Building Consumer Capabilities for Digital Markets: How Cognitive Deliberation and Persuasion Knowledge Relate to Consumer Vulnerability

Jennifer Melissa Hernández Oviedo; Armando Gabriel Diaz; Jennifer Gregoria Posas; Norma Ana Lida Martinez; Alejandra Eludith Corea; Katy Marbely Espinal

Universidad Tecnológica de Honduras, Honduras, jennifer.hernandez@uth.hn, agdiaz@uth.hn, posasjennifer@gmail.com, namartinez3@uth.hn, aecorea@uth.hn, kmespinal@uth.hn

Abstract*— Digital markets increasingly expose consumers to algorithmically personalized and potentially manipulative commercial practices, raising questions about which cognitive capabilities help them avoid being systematically disadvantaged. Drawing on the Elaboration Likelihood Model, the Persuasion Knowledge Model, and the Consumer Vulnerability Framework, this study examined two parallel pathways linking general cognitive motivation to digital consumer vulnerability among adult consumers in Honduras (N = 200). A structural equation model, estimated with maximum likelihood and robust standard errors on 166 complete cases, showed acceptable fit. General cognitive motivation was strongly and positively associated with deliberation in digital purchase decisions and with persuasion knowledge, which were negatively associated with economic and situational vulnerability, respectively; both indirect associations were statistically significant, although explained variance in the vulnerability outcomes was modest. Because the design was cross-sectional, these indirect associations are not interpreted as causal mediation. The findings suggest that deliberation and persuasion knowledge are two differentiated capabilities linked to distinct facets of digital consumer vulnerability rather than a single protective factor. Given the non-probability sample and a newly developed vulnerability measure, the results are preliminary and may inform educational and policy discussions in emerging Central American digital markets.

***Keywords*— need for cognition, persuasion knowledge, consumer vulnerability, algorithmic personalization, structural equation modeling**

I. Introduction

Digital marketplaces increasingly rely on choice architectures, algorithmic personalization, and platform-mediated persuasion to shape how consumers search for, evaluate, and purchase products [1], [2]. The same mechanisms that make online shopping convenient also create conditions under which consumers can be misled, pressured, or nudged toward decisions that do not serve their interests. Galli [3] frames this tension through the notion of digital vulnerability: a condition that, unlike traditional accounts tied to fixed personal traits, arises from the architecture of digital commerce itself and can affect a broad range of users. Identifying which individual capabilities allow consumers to navigate this environment without being systematically disadvantaged has become a pressing question, particularly as digital transactions expand into markets where regulatory and educational safeguards remain uneven.

This question has acquired a specific character with the diffusion of artificial intelligence (AI) in commerce. Recommender systems, algorithmic targeting, and automated content ranking now decide which offers, prices, and persuasive messages each consumer sees, often in real time and with little transparency [1], [4], [5]. The consumer-side counterpart of these AI-driven systems is a set of capabilities that condition whether personalized persuasion is scrutinized or simply followed. The present study does not measure AI exposure directly; instead, it examines two such capabilities, deliberation and persuasion knowledge, whose measurement explicitly referred to algorithmic recommendations, targeted advertising, and influencer content. Its contribution to research on AI-mediated markets therefore lies in clarifying which human capabilities may be relevant when commercial persuasion is increasingly automated.

Consumer vulnerability in digital settings is not a unitary phenomenon. Capone et al. [6] describe e-vulnerability as a multidimensional, relational process triggered by personal, external, and behavioral factors. Zac et al. [7] found that susceptibility to manipulative interfaces, or dark patterns, was only weakly explained by demographic proxies such as income, education, or age, suggesting that vulnerability depends less on who consumers are and more on how they process the persuasion attempts they encounter. Stewart et al. [8] add a cognitive account: heavy reliance on digital technology was associated with reduced consumer skepticism, which in turn heightened exposure to deceptive claims. This body of work points toward cognitive capability, rather than static demographic characteristics, as a promising lens for explaining why some consumers absorb the costs of digital persuasion while others do not.

