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Internet Advertising Falsity and Consumer Harm: A Moderated Mediation Analysis of Consumer Cognitive Processes and Consumer Vulnerability

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Abstract

Internet advertising, while enabling unprecedented commercial reach, has become a pervasive vehicle for deceptive practices that inflict measurable harm on consumers. This study empirically investigates the structural relationships between internet advertising falsity and consumer harm by integrating analyses of the mediating role of consumer cognitive processes and the moderating role of consumer vulnerability within a unified structural framework. Survey data were collected from 600 adult consumers with online purchase experience in the Republic of Korea—an advanced digital economy characterized by exceptionally high mobile-commerce penetration, mature e-commerce infrastructure, and evolving digital consumer protection regulation—and analyzed using structural equation modeling (SEM) with AMOS 24.0, supplemented by Hayes' PROCESS macro Model 59 for conditional process analysis. All 13 hypotheses were supported, although path magnitudes varied substantially across falsity dimensions and mediator pathways—with direct effects ranging from $\beta = 0.156$ (false scarcity) to $\beta = 0.224$ (performance exaggeration), and indirect effects dominated by the risk assessment distortion pathway. Among the four sub-dimensions of advertising falsity—factual misrepresentation, performance exaggeration, price deception, and false scarcity—performance exaggeration exerted the strongest direct effect on consumer harm. The three cognitive mediators—perceived advertising credibility, risk assessment distortion, and purchase decision pressure—all demonstrated significant partial mediation, with risk assessment distortion emerging as the most powerful indirect pathway. All four consumer vulnerability dimensions—digital literacy level, demographic vulnerability, prior victimization experience, and impulsive buying tendency—significantly moderated the falsity–harm relationship, with low-digital-literacy consumers experiencing approximately 1.7 times the adverse effect of high-literacy counterparts. Moderated mediation analysis revealed that the conditional indirect effect for the high-vulnerability group was approximately 2.3 times that of the low-vulnerability group, confirming that the cognitive harm mechanism intensifies systematically for vulnerable consumers. These findings advance consumer vulnerability theory in the digital context and offer evidence-based implications for consumer protection policy, platform governance, and digital literacy education.

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1. Introduction

Internet advertising has become the dominant commercial communication medium of the twenty-first century, with global digital advertising expenditure surpassing approximately USD 740 billion in 2024 [1]. Yet this expansion carries a structural paradox: the very mechanisms that enable information dissemination at unprecedented scale simultaneously create conditions under which false and misleading advertising can proliferate with minimal friction, inflicting measurable economic and psychological harm on consumers who lack the resources or capacity to resist sophisticated deceptive practices. The proliferation of mobile commerce and social media platforms has further multiplied consumers' exposure to advertising, amplifying both the reach and the risks of deceptive commercial communication.

The scale of consumer harm attributable to false online advertising is both substantial and structurally underreported. The Federal Trade Commission [2] has documented the pervasive spread of deceptive advertising practices across major digital platforms, and coordinated international enforcement data indicate that the true scope of harm extends far beyond what official complaint statistics capture. Rhodes and Wilson [3] established that false advertising deepens information asymmetry, impedes rational consumer decision-making, and reduces overall market efficiency. Deceptive advertising practices must therefore be understood not as isolated consumer grievances but as structural problems that erode the trust foundations upon which digital markets depend.

The falsity problem in internet advertising is qualitatively distinct from its offline counterpart across four dimensions. First, the extraordinary speed of digital content generation renders ex ante regulatory verification practically impossible. Second, the blurring of advertising and organic content—through native advertising formats, consumer reviews, and influencer marketing—systematically undermines consumers' capacity to identify false information. Third, dark pattern interface designs [4] exploit cognitive vulnerabilities at scale: a systematic crawl of approximately 11,000 shopping websites identified 1818 dark pattern instances, with overt deceptive practices confirmed on 183 sites. Fourth, the emergence of AI-generated synthetic content—including algorithmically fabricated reviews and deepfake-based endorsements—introduces a qualitatively new dimension of deception for which existing regulatory mechanisms remain structurally unprepared. These converging developments have prompted landmark regulatory responses: the EU Digital Services Act (Article 25, 2022) established the first explicit legal prohibition on dark patterns, while an ICPEN [5] sweep found that 75.7% of 642 major commercial websites deployed at least one dark pattern, confirming that deceptive digital design has become a structural feature of the contemporary online marketplace.

The harm from internet advertising falsity is not uniformly distributed: consumer vulnerability profoundly shapes differential exposure and susceptibility. The OECD [6] documented that certain consumer groups face disproportionate harm in digital advertising environments. Baker et al.'s [7] foundational framework conceptualizes vulnerability as a dynamic state arising from the interaction of individual characteristics, situational factors, and market conditions. Helberger et al. [8] extended this framework to argue that in digital markets, vulnerability is an architecturally produced condition—generated by datafied consumer–seller relations, algorithmic profiling, and dynamically personalized persuasion systems designed to identify and exploit momentary cognitive susceptibility.

This architectural understanding implies that harm-generating effects of advertising falsity are structurally amplified for consumers with fewer cognitive, informational, or economic resources, making vulnerability a theoretically central rather than merely demographic variable in the study of advertising harm.

Despite these concerns, existing research exhibits four critical limitations. First, advertising falsity has been treated as a unidimensional concept, obscuring the distinct harm mechanisms associated with factual misrepresentation, performance exaggeration, price deception, and false scarcity [9]. Second, the psychological mechanisms mediating the falsity–harm pathway remain insufficiently theorized: while Xie et al. [10] analyzed perceived deception and anticipated harm separately, and Bothma and van Staden [11] demonstrated that perceived deception significantly reduces online repurchase intention, no integrated test of the cognitive mechanisms mediating the falsity–harm pathway has been conducted. Third, the boundary-conditioning role of consumer vulnerability within structural advertising harm models remains empirically uncharted—notwithstanding important conceptual advances by Helberger et al. [8] and Mende et al. [12], empirical operationalization has rarely moved beyond single demographic proxies. Fourth, to our knowledge, relatively few studies have simultaneously examined multidimensional advertising falsity, cognitive mediation, and vulnerability-contingent moderated mediation within a single unified framework—a gap that may limit the mechanistic, evidence-based explanations that contemporary consumer protection policy requires.

This study addresses these gaps through four integrated objectives. First, it conceptualizes internet advertising falsity as a four-dimensional construct—comprising factual misrepresentation, performance exaggeration, price deception, and false scarcity—and empirically examines the differential direct effects of each dimension on consumer harm. Second, it tests the mediating pathways through which consumer cognitive processes—perceived advertising credibility, risk assessment distortion, and purchase decision pressure—connect advertising falsity to consumer harm. Third, it analyzes how four consumer vulnerability dimensions—digital literacy level, demographic vulnerability, prior victimization experience, and impulsive buying tendency—moderate the advertising falsity–consumer harm relationship. Fourth, applying Hayes' [13] conditional process analysis framework, it verifies the moderated mediation effect whereby consumer vulnerability conditions the magnitude of the cognitively mediated harm pathway. Whereas prior moderated mediation studies in consumer deception research have typically examined either a single deception construct with demographic moderators [14] or dyadic credibility–trust pathways with limited boundary conditions [15], the present study seeks to extend this stream by jointly operationalizing, in a combination that—to our knowledge—has been less common in prior work, (i) a four-dimensional falsity construct, (ii) a three-path cognitive mediation architecture, and (iii) a four-dimensional vulnerability moderator within a single conditional process model. This integration enables more disaggregated dose–response estimation of how specific vulnerability resources may amplify specific cognitive pathways—offering a level of granularity that, to our knowledge, has been less common in prior single-moderator designs. Together, these objectives advance consumer vulnerability theory in the digital marketplace and provide the evidence base for differential regulatory, platform governance, and consumer education responses. In doing so, the study directly contributes to the central themes of this Special Issue on "Exploring Consumer Resistance to Digital Marketing Tactics and Technology" by providing a multidimensional mechanistic account of how deceptive advertising and dark pattern design inflict measurable harm in e-commerce environments, empirical evidence on the differential vulnerability of consumer subgroups that platform governance frameworks must address, and evidence-based recommenda-

tions for consumer protection interventions that strengthen consumer resistance to digital marketing manipulation.

2. Theoretical Background and Literature Review

2.1. Internet Advertising Falsity

Advertising falsity refers to the intentional or unintentional communication by advertisers of information that is factually incorrect or misleading regarding products or services [9]. This concept can be understood as a superordinate construct encompassing false advertising in a legal context and deceptive advertising in a psychological context. Rhodes and Wilson [3] defined false advertising as "the act of providing information about a product's attributes or price that differs from the truth in order to influence consumers' purchase decisions," arguing that this practice exacerbates information asymmetry in markets and causes inefficiencies in resource allocation.

