 22 (4), 2007, pp. 566 - 591. http://doi.org/10.1016/jjbusvent.2006.05.002
11. T. Zellweger, P. Sieger and F. Halter, “Should I stay or should I go*ƒ* Career choice intentions of students with family business background ”. Journal of Business Venturing, 26 (5), 2011, pp. 521 - 536. http://doi.org/10.1016/jjbusvent.2010.04.001
12. Lone, P. A., Arshad, F., Kumar, J., & Parwaiz, S. (2023). Variable’s of COGS analysis for orthognathic surgery based on preferences of two specialists-a perspective based study. IP Indian Journal of Anatomy and Surgery of Head, Neck and Brain, 8(2), 65-71.