MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 2360-2373

Why Engaging Advertisements Do Not Always Persuade: Evidence from Adolescent Digital Markets

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Abstract

Purpose

This study examines how motivational appeal and cognitive processing jointly influence the effectiveness of online advertising among adolescent consumers.

Design/methodology/approach

Survey data were collected from 664 adolescents and analysed using robust regression, bootstrapped mediation analysis, model-based segmentation, and multi-group comparisons across gender and age categories.

Findings

Motivational appeal exhibits a strong positive effect on perceived advertising effectiveness, while cognitive processing exerts a significant tempering effect. Mediation analysis reveals a competitive mechanism in which motivational appeal simultaneously increases behavioural influence and activates cognitive scrutiny that partially offsets persuasive impact. Segmentation results identify distinct adolescent profiles characterised by varying combinations of motivation, cognition, and scepticism. Multi-group analyses indicate substantial structural stability across demographic groups.

Research implications

The findings advance dual-process perspectives by demonstrating that digital persuasion in adolescent markets is governed by interacting influence and resistance mechanisms. The results highlight the importance of modelling competitive mediation and heterogeneity in contemporary branding research.

Practical implications

Brand managers should balance engagement-oriented strategies with informational credibility and adopt segment-sensitive communication approaches to maximise effectiveness while avoiding excessive resistance.

Originality/value

This study integrates motivational appeal, cognitive processing, mediation mechanisms, and latent segmentation within a unified framework, offering a comprehensive explanation of self-limiting persuasion in adolescent digital advertising.

1. 1. Introduction

Digital media platforms have fundamentally transformed how brands communicate with adolescent consumers. Social networking sites, video-sharing platforms, mobile applications, and influencer-driven ecosystems now constitute primary channels through which young consumers encounter branded content. These platforms combine high interactivity, algorithmic personalisation, and seamless purchase integration, enabling advertising messages to reach adolescents continuously and in highly customised forms (Kaplan and Haenlein, 2010; Belch and Belch, 2018; Kotler et al., 2022). As a result, digital advertising has become a central mechanism through which brands shape preferences, identities, and consumption behaviours during a critical stage of consumer development.

Adolescents represent a strategically important yet particularly vulnerable market segment. While they increasingly exercise independent purchasing power, their cognitive control, persuasion knowledge, and self-regulatory capacities are still developing (John, 1999; Steinberg, 2008; Valkenburg and Piotrowski, 2017). This combination of autonomy and developmental sensitivity makes adolescents highly responsive to digitally mediated persuasion. Contemporary advertising practices targeting youth frequently integrate entertainment, peer endorsement, incentives, and immersive experiences that blur the boundary between commercial and non-commercial content (Hudders et al., 2017; De Jans et al., 2019; Montgomery et al., 2017). Consequently, concerns regarding both the effectiveness and ethical implications of adolescent digital advertising have intensified in academic and policy debates.

Despite growing scholarly attention to youth-oriented digital marketing, important gaps remain in understanding how online advertisements translate into behavioural influence among adolescents. Existing research has documented the role of engagement, social influence, and affective appeal in shaping advertising responses (Taylor et al., 2011; Stephen and Galak, 2012; Ashley and Tuten, 2015). Other studies emphasise the importance of cognitive evaluation and persuasion knowledge in moderating advertising impact (Friestad and Wright, 1994; Evans et al., 2013; Boerman et al., 2017). However, these streams of research are often examined in isolation. Relatively little is known about how motivational appeal and cognitive processing jointly shape adolescents' perceptions of advertising effectiveness in integrated digital environments.

Moreover, prior work has typically focused on average effects across heterogeneous youth populations. Such approaches risk obscuring meaningful subgroup differences in susceptibility, resistance, and decision-making styles (Wedel and Kamakura, 2000; Montgomery et al., 2017). Adolescents vary substantially in their reliance on incentives, social cues, and analytical evaluation, suggesting that uniform branding strategies may produce uneven outcomes. Yet systematic segmentation analyses remain underutilised in adolescent digital advertising research.

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Another limitation concerns the limited examination of underlying mechanisms. While mediation analysis has become increasingly common in marketing research (Hayes, 2018), few studies explicitly model competitive or inconsistent mediation patterns in which engagement-driven persuasion is partially offset by cognitive scrutiny. Such mechanisms are theoretically important because they capture the simultaneous operation of influence and resistance processes in digitally saturated environments. Addressing these limitations is critical for advancing both theory and practice in adolescent branding. From a theoretical perspective, a more integrated account is needed to explain how motivational appeal and cognitive evaluation interact to shape behavioural influence. From a managerial perspective, brands require actionable guidance on how different adolescent segments respond to online advertising and how persuasive strategies may be optimised without triggering resistance. The present study addresses these issues by developing and empirically testing an integrated framework linking motivational appeal, cognitive processing, and advertising effectiveness among adolescents. Using survey data from 664 respondents, the study examines (i) the direct effects of motivating factors and cognitive processing on perceived advertising effectiveness, (ii) the mediating role of cognitive processing in transmitting motivational influence, (iii) latent consumer segments exhibiting distinct response patterns, and (iv) demographic boundary conditions across gender and age groups. The analysis combines robust regression, bootstrapped mediation, model-based segmentation, and multi-group comparison techniques to provide a comprehensive assessment of adolescent advertising responses.

This study makes three primary contributions to the branding literature. First, it demonstrates that motivational appeal constitutes the dominant driver of perceived advertising effectiveness among adolescents, while cognitive processing exerts a systematic tempering effect. These finding advances dual-process perspectives by highlighting the competitive interaction between engagement and scrutiny in digital youth markets. Second, the study provides evidence of competitive mediation, showing that motivational appeal simultaneously increases behavioural influence and cognitive evaluation, with opposing effects on effectiveness. This mechanism offers a nuanced explanation for why highly engaging advertisements do not always yield proportional behavioural outcomes. Third, by integrating latent segmentation and multi-group analysis, the study reveals substantial heterogeneity in adolescent responses, thereby enhancing the managerial relevance of branding strategies.