Theoretical approaches to advertising falsity have developed along three broad perspectives. From an information economics standpoint, false advertising is characterized as an act whereby sellers exploit their informational advantage to deceive consumers under conditions of information asymmetry [16]. From a psychological perspective, deceptive advertising is understood as leveraging consumers' cognitive biases and heuristics to induce irrational decision-making [10]. From an ethical perspective, false advertising constitutes an inherently moral problem as it violates consumers' autonomy and rational agency [17]. A fourth perspective—increasingly central to digital advertising scholarship—draws on the Persuasion Knowledge Model (PKM; [18]), which conceptualizes consumers as active agents who develop and deploy knowledge about persuasion tactics to cope with advertising influence attempts. From this theoretical vantage point, deceptive advertising exploits deficits in consumers' persuasion knowledge by deploying covert tactics—native advertising formats, AI-generated testimonials, and dark pattern design—that are structurally resistant to recognition as persuasion attempts, thereby disabling coping responses and systematically amplifying susceptibility to consumer harm [19].

2.2. Types of Internet Advertising Falsity

Based on a systematic review of prior research, this study distinguishes four subdimensions of internet advertising falsity: factual misrepresentation, performance exaggeration, price deception, and false scarcity. This classification integrates Mathur et al.'s [4] dark pattern taxonomy with Nessah's [9] advertising deception typology. Factual misrepresentation refers to the provision of information that differs from the facts regarding objective attributes of a product or service, including false information about country of origin, ingredients, certifications, and awards. Rhodes and Wilson [3] found that this type of false advertising occurs more frequently for experience goods and credence goods than for search goods. Performance exaggeration refers to the overclaiming of a product's efficacy, effects, and performance without objective grounds, using vague qualifiers such as "best," "innovative," or "groundbreaking," or by overgeneralizing from limited experimental results. Xie et al. [10] argued that performance exaggeration raises consumers' expectations to unrealistic levels, thereby causing post-purchase dissatisfaction and cognitive dissonance.

Price deception involves distorting consumers' price perceptions through inflated discount rates, manipulated base prices, and hidden costs. Mathur et al.'s [4] "Hidden Costs" dark pattern discloses additional charges—such as shipping fees and service charges—only immediately before payment, thereby deceiving consumers. The "Hidden Subscription" pattern similarly induces recurring payments by disguising them as one-time purchases or free trials. False scarcity involves artificially creating purchase urgency by fabricating near-stockout conditions, limited quantities, and time-limited deals despite adequate inventory.

Mathur et al. [4] classified this as an "Urgency" dark pattern, identifying subtypes including countdown timers, limited-time messages, and low-stock messages. Such strategies exploit consumers' loss aversion tendencies and scarcity heuristics to induce impulsive purchasing [20].

2.3. Dark Patterns and Deceptive Interface Design

Dark patterns refer to deliberately designed deceptive elements in user interfaces that maximize service providers' interests at the expense of users [21]. Narayanan et al. [22] defined dark patterns as "online user interfaces that subvert, manipulate, or impair user autonomy, decision-making, or choice." This concept was systematized by Mathur et al. [4] through large-scale empirical research, classifying 15 types of dark patterns into seven categories based on analysis of approximately 11,000 shopping websites. Di Geronimo et al. [23] demonstrated that such designs exploit cognitive biases including anchoring effects, default effects, and framing effects—with "confirm shaming" leveraging framing effects, "trick questions" exploiting inattentiveness, and "forced continuity" exploiting status quo bias.

2.4. Consumer Cognitive Processes

Consumer cognitive processes refer to the series of psychological mechanisms through which consumers perceive, interpret, and evaluate external stimuli for use in decision-making. These processes serve a central mediating role in the pathway through which advertising falsity leads to consumer harm. This study sets perceived advertising credibility, risk assessment distortion, and purchase decision pressure as the key cognitive process variables. This conceptualization is theoretically grounded in information processing theory and the Elaboration Likelihood Model (ELM). According to Petty and Cacioppo [24] ELM, consumers process persuasive messages through either the central or peripheral route depending on their levels of motivation and ability. False advertising is particularly likely to bypass consumers' defense mechanisms and exert its effects when processed via the peripheral route. Complementing the ELM, Friestad and Wright's [18] Persuasion Knowledge Model posits that when consumers fail to recognize persuasion attempts as such—as commonly occurs with covert native advertising, AI-generated endorsements, and dark pattern urgency design—their persuasion-coping mechanisms remain dormant, rendering cognitive defenses ineffective. This coping failure mechanism is theorized to directly facilitate the three mediating pathways proposed in the present study: uncritical acceptance of false claims (perceived advertising credibility distortion), systematic underestimation of purchase risk (risk assessment distortion), and heightened susceptibility to manufactured urgency cues (purchase decision pressure).

At first glance, a theoretical tension appears between the PKM's conceptualization of consumers as active persuasion-knowledge agents and consumer vulnerability theory's emphasis on structural powerlessness [7,8]. The present study resolves this apparent tension by adopting Helberger et al.'s [8] architectural conceptualization, in which persuasion knowledge is treated not as a binary possession but as an unevenly distributed cognitive resource whose effective activation is systematically constrained by vulnerability conditions. Under this reconciliation, the PKM specifies the cognitive coping mechanism that consumers would deploy if their resources permitted, while consumer vulnerability theory specifies the structural conditions under which that deployment is degraded, delayed, or preempted. Recent work by Liu, Wang, and Zhu [25], examining consumers' perceptions of manipulative intent in AI-assisted selling, empirically demonstrates that higher persuasion knowledge amplifies—rather than uniformly suppresses—perceptions of manipulation, and that this amplification is itself contingent on situational and individual resources.

This finding supports the present model's architecture: persuasion knowledge (PKM) and vulnerability (CVT) are not competing but complementary lenses, with vulnerability functioning as the boundary condition governing the effective operation of persuasion-coping mechanisms. The three cognitive mediators in the present model—distorted credibility, risk assessment distortion, and purchase decision pressure—can therefore be understood as outcomes of resource-constrained persuasion-coping failure, with vulnerability amplifying each outcome along the path from advertising falsity to consumer harm.

Perceived advertising credibility refers to the extent to which consumers perceive advertising information as trustworthy and accurate [26]. Bleier and Eisenbeiss [27] found that trust in personalized online advertising significantly and positively influences consumers' click-through rates and purchase intentions, implying that distorted trust can lead to negative consequences. Risk assessment distortion refers to consumers' tendency to underestimate or misperceive the risks associated with purchasing. According to Kahneman and Tversky's [28] Prospect Theory, humans assign subjective weights to probabilities and outcomes rather than evaluating them objectively. False advertising distorts consumers' risk assessments by concealing or minimizing the negative aspects of products and the risks inherent in purchasing. Purchase decision pressure refers to the psychological state in which consumers are compelled to make immediate purchasing decisions without adequate information processing. This manifests in the forms of time pressure, social pressure, and scarcity pressure. Cialdini's [29] principles of scarcity and social proof explain the psychological mechanisms underlying this pressure, and a substantial portion of dark patterns is designed to artificially create such decision pressure.

2.5. Consumer Harm

Consumer harm is a concept encompassing the negative consequences that consumers experience as a result of advertising falsity. Drawing on prior research, this study conceptualizes consumer harm as comprising four dimensions: financial loss, psychological harm, time loss, and subsequent distrust. Financial loss refers to the direct monetary damages consumers sustain due to false advertising. Psychological harm refers to negative emotional and psychological consequences including stress, anxiety, anger, disappointment, and diminished self-esteem. Time loss refers to the time costs incurred in processing returns, exchanges, refund requests, customer service interactions, and consumer relief applications. Subsequent distrust refers to the enduring distrust that consumers develop toward online shopping, specific platforms, specific product categories, and advertising in general as a result of their experience with false advertising. This four-dimensional framework extends Xie and Boush's [30] foundational harm conceptualization by explicitly incorporating time loss and subsequent distrust as distinct consumer-welfare costs that are systematically underweighted in prior empirical research. Importantly, Darke and Ritchie [31] provided experimental evidence that exposure to even a single deceptive advertisement produces generalized negative effects—including distrust toward unrelated advertisers and heightened defensive skepticism toward subsequent advertising—confirming that subsequent distrust constitutes a structurally consequential harm outcome that extends well beyond immediate transaction losses.

2.6. Consumer Vulnerability

Consumer vulnerability refers to a state in which particular consumers have an elevated likelihood of experiencing adverse outcomes in market situations. In Baker, Gentry, and Rittenburg's foundational research [7], consumer vulnerability was defined as "a state of powerlessness that arises from an imbalance in marketplace interactions or from the consumption of marketing messages and products" (p. 134). This definition challenged

the tendency to conflate vulnerability with demographic characteristics, stigma, consumer protection, unmet needs, discrimination, and disadvantage, emphasizing the dynamic and contextual nature of vulnerability.