One capability with a long history in consumer psychology is need for cognition, defined by Cacioppo and Petty [9] as a stable disposition to engage in and enjoy effortful thinking. Within the Elaboration Likelihood Model, this disposition shapes whether individuals process persuasive information centrally, by scrutinizing arguments, or peripherally, by relying on superficial cues [10]. Haugtvedt et al. [11] showed that consumers high in need for cognition formed attitudes based on product attributes, while those low in need for cognition relied more on peripheral advertising cues. Verplanken et al. [12] found that individuals high in need for cognition engaged in more information search before deciding, and recent work in digital retail confirms that the

disposition shapes how consumers process product presentations and respond to algorithmically personalized content [13], [4]. Deliberation in digital purchase decisions can therefore be understood as the applied, decision-specific expression of a broader cognitive motivation.

Whether deliberate evaluation protects against economically costly decisions is a separate question. Guo and Wu [14] characterize consumer deliberation as an effortful process undertaken to resolve uncertainty about a product's value before purchase; forgoing it leaves consumers more exposed to overvaluing what they buy. Mikołajczak-Degrauwe and Brengman [15] found that stronger persuasion-related knowledge was associated with less favorable attitudes toward advertising and lower compulsive buying, while Gathergood [16] found that weaker self-control was associated with greater reliance on costly, fast-access credit and with financial strain. Studies on social commerce associate low-deliberation, emotionally driven purchasing with post-purchase regret [17], [18]. Economic vulnerability thus appears closely tied to the absence of careful evaluation, although evidence specific to digitally mediated purchases remains limited.

A second capability concerns what consumers know about persuasion itself. The Persuasion Knowledge Model describes how consumers build beliefs about the goals, tactics, and agents behind marketing communications, and how this knowledge allows them to recognize and, in principle, resist persuasion attempts [19]. This capability is multicomponential: Ryu and Park [20] distinguish objective from subjective persuasion knowledge in personalized advertising, while the advertising literacy tradition separates recognizing persuasive intent from critically evaluating and identifying specific tactics [21]. Persuasion knowledge is theorized to depend on the same elaborative processing described by the Elaboration Likelihood Model. Ziegler et al. [22] showed that, when persuasion knowledge was accessible, consumers detected and corrected for marketers' ulterior motives, whereas its absence left them dependent on less reliable cues.

Persuasion knowledge, however, is not a fixed shield. Hossain and Saini [23] showed that vigilance against manipulation fluctuates with the time of day, tracing the effect to variation in available cognitive resources. Pan et al. [5] found that persistent algorithmic push on short-video commerce platforms was associated with both persuasion knowledge activation and decision fatigue, and Hansen and Thomsen [24] reported that time pressure impaired the choice quality of consumers who were otherwise confident in their knowledge. Situational strain, whether produced by urgency, fatigue, or repeated exposure, may therefore weaken the practical value of persuasion knowledge precisely when consumers need it, a dynamic that recent work on dark patterns has described as a cognitive-accessibility pathway to reduced persuasion resistance [2], [25].

Much of this literature treats need for cognition and persuasion knowledge as unidimensional moderators of single marketing outcomes, typically in experiments focused on one advertising format. Lord and Putrevu [26] identified multiple, only moderately related dimensions within the need for cognition scale, and Yang et al. [27] showed that two such dimensions can diverge in their consequences. The same caution extends to consumer vulnerability, which recent frameworks describe as encompassing cognitive, economic, and situational facets that need not share antecedents [28], [6]. What remains unexamined is whether a general cognitive-motivational disposition is linked, through distinct applied capabilities, to differentiated forms of protection against different kinds of digital consumer vulnerability.

Evidence on these mechanisms comes disproportionately from North America, Western Europe, and East Asia, where digital consumer protection regimes are comparatively mature [1], [21]. Less is known about emerging digital markets, where purchasing increasingly occurs through marketplace pages, messaging-based storefronts, and delivery applications. The present study examines adult digital consumers in Honduras, a context in which online purchasing is substantially mediated by social media and messaging platforms rather than dedicated retail infrastructure.

Building on the Elaboration Likelihood Model, the Persuasion Knowledge Model, and the Consumer Vulnerability Framework, this study examines two parallel pathways through which general cognitive motivation relates to digital consumer vulnerability: one through deliberation in digital purchase decisions and economic vulnerability, and a second through persuasion knowledge and situational vulnerability. Cognitive vulnerability was retained within the measurement model and allowed to correlate with its economic and situational counterparts. Because all variables were measured at a single time point, the pathways are examined as patterns of statistical association consistent with the proposed theoretical sequence, not as causal mediation.