From a practical standpoint, the findings offer guidance for designing digital campaigns that balance engagement with informational credibility. They suggest that while incentives and creative appeal are essential for capturing adolescent attention, excessive reliance on persuasive triggers may activate cognitive resistance among analytically oriented segments. Effective branding strategies therefore require segment-sensitive approaches that align motivational cues with appropriate informational content.

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature on digital advertising, adolescent consumer behaviour, and persuasion mechanisms. Section 3 develops the theoretical framework and hypotheses. Section 4 describes the methodology and analytical procedures. Section 5 presents the empirical results. Section 6 discusses theoretical and managerial implications, limitations, and directions for future research.

2. Literature Review

2.1 Digital Advertising and Brand Communication in Adolescent Markets

The rapid expansion of digital platforms has transformed how brands communicate with adolescent consumers. Social media, video-sharing platforms, mobile applications, and influencer-driven ecosystems now constitute primary channels through which adolescents encounter branded content (Kietzmann et al., 2011; Belch and Belch, 2018; Kotler et al., 2022). Compared with traditional mass media, digital advertising is characterised by interactivity, personalisation, and continuous exposure, which amplify both its persuasive potential and its social embeddedness (Kaplan and Haenlein, 2010; De Vries et al., 2012).

Adolescents represent a strategically important yet vulnerable segment within digital markets. They possess increasing purchasing autonomy while simultaneously exhibiting developing cognitive control and persuasion knowledge (John, 1999; Valkenburg and Piotrowski, 2017). As a result, digital advertising may exert disproportionate influence on their brand attitudes, preferences, and purchasing behaviours (Nairn and Fine, 2008; Montgomery et al., 2017).

Brand communication targeting adolescents often integrates entertainment, peer influence, and experiential cues to maximise engagement (Hudders et al., 2017; De Jans et al., 2019). Such practices blur the boundary between commercial and non-commercial content, making persuasive intent less salient and potentially enhancing behavioural impact (Evans et al., 2013; Boerman et al., 2017). Consequently, understanding the mechanisms through which digital advertising shapes adolescent brand responses has become a central concern in contemporary branding research.

2.2 Advertising Effectiveness in Digital Contexts

Advertising effectiveness has traditionally been conceptualised as the extent to which exposure produces favourable cognitive, affective, and behavioural responses (MacKenzie and Lutz, 1989; Keller, 1993). In digital environments, effectiveness extends beyond awareness and recall to include engagement metrics, social sharing, and conversion-related behaviours (Hoffman and Fodor, 2010; Kumar et al., 2016).

Recent research emphasises behavioural and purchase-related outcomes as critical indicators of digital advertising performance (Taylor et al., 2011; Stephen and Galak, 2012). In adolescent populations, perceived effectiveness is frequently reflected in impulsive buying, brand switching, repeat purchase, and peer-influenced consumption (Valkenburg and Piotrowski, 2017; Montgomery et al., 2017).

Measurement approaches have evolved accordingly. While early studies focused on recall and attitude change, contemporary research increasingly employs composite behavioural indices capturing multidimensional influence (Spears and Singh, 2004;

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Belch and Belch, 2018). This shift aligns with the present study's operationalisation of advertising effectiveness as perceived behavioural impact.

2.3 Motivational Appeal and Engagement with Online Advertising

Motivational appeal refers to the degree to which advertising stimuli activate attention, curiosity, and reward expectations. In digital environments, such appeal is often generated through incentives, interactivity, personal relevance, and social embeddedness (De Vries et al., 2012; Ashley and Tuten, 2015; Kotler et al., 2022).

The elaboration likelihood framework suggests that motivation determines whether individuals engage with persuasive content (Petty and Cacioppo, 1986). In online contexts, motivational triggers such as discounts, gamification, and influencer endorsements increase the likelihood of message processing and behavioural response (Hollebeek et al., 2014; Hudson et al., 2016).

Adolescent consumers are particularly responsive to motivational cues due to heightened sensitivity to social approval and immediate rewards (Steinberg, 2008; Hudders et al., 2017). Empirical studies demonstrate that engaging and incentive-based digital advertisements generate stronger click-through rates, brand interaction, and purchase intentions among youth audiences (Taylor et al., 2011; De Jans et al., 2019).

Despite these findings, prior research often treats motivational appeal as a direct antecedent of outcomes, without systematically examining how it interacts with cognitive evaluation processes. This represents an important gap addressed in the present study.

2.4 Cognitive Processing and Persuasion in Adolescence

Cognitive processing reflects the extent to which consumers analytically evaluate advertising claims, assess credibility, and integrate information into decision-making (Petty and Cacioppo, 1986; MacKenzie and Lutz, 1989). Higher levels of cognitive elaboration are generally associated with more stable attitudes and resistance to superficial persuasion cues (Friestad and Wright, 1994).

In adolescence, cognitive processing is closely linked to developmental changes in executive functioning and persuasion knowledge (John, 1999; Steinberg, 2008). As adolescents mature, they become more capable of recognising persuasive intent and critically evaluating marketing messages (Valkenburg and Piotrowski, 2017).

Empirical research indicates that analytical evaluation can either enhance or reduce advertising influence depending on context. When advertisements provide diagnostic information, cognition increases effectiveness (MacKenzie and Lutz, 1989; Keller, 1993). However, when messages are perceived as manipulative or exaggerated, cognitive processing activates counter-arguing and scepticism, weakening behavioural impact (Friestad and Wright, 1994; Evans et al., 2013).

Digital environments further complicate this dynamic by combining informational cues with persuasive design features that may overwhelm cognitive resources (Montgomery et al., 2017). As a result, the role of cognition in adolescent digital advertising remains theoretically and empirically contested.

2.5 Mediation Mechanisms in Digital Advertising Research

Understanding how advertising variables influence outcomes requires examination of intervening mechanisms. Mediation analysis has therefore become central in contemporary branding research (Hayes, 2018; Zhao et al., 2010).

Prior studies have examined mediators such as attitude toward the ad, brand trust, engagement, and perceived value (MacKenzie and Lutz, 1989; Hollebeek et al., 2014; Kumar et al., 2016). However, relatively few studies have explicitly modelled the competing roles of engagement-driven motivation and analytical scrutiny within adolescent digital contexts.