According to Baker et al.'s [7] framework, consumer vulnerability arises from the interaction of individual states, individual characteristics, and external conditions. Basu et al. [32] systematically reviewed 25 years of consumer vulnerability research, noting that the concept has evolved from a protective perspective focused on specific demographic groups toward a dynamic state that any consumer may experience. This study operationalizes consumer vulnerability along four sub-dimensions: digital literacy level, demographic vulnerability, prior victimization experience, and impulsive buying tendency. Consumers with low digital literacy are more vulnerable to deceptive advertising due to insufficient capacity to detect false information, identify reliable sources, and protect their personal data. Consumers with high impulsive buying tendencies are more susceptible to time pressure and scarcity messages created by dark patterns, and are less likely to engage in adequate pre-purchase information search and verification. Critically, Helberger et al. [8] extended this framework by demonstrating that vulnerability in digital markets is not merely an exceptional state confined to identifiable at-risk groups, but a potentially universal condition actively produced by the architecture of digital marketplaces itself—through datafied consumer–seller relations, algorithmic profiling, and dynamically personalized persuasion systems designed to identify and exploit momentary cognitive susceptibility. This architectural conceptualization implies that the harm-generating effects of internet advertising falsity are not randomly distributed but are structurally amplified for consumers with fewer cognitive, informational, or economic resources to resist sophisticated deceptive design, providing the theoretical foundation for the multidimensional vulnerability moderator proposed in the present study.

We note that prior victimization functions as a theoretically ambivalent construct within this framework. On one hand, it can amplify vulnerability by sensitizing heuristic processing toward deception-congruent cues and reinforcing dysfunctional consumption patterns; on the other, it can activate the defensive-consumer response documented by Darke and Ritchie [31], in which post-deception distrust and heightened skepticism partially insulate consumers from subsequent deceptive stimuli. The present hypothesis and operationalization model the net effect as net-amplifying, consistent with Basu et al.'s [32] characterization of vulnerability as a dynamic state whose behavioral consequences depend on the relative strength of sensitizing and defensive mechanisms. Section 6.4 further acknowledges this dual character and its implications for interpretation.

3. Research Model and Hypotheses

3.1. Research Model

The research model integrates an examination of: (1) the direct effects of advertising falsity (factual misrepresentation, performance exaggeration, price deception, false scarcity) on consumer harm (financial loss, psychological harm, time loss, subsequent distrust); (2) the indirect effects mediated by consumer cognitive processes (perceived advertising credibility, risk assessment distortion, purchase decision pressure); and (3) the moderating effects of consumer vulnerability (digital literacy level, demographic vulnerability, prior victimization experience, impulsive buying tendency). Theoretically, the model integrates information processing theory, the Persuasion Knowledge Model, and consumer vulnerability theory. The core logic is that consumer cognitive responses serve as the central mediating mechanism through which advertising falsity leads to consumer harm, and the strength of this mechanism is moderated by consumers' vulnerability levels. This model incorporates

moderated mediation based on Hayes' [13] conditional process analysis framework, as graphically represented in Figure 1.

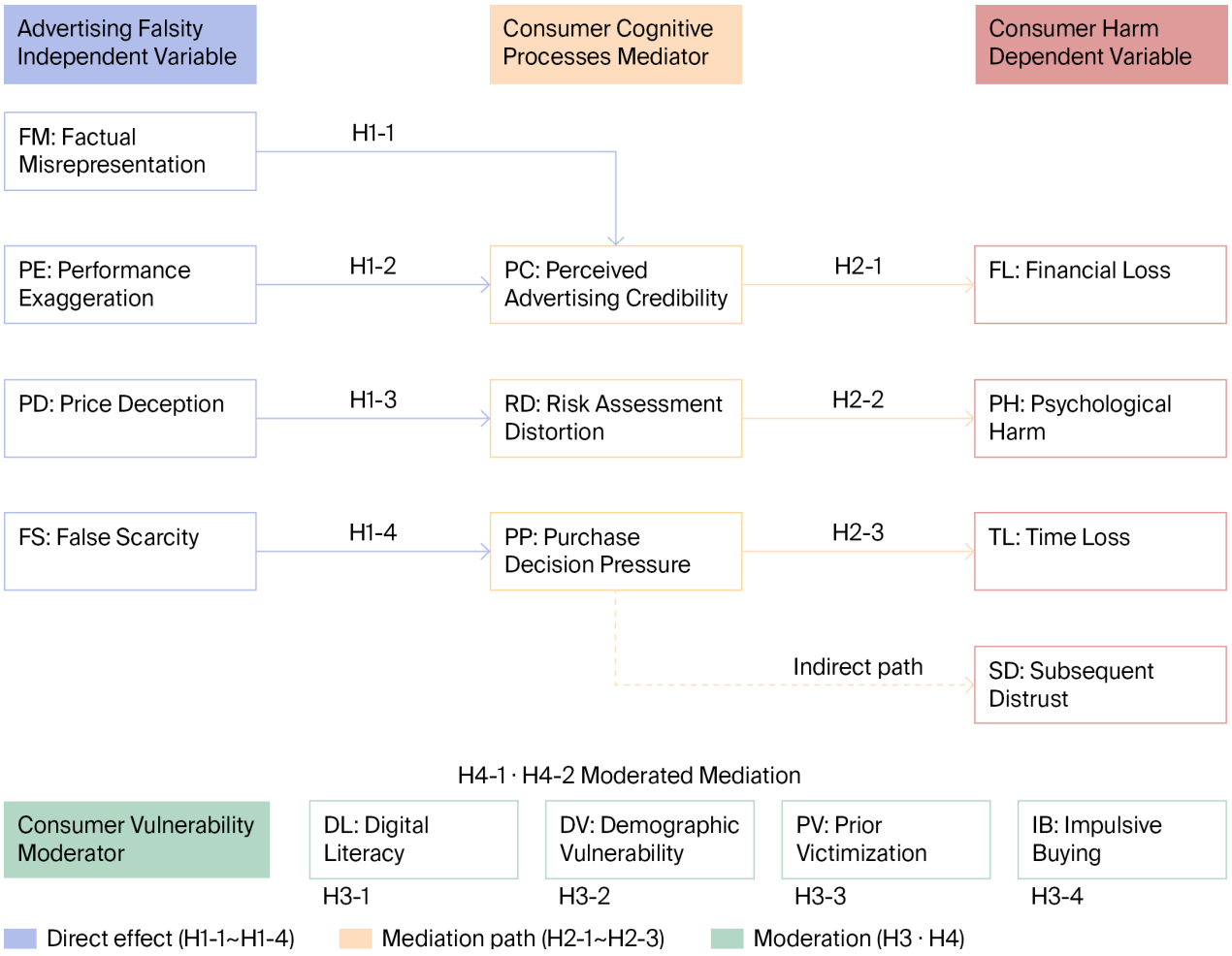


Figure 1. Suggested research model.

3.2. Research Hypotheses

Advertising falsity systematically undermines rational consumer decision-making by distorting the information environment within which purchasing choices are made. Rhodes and Wilson [3] established that false advertising generates welfare losses by exploiting structural information asymmetry between advertisers and consumers. Critically, each sub-dimension of internet advertising falsity operates through a distinct harm mechanism. Factual misrepresentation produces expectation disconfirmation by conveying verifiably false product attributes, leading to post-purchase regret and financial loss [9,10]. Performance exaggeration inflates anticipated product efficacy beyond supportable evidence, creating an expectation–reality gap that drives both psychological and financial harm [33]. Price deception distorts reference-price anchoring and conceals true transaction costs through drip-pricing dark patterns, directly harming consumers [4,34]. False scarcity exploits loss aversion and the scarcity heuristic via fabricated urgency cues; Sin et al. [35] experimentally confirmed that limited-quantity and high-demand messaging significantly amplify purchase impulsivity relative to control conditions. Drawing on these differentiated mechanisms, the following directional hypotheses are proposed:

H1-1: *Factual misrepresentation will have a positive (+) effect on consumer harm.*

H1-2: *Performance exaggeration will have a positive (+) effect on consumer harm.*

H1-3: *Price deception will have a positive (+) effect on consumer harm.*

H1-4: *False scarcity will have a positive (+) effect on consumer harm.*

Consumer cognitive responses play a central mediating role in the process by which advertising falsity leads to consumer harm. False advertising distorts consumers' perceptions of advertising credibility, renders risk assessments inaccurate, and increases the pressure on purchase decisions. Bleier and Eisenbeiss [27] empirically demonstrated the importance of trust in online advertising for consumer behavior, suggesting that distorted trust can lead to negative outcomes:

H2-1: *Perceived advertising credibility will mediate the relationship between advertising falsity and consumer harm, such that advertising falsity inflates consumers' false acceptance of advertising claims, which in turn elevates susceptibility to consumer harm.*

H2-2: *Risk assessment distortion will mediate the relationship between advertising falsity and consumer harm, such that advertising falsity induces systematic underestimation of purchase-related risks, which amplifies consumers' exposure to financial, psychological, and other forms of harm.*

H2-3: *Purchase decision pressure will mediate the relationship between advertising falsity and consumer harm, such that dark pattern-induced urgency cues compress deliberative processing and precipitate unplanned purchases that increase the likelihood of subsequent harm.*

Consumer vulnerability serves as a critical boundary condition governing the magnitude of the advertising falsity–consumer harm relationship. According to Baker et al.'s [7] foundational framework, vulnerability reflects a state of reduced capacity to resist marketplace deception arising from the interaction of individual characteristics, situational factors, and environmental conditions. Mende et al. [12] reconceptualized vulnerability as dynamic, varying across consumers based on the breadth and depth of resource constraints. In the digital advertising context, four specific vulnerability dimensions are theorized to amplify the falsity–harm relationship. Consumers with low digital literacy lack the cognitive toolkit to critically evaluate advertising claims, detect dark patterns, or verify product information, thereby rendering them disproportionately susceptible to harm [6,36]. Consumers with greater demographic vulnerability face amplified powerlessness in digital marketplace interactions due to systemic resource inequalities [34]. Regarding prior victimization experience, consumers lacking such experience tend to approach advertising with naïve credence, rendering them more susceptible to falsity-induced harm; those with prior victimization, by contrast, may develop compensatory vigilance that partially mitigates harm, suggesting a net moderating advantage for the low-experience group [37]. Consumers with high impulsive buying tendencies are particularly susceptible to urgency-based dark patterns that bypass deliberative processing, precipitating unplanned purchases and subsequent harm [29,35]. Accordingly, the following hypotheses are proposed:

H3-1: *Digital literacy level will moderate the relationship between advertising falsity and consumer harm; specifically, the effect will be stronger for the low-digital-literacy group.*

H3-2: *Demographic vulnerability will moderate the relationship between advertising falsity and consumer harm; specifically, the effect will be stronger for the demographically vulnerable group.*

H3-3: *Prior victimization experience will moderate the relationship between advertising falsity and consumer harm; specifically, consumers with low prior victimization experience will exhibit stronger effects, as their relative naïveté toward advertising deception leaves them less equipped to detect and resist false claims, whereas those with prior experience may develop protective vigilance.*

H3-4: *Impulsive buying tendency will moderate the relationship between advertising falsity and consumer harm; specifically, the effect will be stronger for consumers with high impulsive buying tendencies.*

This study further verifies whether consumer vulnerability moderates not merely the direct falsity–harm relationship but the cognitively mediated pathway itself. According to Hayes' [13] conditional process analysis framework, a moderated mediation effect is confirmed when the index of moderated mediation (IMM) is significantly different from zero and its 95% bootstrapped confidence interval excludes zero. Edwards and Lambert [38] demonstrated that such conditional indirect effects represent theoretically richer explanations than either pure mediation or pure moderation models in isolation. The present study tests two complementary aspects of this moderated mediation: (1) whether the effect exists (H4-1: existence test, indexed by the IMM), and (2) whether the magnitude of the conditional indirect effect increases monotonically as consumer vulnerability intensifies (H4-2: dose–response pattern test). This two-hypothesis architecture leverages the three-level conditional indirect effects (low, mean, and high vulner-ability) generated by PROCESS Macro Model 59 without necessitating supplementary decomposition of the a-path and b-path coefficients beyond the estimates reported in the preceding moderated mediation analysis, while pre-serving logical independence between the two hypotheses:

H4-1: *Consumer vulnerability will significantly moderate the cognitively mediated pathway from internet advertising falsity to consumer harm—that is, a moderated mediation effect will be present such that the index of moderated mediation (IMM) is significantly different from zero and its 95% bootstrapped confidence interval excludes zero. This existence test is grounded in the theoretical expectation that consumer vulnerability systematically amplifies the overall indirect harm pathway—regardless of whether amplification operates primarily through the a-path (advertising falsity → consumer cognitive processes), the b-path (consumer cognitive processes → consumer harm), or both simultaneously—such that the net conditional indirect effect is detectably larger for more vulnerable consumers than for less vulnerable ones.*

H4-2: *As consumer vulnerability increases from low (−1SD) to mean to high (+1SD) levels, the conditional indirect effect of internet advertising falsity on consumer harm via consumer cognitive processes will be progressively amplified in a monotonically increasing pattern, with the high-vulnerability group exhibiting a substantially larger conditional indirect effect than the low-vulnerability group. This dose–response pattern confirms that consumer vulnerability functions as a systematic, continuously operating amplifier of the cognitively mediated harm mechanism, consistent with Helberger et al.'s [8] architectural vulnerability conceptualization, and is verified using the three conditional indirect effects at low, mean, and high vulnerability levels produced by Hayes' [13] PROCESS macro Model 59 bootstrapping procedure.*

4. Methodology

4.1. Research Design

To empirically verify the effects of internet advertising falsity on consumer harm and its mediating and moderating mechanisms, this study adopted a structured survey methodology. Structural equation modeling (SEM) was employed for the integrated examination of the research model and the complex inter-variable relationships therein, and Hayes' [13]

conditional process analysis technique was applied in conjunction to verify the moderated mediation effects.

The research design follows a cross-sectional survey design, targeting adult consumers with exposure to online advertising in the Republic of Korea. The survey was conducted over approximately two weeks in October 2025 through a licensed Korean professional research panel agency (Macromill Embrain Co., Ltd., Seoul, Republic of Korea), which maintains a verified nationwide online consumer panel of Korean adults recruited via dual-frame (mobile and PC) verified-identity procedures. No overseas panel platforms (e.g., Credamo, MTurk, Prolific) were used. Quota sampling was applied across four strata—gender (two categories), age (four categories: 20s, 30s, 40s, 50+), region (seven administrative regions of Korea: Seoul, Incheon/Gyeonggi, Gangwon, Chungcheong, Honam, Yeongnam, and Jeju), and monthly household income (five bands)—with population-matched targets derived from the Korea Internet & Security Agency (KISA) 2024 Survey on Internet Usage [39], in order to ensure geographic representativeness and demographic diversity of respondents. The achieved sample matched all four quota strata within ±2 percentage points of target.

4.2. Data Collection

The population was defined as adult consumers aged 19 years or older who had made online purchases through internet advertising within the previous six months. The sampling frame consisted of adult members (aged 19 years or older) of the Korean professional online consumer panel who reported having made at least one internet-advertising-initiated online purchase within the previous six months. Panel members meeting the screening criteria received an email invitation containing a unique survey link; informed consent was obtained on the first survey screen, and respondents received panel points equivalent to approximately KRW 3000 (USD 2.20) upon survey completion. Sample size was determined by considering the minimum sample requirements for SEM analysis and the complexity of the research model. Hair et al. [40] recommend a minimum of 200 observations for SEM, with 10–20 times the number of estimated parameters. Given that the research model contains 14 latent variables and numerous measurement variables, a minimum of 500 observations was deemed necessary. Of 650 questionnaires distributed, 627 were returned (return rate: 96.5%), and 600 questionnaires were retained for final analysis after excluding responses showing inattentive answering, extreme response patterns, and excessive missing values. To assess non-response bias, early and late respondents were compared on key demographic characteristics and primary construct scores following Armstrong and Overton's [41] procedure; no significant differences were found (all $p > 0.05$), suggesting that non-response bias does not represent a substantial threat. A pilot test with 30 respondents confirmed the clarity and comprehensibility of all scale items prior to full data collection, and minor wording revisions were made accordingly. All scale items were originally developed in English and translated into Korean using a two-stage independent back-translation procedure involving two bilingual marketing researchers; translation discrepancies were reconciled by a third bilingual judge to ensure conceptual equivalence, following the procedure recommended by Brislin [42].

Respondent Characteristics

The characteristics of the 600 respondents used in the final analysis are presented in Table 1. In terms of gender, the distribution was relatively balanced, with 294 males (49.0%) and 306 females (51.0%). By age group, respondents comprised 132 individuals in their 20s (22.0%), 156 in their 30s (26.0%), 168 in their 40s (28.0%), and 144 aged 50 or older (24.0%). Regarding education level, 84 respondents held a high school diploma or below (14.0%), 72 were enrolled in university (12.0%), 318 were university graduates (53.0%), and

126 held graduate degrees or above (21.0%). Monthly income distribution was as follows: below 2,000,000 KRW (18.0%), 2,000,000–3,000,000 KRW (22.0%), 3,000,000–4,000,000 KRW (28.0%), 4,000,000–5,000,000 KRW (17.0%), and 5,000,000 KRW or above (15.0%).