A. Hypotheses

The following hypotheses were formulated:

H1. General cognitive motivation will be positively associated with deliberation in digital consumption decisions.

H2. General cognitive motivation will be positively associated with persuasion knowledge.

H3. Deliberation in digital consumption decisions will be negatively associated with economic vulnerability.

H4. Persuasion knowledge will be negatively associated with situational vulnerability.

H5. General cognitive motivation will show a negative indirect association with economic vulnerability through deliberation in digital consumption decisions.

H6. General cognitive motivation will show a negative indirect association with situational vulnerability through persuasion knowledge.

In addition, given evidence that the dimensions of consumer vulnerability tend to be interrelated [28], [6], cognitive, economic, and situational vulnerability were expected to correlate positively.

II. METHODS

This section follows the STROBE reporting guidelines for cross-sectional studies [29].

A. Study Design, Setting, and Participants

The study used a cross-sectional, non-experimental design based on a single self-report online survey administered through Microsoft Forms during May and June 2026 to adult consumers residing in Honduras. This design allows the examination of statistical associations but does not support causal inference. Eligible participants were adults between 18 and 70 years of age who affirmatively consented to participate; those who declined or left the consent item unanswered were excluded. Participants were recruited through non-probability convenience sampling; the sample is not representative of the Honduran adult population. The protocol was approved by an Institutional Ethics Committee before data collection, participation was voluntary, and informed consent was obtained electronically.

B. Variables and Measures

All substantive variables were assessed with self-report Likert-type scales (1 = strongly disagree, 5 = strongly agree), each dimension measured with five items.

1) Need for Cognition. Grounded in Need for Cognition Theory [9] and the Elaboration Likelihood Model [10], this construct was operationalized as a two-dimensional adaptation of the Need for Cognition Scale [9], [30], contextualized to digital consumption: General Cognitive Motivation, reflecting intrinsic enjoyment of effortful thinking (e.g., "I enjoy thinking deeply about topics that catch my attention"), and Deliberation in Digital Consumption Decisions, reflecting elaborated processing before online purchases (e.g., "Before buying a product online, I take the time to carefully analyze its characteristics and conditions").

2) Persuasion Knowledge. Adapted from the Advertising Literacy Scale [31] and Persuasion Knowledge Model-derived scales [19], [32], and contextualized to digital advertising, influencer marketing, and algorithmic recommendations, the instrument comprised three first-order dimensions: Cognitive Persuasion Knowledge (recognition of persuasive or commercial intent), Evaluative Persuasion Knowledge (critical judgment of the honesty and legitimacy of digital advertising tactics), and Tactical Persuasion Knowledge (recognition of specific techniques such as artificial urgency, simulated scarcity, or fabricated social proof). In the structural model, the three dimensions were specified as indicators of a second-order Persuasion Knowledge factor; the rationale for this specification is detailed in Section II-D.

3) Consumer Vulnerability. Given the absence of a validated instrument for digital consumer vulnerability in the Honduran context, an ad hoc scale was developed for this study from the conceptual definitions of the Consumer Vulnerability Framework [28], [33] and related work [34], [35]. Cognitive Vulnerability captured difficulty accessing, processing, and evaluating information in digital consumption environments; Economic Vulnerability captured financial limitations affecting balanced online purchase decisions, including susceptibility to impulsive buying; and Situational Vulnerability captured temporal or contextual circumstances, such as stress, urgency, or fatigue, that increase susceptibility to unfavorable decisions. Items were written in Spanish by the research team, with each item mapped to one of the three conceptual definitions, and the wording was reviewed by the authors for clarity and fit to the local context before administration. No formal expert-panel content-validity study or separate pilot test was conducted. The instrument should therefore be regarded as a first, exploratory operationalization whose structure requires independent validation. Economic and Situational Vulnerability were specified as outcomes of Deliberation and Persuasion Knowledge, respectively, while Cognitive Vulnerability was allowed to correlate with them without a structural path.

4) Sociodemographic Variables. Age was recorded in years; sex, education, marital status, and employment status were recorded with fixed response options (Table I).