Recent work suggests that digital advertising often produces inconsistent or competitive mediation patterns, where positive engagement effects are partially offset by scepticism or privacy concerns (Boerman et al., 2017; Van Noort et al., 2012). Such mechanisms are theoretically important because they explain why highly engaging advertisements do not always translate into proportional behavioural impact.

The present study extends this literature by explicitly modelling cognitive processing as a competitive mediator between motivational appeal and behavioural effectiveness.

2.6 Consumer Heterogeneity and Segmentation in Digital Branding

Consumers differ substantially in how they respond to digital advertising. Segmentation research emphasises that average effects may mask meaningful subgroup differences in motivations, processing styles, and resistance to persuasion (Wedel and Kamakura, 2000; Kotler et al., 2022).

Model-based segmentation techniques have been widely applied in branding contexts to identify latent response patterns (Wedel and Kamakura, 2000; McLachlan and Peel, 2000). In youth markets, segments have been identified based on digital literacy, risk perception, and social influence orientation (Nairn and Fine, 2008; Montgomery et al., 2017).

Despite growing recognition of heterogeneity, many studies continue to rely on pooled models without systematic segmentation, limiting managerial relevance. The present study addresses this limitation by integrating latent segmentation with structural modelling.

2.7 Demographic Moderators: Gender and Age

Gender and age are frequently examined moderators in advertising research due to differences in socialisation patterns, media usage, and cognitive development (John, 1999; Valkenburg and Piotrowski, 2017). Gender-based differences in emotional responsiveness and social influence sensitivity have been reported in some digital contexts, although findings remain mixed (Hudders et al., 2017; De Jans et al., 2019).

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Age-related differences are more consistently observed. Older adolescents typically display higher persuasion knowledge and lower impulsivity, which may attenuate advertising effects (Steinberg, 2008; Montgomery et al., 2017). However, empirical evidence remains fragmented, particularly in non-Western contexts.

Accordingly, gender and age are best conceptualised as boundary conditions rather than primary explanatory variables, warranting systematic examination alongside core psychological mechanisms.

2.8 Research Gaps and Positioning of the Present Study

The foregoing review reveals four major gaps in existing literature.

First, although motivational appeal and cognitive processing are widely studied, their joint influence on adolescent advertising effectiveness remains insufficiently integrated in digital branding models.

Second, prior studies rarely examine competitive mediation mechanisms that capture simultaneous persuasion and resistance processes.

Third, heterogeneity is often acknowledged but not formally modelled through latent segmentation.

Fourth, demographic boundary conditions are frequently examined in isolation rather than within comprehensive structural frameworks.

The present study addresses these gaps by developing and empirically testing an integrated model linking motivational appeal, cognitive processing, and advertising effectiveness among adolescents. By combining mediation analysis, latent segmentation, and multi-group comparisons, this study advances understanding of how and for whom digital advertising is effective in youth markets.

2. 3. Theoretical Background and Hypotheses

3.1 Conceptual Foundation

Digital advertising is increasingly central to brand building among adolescents because it combines persuasive messaging with interactive and personalised delivery, often embedded in entertainment, social feeds, and influencer ecosystems. Compared with traditional media, digital advertisements offer high immediacy, continuous repetition, and frictionless access to purchase pathways. In adolescent populations—who are still developing consumer identity, persuasion knowledge, and self-regulation—advertising responses often involve a blend of affective appeal, social influence, and limited deliberation (John, 1999; Valkenburg and Piotrowski, 2017; Belch and Belch, 2018; Kotler et al., 2022).

From a branding perspective, online advertising effectiveness can be conceptualised as the extent to which exposure translates into brand-relevant outcomes such as favourable evaluation, behavioural influence, and purchase-related responses (Keller, 1993; MacKenzie and Lutz, 1989). The present study adopts a behavioural effectiveness framing appropriate for adolescent consumers: perceived effectiveness is reflected in self-reported purchase influence, prioritisation, repeat purchase tendencies, and the degree to which advertising shapes brand-related choices. This aligns with widely used perspectives in advertising research linking advertising responses to downstream behavioural intentions and purchase outcomes (MacKenzie and Lutz, 1989; Spears and Singh, 2004; Belch and Belch, 2018).

To explain why some online advertisements translate into stronger behavioural influence, we develop a mechanism based on two complementary components: (i) **motivational appeal** (why an advertisement is engaging enough to be processed and acted upon) and (ii) **cognitive processing** (how the adolescent evaluates and scrutinises the advertisement before purchase-relevant behaviour). This structure is consistent with dual-process views of persuasion, where advertising impact depends both on attention/engagement triggers and on the depth and direction of cognitive evaluation (Petty and Cacioppo, 1986; MacKenzie and Lutz, 1989; Belch and Belch, 2018).

Accordingly, we propose a parsimonious model in which **Motivating Factors** drive **Advertising Effectiveness** directly, while **Cognitive Processing** operates as a mechanism that can either amplify or temper advertising influence depending on whether cognition primarily facilitates decision confidence or increases resistance to persuasion.

3.2 Motivating Factors as a Driver of Advertising Effectiveness

Motivating Factors represent the extent to which online advertisements are perceived as attractive, engaging, and rewarding to interact with. In digital environments, motivational appeal can arise from incentives (discounts, deals), novelty and creativity, social relevance, and convenience cues that reduce effort and increase perceived value. Such motivational triggers are important because they determine whether an adolescent attends to and engages with advertising content, a prerequisite for persuasion and behavioural influence (MacKenzie and Lutz, 1989; Belch and Belch, 2018; Kotler et al., 2022).

In adolescent consumers, motivational appeal is particularly consequential because their media consumption is often entertainment-driven and socially embedded. As a result, advertisements that provide hedonic stimulation, social signalling value, or immediate gains may translate more readily into purchase influence and repeat purchase tendencies (Valkenburg and Piotrowski, 2017; Belch and Belch, 2018). From a branding standpoint, motivational appeal can therefore be expected to increase perceived advertising effectiveness.

H1 (Motivational appeal → effectiveness). Motivating Factors related to online advertising are positively associated with Advertising Effectiveness.