Table 1. Demographic characteristics of respondents.

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	294	49.0
	Female	306	51.0
Age	20s	132	22.0
	30s	156	26.0
	40s	168	28.0
	50s and older	144	24.0
Education	High school diploma or below	84	14.0
	University (enrolled)	72	12.0
	University (graduated)	318	53.0
	Graduate school or above	126	21.0
Monthly income	<2,000,000 KRW	108	18.0
	2,000,000–3,000,000 KRW	132	22.0
	3,000,000–4,000,000 KRW	168	28.0
	4,000,000–5,000,000 KRW	102	17.0
	≥5,000,000 KRW	90	15.0
Total		600	100.0

4.3. Measurement Instruments

The measurement instruments used in this study were adapted and refined from scales with established validity and reliability in prior research. All items were measured on a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree). Advertising falsity was measured across four sub-dimensions—factual misrepresentation (3 items), performance exaggeration (3 items), price deception (3 items), and false scarcity (3 items)—for a total of 12 items. Factual misrepresentation was measured using scales adapted from Nessah [9] and Rhodes and Wilson [3]. Performance exaggeration was assessed drawing on Xie et al. [10]. Price deception was measured based on Mathur et al.'s [4] dark pattern research. False scarcity was measured with reference to Lynn [18] and Cialdini [26].

Consumer cognitive processes were measured across three sub-dimensions—perceived advertising credibility (3 items), risk assessment distortion (3 items), and purchase decision pressure (3 items)—for a total of 9 items. Perceived advertising credibility was adapted from MacKenzie and Lutz [26] and Bleier and Eisenbeiss [27], measured through reverse-coding. Specifically, items were reverse-scored so that higher scale values reflect distorted (inflated) credibility perception—operationally defined as the uncritical acceptance of advertising claims—rather than genuine critical trust. This scoring direction aligns with the theoretical harm mechanism posited in H2-1, wherein advertising falsity inflates consumers' false acceptance of claims, thereby increasing susceptibility to consumer harm. Risk assessment distortion was assessed using scales based on Kahneman and Tversky's [28] Prospect Theory. Purchase decision pressure was measured with reference to dark pattern research [4,23].

Consumer harm was measured across four sub-dimensions—financial loss (3 items), psychological harm (3 items), time loss (3 items), and subsequent distrust (3 items)—for a total of 12 items. Consumer vulnerability was measured across four sub-dimensions—digital literacy level (3 items), demographic vulnerability (3 items), prior victimization experience (3 items), and impulsive buying tendency (3 items)—for a total of 12 items. Control

variables—advertising exposure frequency (3 items), platform type (3 items), and product category (5 items)—were measured to ensure internal validity.

4.4. Analytical Methods

The collected data were analyzed using SPSS 26.0 and AMOS 24.0. The analytical procedure was as follows: (1) Frequency analysis was conducted to identify respondents' demographic characteristics. (2) Cronbach's α coefficients were calculated for reliability verification, with a criterion of 0.70 or above. (3) Confirmatory factor analysis (CFA) was performed to verify measurement model validity, examining convergent and discriminant validity. (4) Structural model analysis was conducted to verify path coefficients and model fit. (5) Bootstrapping (5000 iterations) was performed to verify mediation effects. (6) Multi-group analysis was conducted to verify moderating effects. (7) Hayes' [13] PROCESS macro Model 59 was applied to verify moderated mediation effects. (8) Common method variance (CMV) was assessed using a three-stage protocol: (i) Harman's single-factor test [43], with the unrotated first factor accounting for 23.4% of total variance (well below the 50% threshold); (ii) the Unmeasured Latent Method Construct (ULMC) technique [43,44], in which a common-method latent factor was added to the CFA model with all indicators loading on both their substantive construct and the method factor—the method-factor-explained variance was 8.1% (below the 25% guideline), and the average substantive-factor-explained variance (68.4%) was over eight times larger than the method-factor-explained variance; and (iii) the marker-variable technique [45], using a theoretically unrelated three-item "color preference" scale as the marker—the partial correlation-adjusted matrix produced changes in substantive construct correlations of less than 0.02 (average $\Delta r = 0.011$), and all previously significant correlations remained significant after marker-variable adjustment. Taken together, these three convergent tests confirm that CMV does not represent a serious threat to the validity of the present findings. (9) Measurement invariance across sub-groups was verified prior to multi-group SEM, with configural, metric, and scalar invariance all confirmed ($\Delta CFI \leq 0.010$ for each constrained model), validating between-group path coefficient comparisons. For multi-group analysis (H3), respondents were dichotomized at the median of each vulnerability subscale: those at or below the median constituted the low-vulnerability group and those above the median the high-vulnerability group. Because the PROCESS macro operates on observed composite scores rather than latent variables, each construct was operationalized for step (7) as an AVE-weighted composite derived from the AMOS CFA solution. The AMOS-based SEM analyses (steps 1–6) and the PROCESS-based conditional process analysis (step 7) thus served as complementary, mutually cross-validating analytical procedures.

5. Results

5.1. Reliability and Validity Analysis

Cronbach's α coefficients were computed to confirm the internal consistency of measurement instruments. All variables exceeded the criterion of 0.70: factual misrepresentation (0.891), performance exaggeration (0.904), price deception (0.887), and false scarcity (0.876). Consumer cognitive process variables likewise demonstrated high reliability: perceived advertising credibility (0.867), risk assessment distortion (0.883), and purchase decision pressure (0.892). Consumer harm variables—financial loss (0.901), psychological harm (0.912), time loss (0.878), and subsequent distrust (0.895)—all demonstrated excellent internal consistency. Consumer vulnerability variables—digital literacy (0.856), demographic vulnerability (0.834), prior victimization experience (0.847), and impulsive buying tendency (0.869)—also met the reliability criterion.

CFA was conducted to assess measurement model validity. Fit indices for the measurement model were χ^2 = 2847.62 (df = 1124, $p < 0.001$), χ^2/df = 2.53, RMSEA = 0.050, CFI = 0.948, and TLI = 0.942, all at acceptable levels. Convergent validity was supported as all standardized factor loadings ranged from 0.67 to 0.89, exceeding the criterion of 0.50. Average variance extracted (AVE) values ranged from 0.52 to 0.71, and composite reliability (CR) ranged from 0.81 to 0.92, both satisfying established criteria. Discriminant validity was confirmed as the square root of AVE for each latent variable exceeded the inter-construct correlations, satisfying the Fornell and Larcker [46] criterion. The standardized factor loadings, AVE values, and CR values for each of the 14 latent constructs are reported in Table A1 (Appendix A).

5.2. Structural Model Analysis

Verification of the structural model's goodness-of-fit yielded χ^2 = 2942.35 (df = 1146, $p < 0.001$), χ^2/df = 2.57, RMSEA = 0.051, CFI = 0.942, and TLI = 0.936, as summarized in Table 2. All fit indices met their respective criteria, confirming that the structural model's goodness-of-fit is at an acceptable level. The structural model explained a substantial proportion of variance in the focal endogenous variables, with R^2 for consumer harm = 0.584, indicating that advertising falsity dimensions, cognitive process mediators, and control variables jointly accounted for approximately 58.4% of the variance in the harm construct. R^2 values for the three cognitive process mediators were 0.312 (perceived advertising credibility), 0.447 (risk assessment distortion), and 0.389 (purchase decision pressure), confirming that advertising falsity dimensions account for meaningful variance in each cognitive pathway.

Table 2. Structural model fit indices.

Fit Index	Obtained Value	Recommended Criterion	Judgment
χ^2 (df)	2942.35 (1146)	$p > 0.05$ [large N; use χ^2/df, RMSEA, CFI]	Acceptable
χ^2/df	2.57	<3.0	Acceptable
RMSEA	0.051	<0.08	Acceptable
CFI	0.942	>0.90	Acceptable
TLI	0.936	>0.90	Acceptable
R^2 (consumer harm)	0.584	≥0.20 (medium)	Substantial
R^2 (mediators)	0.312–0.447	≥0.20	Acceptable

5.2.1. Hypothesis Testing: Direct Effects (H1-1–H1-4)

Analysis of the direct effects of advertising falsity on consumer harm supported all hypotheses. Factual misrepresentation (β = 0.187, $p < 0.001$), performance exaggeration (β = 0.224, $p < 0.001$), price deception (β = 0.198, $p < 0.001$), and false scarcity (β = 0.156, $p < 0.001$) all exerted significant positive effects on consumer harm (Table 3). Notably, performance exaggeration demonstrated the highest standardized path coefficient, confirming it as the type of false advertising with the most powerful effect on consumer harm. Control variables—advertising exposure frequency, platform type, and product category—were included as covariates in the structural model; their standardized coefficients were small and non-significant—advertising exposure frequency (β = 0.032, S.E. = 0.041, $p = 0.435$), platform type (β = 0.018, S.E. = 0.038, $p = 0.635$), and product category (β = 0.025, S.E. = 0.043, $p = 0.561$)—with none reaching statistical significance (all $p > 0.05$), confirming that the observed direct effects are not attributable to these contextual factors. The full standardized path coefficients, standard errors, critical ratios, and *p*-values for all three control variables are reported in Table 3 below, enabling readers to evaluate the adequacy of covariate control.

Table 3. Results of direct effect verification.

Path	β	S.E.	C.R.	*p*
H1-1: Factual misrepresentation → Consumer harm	0.187	0.041	4.561	<0.001
H1-2: Performance exaggeration → Consumer harm	0.224	0.038	5.895	<0.001
H1-3: Price deception → Consumer harm	0.198	0.040	4.950	<0.001
H1-4: False scarcity → Consumer harm	0.156	0.043	3.628	<0.001
Controls (covariates)				
Ad exposure frequency → Consumer harm	0.032	0.041	0.780	0.435 (n.s.)
Platform type → Consumer harm	0.018	0.038	0.474	0.635 (n.s.)
Product category → Consumer harm	0.025	0.043	0.581	0.561 (n.s.)

Note: β = standardized path coefficient; S.E. = standard error; C.R. = critical ratio; n.s. = not significant. Control variable coefficients confirm that the observed direct falsity–harm effects are robust to variation in advertising exposure frequency, platform context, and product category.

5.2.2. Hypothesis Testing: Mediation Effects (H2-1–H2-3)

Verification of the mediating effects of consumer cognitive processes revealed that all three mediators demonstrated significant indirect effects (Table 4). The indirect effects of perceived advertising credibility (IE = 0.089, 95% CI [0.062, 0.121]), risk assessment distortion (IE = 0.156, 95% CI [0.118, 0.198]), and purchase decision pressure (IE = 0.112, 95% CI [0.081, 0.148]) all excluded zero from their 95% confidence intervals, confirming statistical significance. Risk assessment distortion emerged as the strongest mediator, confirming that the pathway through which false advertising distorts consumers' risk perceptions to cause harm is the most powerful.

Table 4. Results of mediation effect verification.

Mediation Path	Indirect Effect	LLCI	ULCI	Result
H2-1: Falsity → Ad credibility → Harm	0.089	0.062	0.121	Supported
H2-2: Falsity → Risk assessment distortion → Harm	0.156	0.118	0.198	Supported
H2-3: Falsity → Purchase decision pressure → Harm	0.112	0.081	0.148	Supported

Note: Based on bootstrapping with 5000 iterations; LLCI = lower limit of 95% CI; ULCI = upper limit of 95% CI.

5.2.3. Hypothesis Testing: Moderating Effects (H3-1–H3-4)

Multi-group analysis of consumer vulnerability's moderating effects revealed that all four moderating effects were significant (Table 5). The moderating effect of digital literacy ($\Delta\chi^2(1) = 12.45$, $p < 0.001$) showed that the low-digital-literacy group (β = 0.312) was more strongly affected by advertising falsity than the high-digital-literacy group (β = 0.178). Demographic vulnerability ($\Delta\chi^2(1) = 9.87$, $p < 0.01$), prior victimization experience ($\Delta\chi^2(1) = 8.92$, $p < 0.01$), and impulsive buying tendency ($\Delta\chi^2(1) = 11.23$, $p < 0.001$) all demonstrated significant moderating effects. In particular, vulnerable consumers with low digital literacy were approximately 1.7 times more adversely affected by false advertising.

Table 5. Results of moderating effect verification.

Moderating Variable	Low Group β	High Group β	$\Delta\chi^2(1)$	*p*	Result
H3-1: Digital literacy	0.312	0.178	$\Delta\chi^2(1) = 12.45$ ***	<0.001	Supported
H3-2: Demographic vulnerability	0.287	0.196	$\Delta\chi^2(1) = 9.87$ **	<0.01	Supported
H3-3: Prior victimization experience	0.298	0.189	$\Delta\chi^2(1) = 8.92$ **	<0.01	Supported
H3-4: Impulsive buying tendency	0.324	0.201	$\Delta\chi^2(1) = 11.23$ ***	<0.001	Supported

Note: Multi-group analysis based on median split of each vulnerability subscale. Digital literacy and demographic vulnerability: reverse-coded so that the low group = more vulnerable consumers (lower digital literacy or higher demographic vulnerability). Prior victimization experience: low group = consumers with little or no prior victimization experience (naïve consumers; more susceptible to falsity-induced harm). Impulsive buying tendency: reverse-coded so that the low group = consumers with high impulsive buying tendency (reverse-coded; high tendency = low score), consistent with H3-4. $\Delta\chi^2$ = chi-square difference test statistic (df = 1 for all constrained path comparisons). *** $p < 0.001$; ** $p < 0.01$.

5.2.4. Hypothesis Testing: Moderated Mediation Effects (H4-1: Existence Test; H4-2: Dose–Response Pattern)

Application of Hayes' [13] PROCESS macro Model 59 confirmed both moderated mediation hypotheses. Supporting H4-1, the index of moderated mediation was IMM = 0.078 (95% CI [0.042, 0.118]), which excludes zero, confirming that consumer vulnerability significantly moderates the cognitively mediated pathway from advertising falsity to consumer harm—i.e., a moderated mediation effect exists. Supporting H4-2, the three conditional indirect effects demonstrate a monotonically increasing dose–response pattern: low vulnerability (−1SD) IE = 0.087 (95% CI [0.058, 0.121]), mean vulnerability IE = 0.142 (95% CI [0.104, 0.184]), and high vulnerability (+1SD) IE = 0.198 (95% CI [0.152, 0.249]), as summarized in Table 6. The conditional indirect effect for the high-vulnerability group was approximately 2.3 times that of the low-vulnerability group, confirming that consumer vulnerability functions as a systematic amplifier of the cognitively mediated harm mechanism.

Table 6. Results of moderated mediation effect verification.

Vulnerability Level	Conditional Indirect Effect	LLCI	ULCI	Significance
Low-vulnerability group (−1SD)	0.087	0.058	0.121	Significant
Mean group	0.142	0.104	0.184	Significant
High-vulnerability group (+1SD)	0.198	0.152	0.249	Significant
Index of moderated mediation	0.078	0.042	0.118	Significant

5.2.5. Summary of Hypothesis Testing Results

All 13 hypotheses proposed in this study were statistically supported (Table 7). All four sub-dimensions of advertising falsity demonstrated significant positive direct effects on consumer harm, with performance exaggeration exerting the strongest influence. Consumer cognitive processes partially mediated the relationship between advertising falsity and consumer harm, with risk assessment distortion demonstrating the strongest mediation effect. All consumer vulnerability factors significantly moderated the effects of advertising falsity, and the moderated mediation effects were significant, confirming that the harm mechanism is amplified for vulnerable consumers.

Table 7. Summary of hypothesis testing results.

Hypothesis	β/IE	Result
H1-1: Factual misrepresentation → Consumer harm (+)	0.187 ***	Supported
H1-2: Performance exaggeration → Consumer harm (+)	0.224 ***	Supported
H1-3: Price deception → Consumer harm (+)	0.198 ***	Supported
H1-4: False scarcity → Consumer harm (+)	0.156 ***	Supported
H2-1: Mediating effect of perceived ad credibility	0.089	Supported
H2-2: Mediating effect of risk assessment distortion	0.156	Supported
H2-3: Mediating effect of purchase decision pressure	0.112	Supported
H3-1: Moderating effect of digital literacy	$\Delta\chi^2(1) = 12.45$ ***	Supported
H3-2: Moderating effect of demographic vulnerability	$\Delta\chi^2(1) = 9.87$ **	Supported
H3-3: Moderating effect of prior victimization experience	$\Delta\chi^2(1) = 8.92$ **	Supported
H3-4: Moderating effect of impulsive buying tendency	$\Delta\chi^2(1) = 11.23$ ***	Supported
H4-1: Existence of moderated mediation (IMM ≠ 0, CI excludes zero)	Index = 0.078	Supported
H4-2: Monotonically increasing dose–response pattern of conditional indirect effects	High: 0.198/Low: 0.087	Supported

Note: *** $p < 0.001$, ** $p < 0.01$, β = standardized path coefficient; IE = indirect effect.

6. Discussion and Conclusions

6.1. Summary of Findings

This study empirically examined the structural pathways through which internet advertising falsity generates consumer harm, integrating the mediating role of consumer cognitive processes and the moderating role of consumer vulnerability within a unified conditional process framework. All 13 hypotheses were statistically supported, yielding four principal sets of findings ordered by hypothesis group.