3.3 Cognitive Processing and Advertising Effectiveness

Cognitive Processing refers to adolescents' analytical evaluation of online advertisements. In practical terms, this includes assessing relevance and credibility, understanding product features, comparing alternatives, and using informational cues (including post-purchase confidence and perceived decision support). Cognitive processing is a central construct in persuasion

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research because it shapes whether advertising messages are accepted, resisted, or integrated into consumer decision-making (Petty and Cacioppo, 1986; MacKenzie and Lutz, 1989).

In adolescent contexts, cognition can plausibly exert two different influences. On the one hand, cognitive processing can increase effectiveness when adolescents perceive that advertisements provide useful information and decision support, strengthening confidence and purchase intention (MacKenzie and Lutz, 1989; Keller, 1993). On the other hand, cognitive processing may reduce susceptibility when it activates scepticism, counter-arguing, or persuasion knowledge. As adolescents mature, they increasingly recognise persuasive intent and can discount advertising claims, especially when they perceive manipulation or exaggerated promises (John, 1999; Valkenburg and Piotrowski, 2017). Thus, when cognitive evaluation is primarily critical, it may reduce advertising-driven behavioural influence.

Given the present study's operationalisation of Cognitive Processing as analytical scrutiny and evaluation cues, we expect a **tempering effect** on behavioural influence in the adolescent sample.

H2 (Cognitive processing → effectiveness). Cognitive Processing is negatively associated with Advertising Effectiveness.

3.4 Cognitive Processing as a Mechanism Linking Motivational Appeal to Effectiveness

Motivational appeal and cognitive processing are not independent. In digital advertising, motivational triggers (e.g., curiosity, incentives, novelty, social content) increase engagement, and engagement increases the likelihood that adolescents will invest attention and mental resources into processing the message. This is consistent with persuasion frameworks where attention and involvement are antecedents of elaboration (Petty and Cacioppo, 1986; MacKenzie and Lutz, 1989).

However, the consequence of enhanced processing is not necessarily uniformly positive. Greater engagement may increase both (i) the direct persuasive pull of advertisements and (ii) the level of scrutiny that partially counteracts impulsive purchase influence. This produces a mechanism often described as **competitive (or inconsistent) mediation**, where the indirect pathway acts in the opposite direction to the direct effect (Hayes, 2018). In the adolescent setting, this mechanism is theoretically meaningful: motivationally appealing ads may simultaneously stimulate interest and prompt evaluation, with evaluation reducing net persuasive impact for some consumers.

Accordingly, we propose the following mediation hypothesis.

H3 (Mediation via cognition). Cognitive Processing mediates the relationship between Motivating Factors and Advertising Effectiveness such that Motivating Factors increase Cognitive Processing, which in turn reduces Advertising Effectiveness (competitive mediation).

3.5 Consumer Heterogeneity and Latent Segments

Adolescent consumers are not homogeneous. Individuals differ in their tendency to rely on analytical cues, their susceptibility to incentives and social influence, and their baseline scepticism towards online marketing. Contemporary branding research therefore increasingly recognises the need to examine unobserved heterogeneity and segment-specific response patterns, particularly in digital contexts where consumer experiences are personalised and socially mediated (Wedel and Kamakura, 2000; Kotler et al., 2022).

A segmentation perspective is directly relevant here because the same motivational and cognitive mechanisms may operate differently across groups. For example, a "motivation-dominant" segment may respond strongly to engagement triggers, whereas a "cognition-dominant" or "sceptical" segment may show attenuated effectiveness due to heightened scrutiny. Testing segment-level differences offers a rigorous way to demonstrate that the proposed model has practical branding relevance: it identifies which adolescents are most influenced by online advertising and through which pathway.

H4 (Segment heterogeneity). The magnitude of the relationships in the proposed model differs across latent segments of adolescent consumers.

3.6 Demographic Boundary Conditions: Gender and Age

Gender and age are often discussed as boundary conditions in adolescent advertising research because they can shape media usage patterns, social influence sensitivity, and development of persuasion knowledge. Age is particularly relevant because adolescents' cognitive maturity and advertising literacy tend to increase with developmental stage, potentially strengthening critical evaluation and reducing susceptibility to persuasive cues (John, 1999; Valkenburg and Piotrowski, 2017). Gender differences are less theoretically determinate and are therefore treated as a boundary condition rather than assumed a priori.

To avoid dissertation-style "null hypotheses" (e.g., "no difference across gender"), this study frames demographic heterogeneity as an empirical boundary assessment consistent with good practice in consumer research.

H5a (Gender boundary condition). The structural relationships in the proposed model differ across gender groups.

H5b (Age boundary condition). The structural relationships in the proposed model differ across age categories.

3.7 Summary of the Hypothesised Model

The proposed framework predicts that Motivating Factors increase Advertising Effectiveness directly (H1), while Cognitive Processing reduces Advertising Effectiveness (H2). Motivational appeal also influences effectiveness indirectly through cognition in a competitive mediation pattern (H3). The strength of these relationships is expected to vary across latent segments (H4) and may differ across gender and age categories (H5a–H5b).

This conceptual structure provides an integrated branding explanation for why online advertising influences adolescents differently: persuasion is driven by motivational engagement, tempered by cognitive evaluation, and moderated by heterogeneity across consumer profiles.

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3. 4. Methodology

4.1 Research Design and Data Collection

This study adopted a quantitative, cross-sectional survey design to examine the influence of online advertising on adolescent brand-related responses. A structured questionnaire was administered to adolescent respondents using a supervised offline survey procedure to ensure comprehension and completeness. Data collection was conducted over a three-month period.

A cross-sectional design is appropriate for examining perceptual and behavioural mechanisms in branding and advertising contexts where experimental manipulation is not feasible (Malhotra, 2019; Hair et al., 2019). The survey instrument was designed to capture motivational, cognitive, emotional, and behavioural responses to online advertising exposure.

Participation was voluntary and anonymous. Respondents were informed of the academic purpose of the study and assured of confidentiality. No personally identifiable information was collected.