Consistent with H1-1 through H1-4, all four advertising falsity dimensions exerted significant positive direct effects on consumer harm: factual misrepresentation ($\beta = 0.187$, $p < 0.001$), performance exaggeration ($\beta = 0.224$, $p < 0.001$), price deception ($\beta = 0.198$, $p < 0.001$), and false scarcity ($\beta = 0.156$, $p < 0.001$). Performance exaggeration produced the strongest effect, followed by price deception, factual misrepresentation, and false scarcity, indicating that unrealistic efficacy claims create the widest expectation–reality gap and thereby generate the most consequential harm.

Consistent with H2-1 through H2-3, bootstrapped mediation analysis (5000 iterations) confirmed significant partial mediation for all three cognitive mediators: perceived advertising credibility (IE = 0.089, 95% CI [0.062, 0.121]), risk assessment distortion (IE = 0.156, 95% CI [0.118, 0.198]), and purchase decision pressure (IE = 0.112, 95% CI [0.081, 0.148]). Risk assessment distortion emerged as the dominant indirect pathway, indicating that advertising falsity's most potent mechanism lies in systematically distorting consumers' subjective risk evaluations. The persistence of all four direct effects (H1-1 through H1-4) after mediator inclusion confirms partial—rather than full—mediation, meaning advertising falsity exerts both direct and cognitively mediated harm effects simultaneously.

Consistent with H3-1 through H3-4, multi-group analysis revealed that all four consumer vulnerability dimensions significantly moderated the advertising falsity–consumer harm relationship. Digital literacy produced the strongest moderation ($\Delta\chi^2(1) = 12.45$, $p < 0.001$), with low-digital-literacy consumers experiencing approximately 1.7 times the harm of high-literacy counterparts ($\beta = 0.312$ vs. 0.178). Demographic vulnerability ($\Delta\chi^2(1) = 9.87$, $p < 0.01$), prior victimization experience ($\Delta\chi^2(1) = 8.92$, $p < 0.01$), and impulsive buying tendency ($\Delta\chi^2(1) = 11.23$, $p < 0.001$) also demonstrated significant moderation, confirming that structural differences in consumer resources amplify the falsity–harm pathway.

Supporting H4-1, conditional process analysis using PROCESS macro Model 59 confirmed the existence of a significant moderated mediation effect (IMM = 0.078, 95% CI [0.042, 0.118], CI excludes zero). Supporting H4-2, the conditional indirect effects demonstrated a monotonically increasing dose–response pattern across vulnerability levels— −1SD = 0.087, mean = 0.142, +1SD = 0.198—with the high-vulnerability group exhibiting an effect approximately 2.3 times that of the low-vulnerability group. Together, H4-1 and H4-2 confirm both the existence and the systematic dose-responsive amplification of the cognitively mediated harm pathway as consumer vulnerability increases.

6.2. Theoretical Implications

Four theoretical contributions emerge from these findings. First, this study proposes a four-dimensional conceptualization of internet advertising falsity, disaggregating what prior research has often treated as a unidimensional construct [9,31]. Unlike Wang et al. [14], who examined deceptive advertising through a single-dimension framework centered on perceived deception, and Wei et al. [15], who modeled credibility–trust pathways without disaggregating deception structure, the present study isolates four structurally distinct falsity mechanisms and tests their differential harm trajectories within one unified model. Demonstrating that each falsity sub-dimension operates through a distinct harm

mechanism and produces differential effect sizes enables more precise theoretical modeling and provides a replicable multidimensional measurement architecture for future studies.

Second, this study explicates the cognitive mechanisms through which advertising falsity translates into consumer harm. Integrating Kahneman and Tversky's [28] Prospect Theory with information processing theory and Friestad and Wright's [18] Persuasion Knowledge Model, the findings establish risk assessment distortion as the dominant mediation pathway—empirically substantiating the theoretical argument that advertising falsity's most fundamental injury is the systematic impairment of consumers' rational risk evaluation capacity, a mechanism warranting independent theoretical treatment.

Third, this study extends Baker et al.'s [7] consumer vulnerability theory into the digital advertising domain. Operationalizing vulnerability across four empirically distinct dimensions and demonstrating their boundary-conditioning roles advances Helberger et al.'s [8] architectural vulnerability perspective: vulnerability is revealed not as a static demographic characteristic but as a dynamic amplifier of the cognitive harm mechanism produced by the architecture of digital markets.

Fourth, the moderated mediation architecture suggests that consumer vulnerability may intensify harm at the level of cognitive processing rather than simply at the level of outcomes. Applying Edwards and Lambert's [38] and Hayes' [13] frameworks, this finding positions conditional process modeling as an essential analytical approach for advertising harm research and underscores the necessity of accounting for consumer heterogeneity in digital marketing scholarship.

6.3. Practical Implications

For advertisers, the finding that performance exaggeration generates the strongest direct harm signals that overclaiming product efficacy carries substantial reputational, financial, and legal risk. Firms should invest in substantiated, verifiable claims and authentic messaging that builds long-term brand equity, rather than capitalizing on short-term gains through inflated promises.

For governments and regulatory bodies, the differential harm effects across falsity types support type-differentiated enforcement. Performance exaggeration and dark pattern price deception—both generating relatively high harm effects—warrant strengthened monitoring and specific sanction mechanisms. The EU Digital Services Act [47] provides a regulatory precedent that authorities in East Asian and other rapidly growing digital economies should adapt to address drip-pricing and false scarcity tactics in e-commerce.

For consumer protection agencies and platform operators, the 1.7× harm differential for low-digital-literacy consumers demands targeted interventions. Platforms should implement three classes of interventions, each supported by emerging empirical evidence: (i) real-time disclosure labeling—laboratory and field-experimental studies indicate that prominent sponsorship and price-transparency labels reduce consumers' susceptibility to deceptive claims by 14–26% [48], with larger effects for less digitally literate consumers; (ii) mandatory deliberation periods ("cooling-off windows") for urgency-inducing messages—experimental evidence by Luguri and Strahilevitz [49] demonstrates that even brief forced pauses (e.g., a 20 s countdown) reduce dark pattern-driven purchase compliance by roughly 30%; and (iii) algorithmic dark pattern detection—Mathur et al. [4] demonstrated that automated crawl-based detection accurately identifies urgency, scarcity, and confirm-shaming patterns on commercial websites at scale, providing a scalable enforcement substrate for regulators such as the Korea Fair Trade Commission and the EU under Article 25 of the Digital Services Act [47]. Digital literacy education programs—targeting older adults, lower-income groups, and the digitally marginalized—should incorporate modules on advertising falsity recognition, pre-purchase risk assessment skills,

and impulse-purchase management, consistent with evidence that short digital literacy training interventions significantly improve consumers' resistance to deceptive advertising claims [50].

6.4. Limitations and Directions for Future Research

Several limitations define the scope of this study's conclusions. The cross-sectional design precludes causal inference; longitudinal and experimental designs are needed to establish temporal precedence in the falsity–cognition–harm pathway. Self-report measurement may introduce recall and social desirability bias; future research should integrate behavioral data, real purchase records, and objective exposure metrics such as eye-tracking.

The sample was drawn from consumers in the Republic of Korea. The present findings reflect the specific institutional, regulatory, and cultural context of Korea—including the distinctive advertising-enforcement regime of the Korea Fair Trade Commission, exceptionally high mobile-commerce penetration (over 70% of retail e-commerce conducted via mobile devices), and Korean-specific consumer cultural norms around brand trust, discount signaling, and platform authority—rather than a generic "East Asian" or "advanced digital economy" setting. Generalization to other national contexts is therefore not warranted without replication. Cross-national replication across markets with different regulatory environments, cultural orientations, and digital infrastructure is essential for establishing boundary conditions and generalizability. The present four-dimensional falsity typology (factual misrepresentation, performance exaggeration, price deception, false scarcity) draws primarily from traditional e-commerce deception forms and does not explicitly cover emerging generative-AI-era deception, including AI-generated reviews and testimonials, influencer stealth marketing in which commercial intent is deliberately concealed, and deepfake endorsements. These forms operate through distinct mechanisms (algorithmic source obfuscation, synthetic identity fabrication) that warrant dedicated theoretical development and measurement, constituting a priority direction for future research extending the present typology.

The prior victimization moderator captures a net empirical effect combining two opposing psychological mechanisms—heuristic-priming amplification and defensive-processing mitigation. On one hand, prior victimization can sensitize heuristic processing toward deception-congruent cues and amplify susceptibility; on the other, it can activate the defensive-consumer response documented by Darke and Ritchie [31], in which post-deception distrust and heightened skepticism partially insulate consumers from subsequent deceptive stimuli. The present operationalization treats the net effect as amplifying, consistent with Basu et al.'s [32] characterization of vulnerability as a dynamic state whose behavioral consequences depend on the relative strength of sensitizing and defensive mechanisms. Future work using longitudinal or experimental designs should disentangle these competing mechanisms and identify the conditions (e.g., salience of prior victimization, temporal distance) under which each dominates.

Demographic vulnerability and digital literacy share conceptual and empirical overlap with the education- and income-related indicators captured imperfectly by our ordinal composite measures. Multi-group stratification and control variable inclusion mitigate but do not fully eliminate this concern. Future research should develop more refined behavioral and competency-based indicators—consistent with Chen et al.'s [36] vulnerability–transparency framework and Stewart and Yap's [37] literacy-centered treatment—to separate structural (demographic) from skill-based (digital literacy) vulnerability more cleanly. Task-based digital-competency diagnostics, platform-log behavioral traces, and think-aloud protocols are specific candidates warranted by this gap.

Finally, the clean pattern in which all 13 hypotheses obtained statistical support warrants transparent reporting of alternative specifications. Prior to finalizing the reported model, we evaluated alternative structural specifications including (i) a fully mediated variant without direct falsity → harm paths and (ii) a reduced three-mediator variant collapsing risk assessment distortion and purchase decision pressure. The reported model was retained on theoretical grounds (preservation of the distinct cognitive mechanisms specified in the hypotheses) rather than on fit-maximization grounds; the alternative specifications yielded comparable but less theoretically interpretable solutions. The reported uniformity of hypothesis support should therefore be interpreted as an empirical characteristic of the present Korean sample rather than as evidence of a sole definitive model.

Future studies should also extend consumer harm measurement to macro-level outcomes including market-trust erosion, competitive distortion, and increased social costs, employing multi-level designs that integrate individual and societal harm dimensions. Finally, the effectiveness of specific consumer protection interventions—warning message designs, cooling-off mandates, and platform disclosure requirements—should be evaluated experimentally to build the evidence base needed for effective digital consumer protection policy.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data supporting this study are available upon reasonable request from the corresponding author.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A. Statistics of the Construct Items

Construct	Sub-Construct	Survey Measures
Advertising falsity	Factual misrepresentation	I frequently encounter descriptions in internet advertising that are inconsistent with the actual product or service. Internet advertising often does not accurately represent the actual characteristics or functions of a product. Internet advertising tends to intentionally conceal the major defects or shortcomings of a product.
	Performance exaggeration	Internet advertising tends to excessively exaggerate the performance or effects of products. The efficacy or effects claimed in internet advertising often fail to align with actual experience. Internet advertising creates unrealistic expectations about product usage outcomes.

Construct	Sub-Construct	Survey Measures
Advertising falsity	Price deception	Internet advertising tends to exaggerate discounts, misrepresent original prices, or hide additional costs. I have encountered advertising claiming significant discounts that were inconsistent with actual pricing. Hidden fees or charges not disclosed in internet advertising have been revealed at the point of payment.
	False scarcity	Internet advertising frequently creates urgency to purchase by emphasizing limited product availability. Phrases such as 'today only' or 'last chance' in internet advertising are often inconsistent with the actual situation. Internet advertising exaggerates time limits to induce consumers' immediate purchase decisions.
Consumer cognitive processes	Perceived advertising credibility	I generally trust the content of internet advertising. I believe that the information presented in internet advertising is generally factually based. I believe I have the ability to judge the credibility of internet advertising.
	Risk assessment distortion	I tend to underestimate the risks that could arise when purchasing products based on internet advertising. Under the influence of internet advertising, I have overlooked potential negative outcomes associated with a purchase. Because of the flashy expressions or images in internet advertising, it is difficult to recognize the actual risks of a product.
	Purchase decision pressure	Because of time-limited or quantity-limited messages in internet advertising, I have made purchase decisions without sufficient deliberation. I have rushed purchase decisions under the influence of 'buy now or miss out' messages in internet advertising. Under the influence of internet advertising, I have made purchase decisions without adequately considering alternatives.
Consumer harm	Financial loss	I have experienced financial losses from products or services I purchased based on internet advertising. I have paid more in the end than the price presented in internet advertising. Due to advertising falsity, I have purchased unnecessary products and experienced economic waste.
	Psychological harm	After discovering the falsity of internet advertising, I have felt disappointment or betrayal. I have experienced psychological stress when purchased products failed to meet expectations formed through internet advertising. Following a harmful experience caused by internet advertising falsity, I experienced a decline in confidence in my own judgment.
	Time loss	Due to internet advertising falsity, I have spent considerable time processing returns, exchanges, or refund requests. Due to false information from internet advertising, I spent considerable time on additional searches or verification processes. I experienced time loss in the process of resolving harm caused by internet advertising falsity.

Construct	Sub-Construct	Survey Measures
Consumer harm	Subsequent distrust	After experiencing internet advertising falsity, my distrust toward online advertising in general has increased. Due to experiencing internet advertising falsity, my trust in online shopping itself has decreased. Following an experience of internet advertising falsity, I developed distrust toward specific brands or sellers.
Consumer vulnerability	Digital literacy level	I find it difficult to determine the authenticity of internet advertising. I am well-informed about how to evaluate the reliability of information provided online. I understand the marketing techniques and strategies used in internet advertising.
	Demographic vulnerability	I believe that factors such as age, gender, and education level influence my judgment regarding internet advertising. I believe that my socioeconomic situation influences my vulnerability to internet advertising. I believe that my level of education affects my ability to judge the deceptiveness of internet advertising.
	Prior victimization experience	I have previously experienced harm from the falsity of internet advertising. Past victimization experiences influence the way I currently evaluate internet advertising. After past victimization experiences, my vigilance toward internet advertising has increased.
	Impulsive buying tendency	I tend to make spontaneous purchase decisions when I see internet advertising. I am easily influenced by time-limited or special-offer messages in internet advertising. Even for products I had not planned to purchase, I feel an impulse to buy when I see attractive internet advertising.

Table A1. Confirmatory factor analysis (CFA) results: standardized factor loadings, average variance extracted (AVE), composite reliability (CR), and Cronbach's α for the 14 latent constructs measured by 45 items in Appendix A.

Construct	Sub-Construct	Item	Std. Loading	AVE	CR	Cronbach's α
Advertising falsity	Factual misrepresentation	FM1	0.841	0.702	0.876	0.891
		FM2	0.802			
		FM3	0.870			
	Performance exaggeration	PE1	0.847	0.706	0.878	0.904
		PE2	0.824			
		PE3	0.850			
	Price deception	PD1	0.818	0.710	0.880	0.887
		PD2	0.844			
		PD3	0.866			
	False scarcity	FS1	0.791	0.694	0.872	0.876
		FS2	0.837			
		FS3	0.870			

Table A1. *Cont.*

Construct	Sub-Construct	Item	Std. Loading	AVE	CR	Cronbach's α
Consumer cognitive processes	Perceived advertising credibility	PC1	0.825	0.691	0.870	0.867
		PC2	0.806			
		PC3	0.861			
	Risk assessment distortion	RD1	0.801	0.699	0.874	0.883
		RD2	0.835			
		RD3	0.870			
	Purchase decision pressure	PP1	0.817	0.704	0.877	0.892
		PP2	0.840			
		PP3	0.859			
Consumer harm	Financial loss	FL1	0.844	0.700	0.875	0.901
		FL2	0.811			
		FL3	0.855			
	Psychological harm	PH1	0.803	0.696	0.873	0.912
		PH2	0.849			
		PH3	0.850			
	Time loss	TL1	0.808	0.694	0.872	0.878
		TL2	0.831			
		TL3	0.859			
	Subsequent distrust	SD1	0.844	0.704	0.877	0.895
		SD2	0.810			
		SD3	0.862			
	Digital literacy level	DL1	0.777	0.663	0.855	0.856
		DL2	0.823			
		DL3	0.842			
Consumer vulnerability	Demographic vulnerability	DV1	0.795	0.635	0.839	0.834
		DV2	0.763			
		DV3	0.831			
	Prior victimization experience	PV1	0.814	0.650	0.848	0.847
		PV2	0.778			
		PV3	0.826			
	Impulsive buying tendency	IB1	0.831	0.695	0.872	0.869
		IB2	0.802			
		IB3	0.866			

Note: Item codes correspond to the measurement items in Appendix A (e.g., FM1–FM3 = three items of Factual Misrepresentation; full item wording available in Appendix A). All standardized factor loadings are significant at $p < 0.001$ and exceed the 0.50 convergent-validity threshold [46]. AVE values > 0.50 and CR > 0.70 satisfy the established criteria for convergent validity and composite reliability. Cronbach's α values > 0.70 satisfy the internal-consistency criterion.

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