4.2 Sampling Procedure and Sample Characteristics

A multi-stage convenience sampling approach was employed. Educational institutions and community centres were first identified. Within these institutions, adolescent respondents who regularly accessed online content were invited to participate. The final usable sample consisted of **664 respondents** after eliminating incomplete questionnaires. This sample size exceeds minimum requirements for multivariate modelling and mediation analysis (Cohen, 1988; Hair et al., 2019).

Respondents were drawn from diverse socio-economic and educational backgrounds. Gender and age-group distributions are reported in Section 5.2. The relatively large sample supports stable estimation and subgroup analysis.

Although probability sampling was not feasible, the sample size and heterogeneity enhance external validity in comparable adolescent consumer contexts (Malhotra, 2019).

4.3 Measurement Instrument and Construct Operationalisation

4.3.1 Questionnaire Development

The questionnaire was developed based on established advertising, persuasion, and consumer behaviour literature (Belch and Belch, 2018; Kotler et al., 2022; Solomon, 2020). Items were adapted to reflect adolescents' digital media usage patterns.

All perceptual items were measured on five-point Likert-type scales ranging from 1 ("Strongly disagree") to 5 ("Strongly agree"). Demographic variables included gender and age-group categories.

Prior to full administration, the questionnaire was pilot tested with 40 respondents to assess clarity, wording, and response variability. Minor revisions were implemented based on feedback.

4.3.2 Construct Definition

Three composite constructs were operationalised for structural modelling.

(a) Advertising Effectiveness (EFF12)

Advertising Effectiveness captures adolescents' perceived behavioural influence of online advertisements, including purchase priority, compulsive buying tendencies, repeat purchase intentions, and affective uplift. It was measured using twelve items.

The composite score was computed as:

$$EFF_{12} = \left(\frac{1}{12}\right) \backslash sum_{i=1}^{12} x_i$$

where x_i denotes the i-th effectiveness item.

(b) Motivating Factors (MOT18)

Motivating Factors reflect the engagement and appeal characteristics of online advertisements, including incentives, creativity, curiosity, social influence, and convenience. Eighteen items were used.

The composite score was computed as:

$$MOT_{18} = \left(\frac{1}{18}\right) \backslash sum_{j=1}^{18} m_j$$

where m_j represents the j-th motivational item.

(c) Cognitive Processing (COG7)

Cognitive Processing captures analytical evaluation of advertisements, including information relevance, credibility, comparison, understanding, and post-purchase comfort. Seven items were employed.

The composite score was computed as:

$$COG_7 = \left(\frac{1}{7}\right) \backslash sum_{k=1}^{7} c_k$$

where c^k denotes the k-th cognitive evaluation item.

4.3.3 Scale Development Strategy

Because the survey instrument was practitioner-designed and contained multidimensional item batteries, the constructs were treated as composite indices rather than strict reflective latent variables. This approach is appropriate when the objective is predictive explanation and behavioural interpretation rather than confirmatory scale purification (Hair et al., 2019; Diamantopoulos and Winklhofer, 2001).

Exploratory factor analysis and reliability assessment were conducted to verify dimensional coherence prior to model estimation.

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4. 4.4 Data Preparation and Preliminary Analysis

4.4.1 Data Screening

Data were screened for missing values, outliers, and response patterns. The core Likert block exhibited no missing values. Univariate distributions were inspected for extreme skewness and kurtosis. No variable exceeded conventional thresholds (|skew| < 2, |kurtosis| < 7) (Kline, 2016).

Multivariate outliers were assessed using Mahalanobis distance. Observations exceeding the critical χ^2 threshold were examined and retained after confirming substantive plausibility.

4.4.2 Common Method Bias Assessment

Because all measures were self-reported, potential common method variance (CMV) was evaluated. First, Harman's single-factor test indicated that no single factor accounted for the majority of variance. Second, a latent common method factor approach was employed as a robustness check (Podsakoff et al., 2003).

Both procedures suggested that CMV was unlikely to substantially bias the estimates.

4.5 Exploratory Factor Analysis

To examine underlying dimensionality, exploratory factor analysis (EFA) was conducted using principal axis factoring with varimax rotation. Parallel analysis was employed to determine the optimal number of factors (Horn, 1965; Hayton et al., 2004). Parallel analysis supported a five-factor solution. Items exhibited salient loadings (> 0.60) on theoretically interpretable factors corresponding to utility/appeal, engagement, cognitive–social processing, perceived risk, and behavioural influence.

The resulting factor scores were subsequently used for segmentation analysis.

4.6 Structural Model Specification and Estimation

4.6.1 Model Specification

The main structural model examines the influence of motivational and cognitive mechanisms on advertising effectiveness:

$$EFF_{12}, i = \beta_0 + \beta_1 MOT_{18}, i + \beta_2 COG_7, i + \beta_3 Gender_i + \beta_4 Age_i + \epsilon_i$$

where:

- $EFF_{12,i}$ denotes perceived advertising effectiveness for respondent i,
- $MOT_{18,i}$ represents motivating factors,
- COG_7, i represents cognitive processing,
- $Gender_i$ and Age_i are control variables,
- ϵ_i is the disturbance term.

4.6.2 Estimation Method

The model was estimated using ordinary least squares with HC3 heteroskedasticity-consistent standard errors (White, 1980; Long and Ervin, 2000). Robust estimation is recommended for survey-based behavioural data due to potential heteroskedasticity.

Statistical significance was evaluated using two-tailed tests at conventional levels (α = 0.05, 0.01, 0.001).

4.7 Mediation Analysis Procedure

Mediation was examined to test whether cognitive processing transmits the effect of motivating factors on effectiveness.

The indirect effect was computed as:

Indirect Effect = a × b

where:

a = effect of $MOT_{18,i}$ on COG_7, i

b = effect of COG_7, i on $EFF_{12,i}$

Bootstrapped confidence intervals were obtained using 1,000 resamples (Efron and Tibshirani, 1993; Hayes, 2018). Mediation was inferred when the confidence interval excluded zero.

4.8 Segmentation Analysis

To capture unobserved heterogeneity, model-based segmentation was performed using Gaussian mixture models on standardized factor scores (McLachlan and Peel, 2000; Wedel and Kamakura, 2000).

The probability that observation i belongs to segment s is given by:

$$P(z_i = s) = \pi_s \, \phi(x_i \mid \mu_s, \Sigma_s)$$

where:

- π_s is the mixing proportion,
- $\phi(\cdot)$denotes the multivariate normal density,
- $\mu_s$and Σ_s are segment-specific parameters.

The number of segments was selected using Bayesian Information Criterion (BIC).

4.9 Multi-Group Analysis

Multi-group analyses were conducted across gender and age categories. Separate models were estimated for each subgroup. Path coefficients were compared using interaction-based tests and confidence interval overlap criteria (Henseler et al., 2015; Hair et al., 2019).

This approach allows examination of demographic boundary conditions without imposing restrictive invariance constraints.

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4.10 Robustness and Validation Procedures

Several robustness checks were conducted. First, alternative specifications excluding control variables were estimated. Second, split-sample validation was performed by randomly dividing the sample into calibration and validation subsamples. Third, bootstrapped standard errors were compared with robust estimates.

Consistency across these analyses supports the stability and credibility of the reported findings.

5. 5. Results and Analysis

5.1 Analytical Procedure

The empirical analysis followed established procedures in branding and consumer behaviour research. Measurement reliability and validity were examined using internal consistency and variance-based criteria (Nunnally and Bernstein, 1994; Fornell and Larcker, 1981; Hair et al., 2019). Structural relationships were estimated using heteroskedasticity-consistent regression to ensure robust inference (White, 1980). Mediation effects were tested using nonparametric bootstrapping (Efron and Tibshirani, 1993; Hayes, 2018). Response heterogeneity was examined using model-based segmentation (Wedel and Kamakura, 2000), followed by multi-group analysis across gender and age categories (Henseler et al., 2015).

5.2 Sample Profile

The final sample consisted of 664 adolescent respondents. Table 1 presents the demographic characteristics.

Table 1. Sample Profile (N = 664)

Variable	Category	Frequency	Percentage
Gender	Male	403	60.7
	Female	261	39.3
Age Group (Code)	1	21	3.2
	2	29	4.4
	3	171	25.8
	4	314	47.3
	5	129	19.4

The distribution indicates adequate demographic variability for structural and subgroup analyses.

5.3 Measurement Model Assessment

5.3.1 Reliability and Convergent Validity

Construct reliability and convergent validity were assessed using Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE).

Table 2. Reliability and Convergent Validity

Construct	Items	Cronbach's α	CR	AVE
Advertising Effectiveness (EFF12)	12	0.884	0.884	0.390
Motivating Factors (MOT18)	18	0.881	0.869	0.305
Cognitive Processing (COG7)	7	0.896	0.891	0.549

All constructs exhibit satisfactory internal consistency (α, CR > 0.70). Although AVE values for EFF12 and MOT18 are marginally below 0.50, their strong reliability supports their use as composite indicators in predictive modelling (Hair et al., 2019).

5.3.2 Discriminant Validity

Discriminant validity was evaluated using the HTMT ratio.

Table 3. HTMT Matrix

	EFF12	MOT18	COG7
EFF12	—	0.61	0.12
MOT18	0.61	—	0.12
COG7	0.12	0.12	—

All HTMT values are below 0.85, indicating adequate discriminant validity (Henseler et al., 2015).

5.4 Structural Model Results

The main structural model was estimated using OLS with HC3 robust standard errors.

Table 4. Structural Model Results (DV = Advertising Effectiveness)

Predictor	β	Robust SE	z	p
Motivating Factors (MOT18)	0.969	0.042	23.00	<0.001
Cognitive Processing (COG7)	-0.193	0.035	-5.51	<0.001
Gender (Male = 1)	-0.009	0.040	-0.22	0.815
Age Group (1–5)	-0.085	0.019	-4.47	<0.001
Constant	1.011	0.205	4.93	<0.001

Model Fit: $R^2 = 0.522$; N = 664

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Motivating Factors exert a strong positive influence on advertising effectiveness. Cognitive Processing exhibits a significant negative association, indicating reduced susceptibility under analytical scrutiny. Age shows a modest negative effect, while gender is not significant.

5.5 Mediation Analysis

Bootstrapped mediation analysis (1,000 resamples) was conducted to examine indirect effects.

Table 5. Bootstrapped Mediation Results

Path	Indirect Effect	95% Confidence Interval
MOT18 → COG7 → EFF12	-0.071	[-0.109, -0.040]

The indirect effect is significant, indicating competitive mediation (Hayes, 2018). Motivating Factors increase effectiveness directly while simultaneously increasing cognitive scrutiny, which partially suppresses behavioural influence.

5.6 Segmentation and Heterogeneity Analysis

Gaussian mixture modelling was used to identify latent segments.

Table 6. Segment Sizes

Segment	n	Percentage
1	64	9.6
2	436	65.7
3	36	5.4
4	128	19.3

Table 7. Segment Profiles (Means)

Segment	EFF12	MOT18	COG7	RISK8
1	3.340	3.610	4.763	3.414
2	3.363	3.674	4.429	3.558
3	3.463	3.630	3.877	3.701
4	3.400	3.381	3.190	3.259

Segment 1 shows high cognitive processing, Segment 3 exhibits elevated risk perceptions, and Segment 2 represents the dominant motivation-driven group.

5.7 Multi-Group Analysis

Multi-group analyses were conducted across gender and age categories.

Table 8. Multi-Group Path Comparisons

Group	MOT18 → EFF12	COG7 → EFF12	R^2
Male	0.961***	-0.201***	0.528
Female	0.977***	-0.184***	0.517
Younger (1–3)	0.994***	-0.215***	0.541
Older (4–5)	0.941***	-0.176***	0.506

*** $p < 0.001$

The results indicate substantial structural stability across demographic groups, with only minor variations in effect magnitudes.

5.8 Robustness Checks

Alternative specifications excluding demographic controls produced consistent estimates. Split-sample validation confirmed coefficient stability. Bootstrapped inference yielded comparable confidence intervals. These analyses indicate that the findings are robust to model specification and sampling variation (White, 1980; Efron and Tibshirani, 1993).

5.9 Summary of Findings

The results demonstrate that motivational appeal is the dominant driver of advertising effectiveness among adolescents. Cognitive processing reduces susceptibility, producing a competitive mediation mechanism. Latent segmentation reveals meaningful heterogeneity, while multi-group analysis indicates structural stability across gender and age categories. Together, these findings provide strong empirical support for the proposed branding framework.

6. 6. Discussion, Implications, and Limitations

6.1 Discussion of Findings

This study examined how motivational appeal and cognitive processing jointly influence perceived advertising effectiveness among adolescent consumers in digital environments. The results provide consistent evidence that motivational factors constitute the primary driver of behavioural influence, while cognitive processing exerts a systematic tempering effect.

Consistent with prior studies emphasising engagement and appeal in digital advertising (Taylor et al., 2011; Ashley and Tuten, 2015; De Jans et al., 2019), motivating factors were found to strongly enhance perceived effectiveness. However, the present findings extend this literature by demonstrating that motivational appeal does not operate in isolation. Instead, increased

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engagement simultaneously stimulates analytical evaluation, which partially offsets persuasive influence. This competitive mediation mechanism has received limited empirical attention in adolescent contexts and represents a key theoretical advancement.

Previous research has often reported positive associations between cognitive elaboration and advertising outcomes (MacKenzie and Lutz, 1989; Keller, 1993), particularly when messages provide diagnostic information. In contrast, our results indicate that, within contemporary digital ecosystems, heightened cognitive processing tends to reduce behavioural influence among adolescents. This finding is consistent with persuasion knowledge and scepticism frameworks (Friestad and Wright, 1994; Evans et al., 2013; Boerman et al., 2017) and reflects the growing awareness of persuasive intent among digitally native youth.

Importantly, the present study reconciles these seemingly contradictory perspectives by showing that motivation and cognition operate simultaneously but in opposing directions. Highly engaging advertisements increase both behavioural influence and analytical scrutiny, producing a net effect that depends on individual processing styles. This integrative explanation goes beyond prior work that has typically examined either engagement or resistance mechanisms in isolation.

6.2 Comparison with Prior Research

Compared with existing studies on adolescent digital advertising, this paper offers several methodological and conceptual improvements.

First, many prior studies rely on single-outcome measures such as click-through rates, recall, or attitude toward the ad (MacKenzie and Lutz, 1989; Stephen and Galak, 2012; Taylor et al., 2011). In contrast, the present study employs a multidimensional behavioural effectiveness index capturing purchase influence, prioritisation, repeat purchase tendencies, and affective uplift. This provides a more comprehensive assessment of branding impact.

Second, earlier work has frequently adopted bivariate or limited multivariate models that do not account for mediating mechanisms (De Vries et al., 2012; Ashley and Tuten, 2015). By incorporating bootstrapped mediation analysis, this study explicitly models how motivational appeal is transmitted through cognitive processing. This allows stronger causal interpretation than correlational approaches.

Third, although consumer heterogeneity is widely acknowledged, many studies continue to rely on pooled estimations (Montgomery et al., 2017; Hudders et al., 2017). The integration of latent segmentation in the present study provides direct evidence of distinct response profiles, thereby enhancing explanatory depth and managerial relevance.

Fourth, existing adolescent advertising research often treats demographic variables as primary predictors without embedding them in broader theoretical frameworks (Nairn and Fine, 2008; De Jans et al., 2019). By treating gender and age as boundary conditions within an integrated structural model, this study offers a more theoretically coherent approach.

Collectively, these features position the present study as more comprehensive and analytically rigorous than much of the existing literature on adolescent digital advertising effectiveness.

6.3 Theoretical Implications

This study contributes to branding and advertising theory in three major ways.

First, it advances dual-process models of persuasion by demonstrating that motivational and cognitive pathways operate in competitive rather than complementary fashion in adolescent digital contexts. Whereas classical models emphasise either central or peripheral processing (Petty and Cacioppo, 1986), the present findings show that both operate simultaneously, with opposing behavioural consequences.

Second, the identification of competitive mediation extends recent work on inconsistent mediation in marketing research (Hayes, 2018; Zhao et al., 2010) to adolescent branding environments. This suggests that digital persuasion is best conceptualised as a dynamic balance between influence and resistance, rather than a unidirectional process.

Third, the integration of latent segmentation with structural modelling contributes to the growing literature on heterogeneity in branding responses (Wedel and Kamakura, 2000; Kotler et al., 2022). The findings indicate that theoretical models of advertising effectiveness must explicitly account for distinct cognitive–motivational profiles among youth consumers.

Together, these contributions support a more nuanced and developmentally informed theory of digital advertising effectiveness. Appendix A develops an interpretive framework, drawing on insights from foundational work on meta-reasoning and self-reference, to further illuminate the observed competitive interaction between motivational appeal and cognitive scrutiny.

6.4 Managerial Implications

The results offer several actionable implications for brand managers and digital marketers targeting adolescent audiences.

First, motivational appeal remains essential for capturing attention and generating behavioural influence. Campaigns that incorporate incentives, creativity, and social relevance are likely to achieve higher effectiveness. However, excessive reliance on persuasive triggers may activate scepticism among cognitively oriented segments.

Second, managers should design campaigns that balance engagement with informational credibility. Providing transparent product information, realistic claims, and verifiable cues may reduce resistance among analytically oriented adolescents while maintaining persuasive appeal.

Third, the segmentation results suggest that uniform branding strategies are suboptimal. Motivation-dominant segments respond strongly to engagement cues, whereas cognition-dominant segments require greater informational support. Segment-sensitive communication strategies are therefore recommended.

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Fourth, age-related differences indicate that persuasion strategies should evolve with developmental stage. Younger adolescents may respond more strongly to motivational cues, while older adolescents may require credibility-focused messaging.

From a strategic perspective, effective adolescent branding requires integrating engagement design with credibility management to maximise long-term brand equity.

6.5 Policy and Social Implications

Beyond managerial relevance, the findings have implications for public policy and consumer protection. The strong influence of motivational appeal highlights the potential vulnerability of adolescents to persuasive digital practices, particularly when commercial content is embedded in entertainment or social interactions.

The observed tempering role of cognitive processing suggests that advertising literacy and media education may play an important protective role. Policies promoting transparency, disclosure of sponsored content, and critical media skills may help strengthen adolescents' evaluative capacities (Boerman et al., 2017; Montgomery et al., 2017).

Regulatory frameworks should therefore consider both engagement mechanisms and cognitive safeguards when assessing the societal impact of youth-oriented digital advertising.

6.6 Limitations

Several limitations should be acknowledged.

First, the cross-sectional design restricts causal inference. Although mediation analysis provides insight into mechanisms, longitudinal or experimental designs would allow stronger causal conclusions.

Second, the use of self-reported measures may introduce social desirability and recall biases. While common method variance tests suggest limited bias, behavioural tracking data could complement survey measures in future research.

Third, the sample was obtained using non-probability sampling within a specific national context. Caution is therefore warranted in generalising the findings to other cultural or regulatory environments.

Fourth, the constructs were operationalised as composite indices rather than strictly validated latent scales. Although appropriate for predictive modelling, future studies may further refine scale development.

These limitations do not undermine the main conclusions but indicate avenues for refinement.

6.7 Directions for Future Research

Future research may extend this work in several directions.

Longitudinal designs could examine how motivational and cognitive mechanisms evolve across developmental stages. Experimental studies could manipulate engagement and information cues to isolate causal pathways. Cross-cultural comparisons could explore how regulatory and cultural contexts shape adolescent responses.

In addition, integrating objective behavioural data from digital platforms may provide deeper insight into real-time persuasion dynamics. Finally, future work may examine ethical and well-being outcomes associated with sustained exposure to persuasive digital content.

6.8 Conclusion

This study provides a comprehensive examination of how online advertising influences adolescent consumers through interacting motivational and cognitive mechanisms. By demonstrating competitive mediation, substantial heterogeneity, and demographic boundary effects, the findings offer an integrated explanation of digital advertising effectiveness in youth markets.

The results underscore that persuasive success depends not only on generating engagement but also on managing cognitive resistance. Effective branding strategies must therefore balance appeal with credibility and segmentation with inclusivity.

Overall, this research advances theory, informs practice, and contributes to ongoing debates on the role of digital advertising in adolescent development.

7. Appendix

An Interpretive Framework for Self-Limiting Persuasion

A.1 Motivation

The empirical results of this study reveal a systematic pattern in which motivational appeal increases advertising effectiveness directly while simultaneously activating cognitive scrutiny that partially offsets persuasive influence. This competitive mediation mechanism suggests that digital persuasion among adolescents exhibits an inherent tendency toward self-limitation. To provide deeper conceptual insight into this phenomenon, this appendix introduces an interpretive framework inspired by foundational work in logic and meta-reasoning. The objective is not to establish formal equivalence, but to offer a conceptual lens through which the observed behavioural dynamics may be understood.

A.2 Persuasion as a Self-Referential System

In digital advertising environments, persuasive messages operate within cognitively reflexive systems. Adolescents do not merely receive advertising content; they also evaluate, interpret, and contextualise it in relation to prior beliefs, social norms, and perceived persuasive intent.

Let A denote the persuasive message and B denote the resulting behavioural influence. Standard models implicitly assume:

$B = f(A)$

where $f(\cdot)$ represents the persuasive mechanism.

However, the present findings indicate that exposure to A also generates evaluative responses C, corresponding to cognitive scrutiny and analytical processing. Behavioural influence is therefore more accurately represented as:

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ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 2360-2373

$B = f(A, C)$
with:
$C = g(A)$
where $g(\cdot)$ captures meta-cognitive evaluation.
Thus, the persuasive system generates both influence and an internal validator of that influence.

A.3 Meta-Reasoning and Incompleteness Analogies

Foundational results in logic demonstrate that sufficiently expressive systems cannot fully verify their own outputs without introducing limitations. Gödel's incompleteness theorems show that formal systems capable of arithmetic contain true statements that cannot be proven within the system itself (Gödel, 1931). Tarski's undefinability theorem establishes that truth cannot be defined internally within sufficiently rich languages (Tarski, 1936). Löb's theorem characterises paradoxes arising from self-referential trust (Löb, 1955).

Although these results apply to formal systems, they highlight a general structural principle: systems that generate outputs and simultaneously evaluate those outputs tend to exhibit inherent constraints.

In the present context, motivational appeal functions as a generative mechanism producing behavioural influence, while cognitive processing functions as a validation mechanism assessing that influence. Because both arise from the same informational environment, the system cannot produce unbounded persuasion without also producing resistance.

A.4 Self-Limiting Persuasion Mechanism

The empirical mediation results can therefore be interpreted as evidence of a self-limiting persuasion structure.
Motivational appeal increases behavioural influence:
$\partial B / \partial A > 0$
Motivational appeal also increases cognitive scrutiny:
$\partial C / \partial A > 0$
Cognitive scrutiny reduces behavioural influence:
$\partial B / \partial C < 0$
Together, these relations imply that increases in persuasive intensity generate countervailing evaluative responses that constrain net effectiveness.

This mechanism parallels logical systems in which increased expressive power generates additional undecidable propositions. In behavioural terms, increased persuasive sophistication generates increased scepticism.

A.5 Implications for Digital Branding Theory

This interpretive framework suggests that digital persuasion in adolescent markets is structurally bounded. Attempts to maximise engagement and influence inevitably stimulate evaluative processes that limit marginal returns.

From a theoretical standpoint, this supports a view of advertising effectiveness as an emergent property of interacting influence and validation processes rather than a unidirectional causal chain. From a managerial perspective, it implies that sustainable branding strategies must balance motivational triggers with informational credibility to avoid activating excessive resistance.

A.6 Scope and Limitations

The analogy developed in this appendix is intended as a conceptual interpretation rather than a formal model. No claim is made that adolescent cognition constitutes a formal logical system. Rather, the framework highlights structural similarities between self-referential reasoning systems and empirically observed persuasion dynamics.

Future research may explore formal modelling approaches that more explicitly capture recursive evaluation processes in digital advertising environments.

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