C. Data Quality Screening

Microsoft Forms recorded start and completion timestamps for each submission. Records without affirmative consent were excluded. Response time was screened with a lower bound of one-third of the sample median, a criterion for detecting respondents who could not plausibly have read the items [36], and an upper bound defined by Tukey's criterion ($Q3 + 1.5 \times IQR$). Records with identical responses across 80% or more of the 40 Likert-type items were removed as straight-lining [37], [38], [36], and records with implausible age values were screened for removal.

D. Statistical Analysis

Analyses were conducted in jamovi 2.7 [39] with R 4.5 [40], using lavaan [41] for confirmatory factor analysis (CFA) and structural equation modeling (SEM), and psych [42] and semTools [43] for reliability and validity indices. Three CFAs, one per instrument, were estimated using maximum likelihood with robust standard errors. Fit was evaluated with robust CFI, TLI, RMSEA (90% CI), and SRMR against conventional benchmarks (CFI and TLI $\geq .90$; RMSEA and SRMR $\leq .08$). Internal consistency was estimated with Cronbach's alpha and McDonald's omega; convergent validity with the average variance extracted (AVE), interpreted jointly with composite reliability [44]; and discriminant validity with the heterotrait-monotrait ratio (HTMT), using .85 as the conservative and .90 as the liberal threshold [45].

Second-order specification of Persuasion Knowledge. Three considerations supported modeling Persuasion Knowledge as a second-order factor. First, the Persuasion Knowledge Model treats recognizing persuasive intent, evaluating the legitimacy of tactics, and identifying specific tactics as facets of a single knowledge structure consumers use to cope with persuasion [19], and advertising literacy frameworks describe these components as interrelated elements of a general literacy [31], [21]; the hypotheses concern this general capability rather than any single facet. Second, with three first-order factors the higher-order level is just-identified, so the second-order model is statistically

equivalent in fit to the correlated three-factor model [46]; the choice between them therefore rests on theory and parsimony rather than fit. Third, entering three dimensions with HTMT values between .847 and .908 as separate predictors would introduce severe collinearity into the structural model, whereas the second-order factor represents their shared variance while preserving the first-order distinction at the measurement level. A single-factor model collapsing the 15 items was not retained because each dimension showed AVE above .50 and adequate separate reliability; formal comparison of these alternatives in an independent sample remains a task for future research.

The final SEM integrated the three measurement structures and specified General Cognitive Motivation as a predictor of Deliberation and Persuasion Knowledge, which were in turn specified as predictors of Economic and Situational Vulnerability, respectively, with residual correlations among the three vulnerability dimensions. It was estimated with maximum likelihood, robust standard errors, and the Yuan-Bentler scaled statistic. Indirect effects were estimated as products of coefficients with robust standard errors and 95% confidence intervals. In this cross-sectional design, indirect effects are interpreted as statistical indirect associations consistent with the hypothesized pattern, not as evidence of causal mediation.

Missing data. Missing item responses were handled through listwise deletion, applied by jamovi when robust standard errors are requested; the effective sample therefore differed across models. Listwise deletion yields unbiased estimates only when data are missing completely at random and reduces statistical power [47]; the extent of missingness is reported in Section III-A.

Sample-size adequacy. The final SEM estimated 116 free parameters on 166 cases, a ratio of about 1.4 cases per parameter, which is below commonly cited heuristics [48]. Monte Carlo evidence, however, indicates that sample-size requirements depend on model features rather than on a fixed ratio, and that requirements decrease as the number of indicators per factor and the magnitude of factor loadings increase [49], [50]. The present model used five indicators per first-order factor with standardized loadings between .600 and .829. As a complementary check, an RMSEA-based power analysis [51] was computed for the final model (df = 549, n = 166, $\alpha = .05$).

III. Results

A. Data Screening, Missing Data, and Analytical Sample

An initial pool of 213 responses was collected. Two records were removed for failing the consent item (211 cases). The median completion time was 244 seconds, giving a lower bound of 81.3 seconds and an upper bound of 1161.5 seconds; two cases were removed for responding too quickly and eight for exceeding the upper bound (201 cases). One case was removed for straight-lining, and none for implausible age (observed range 18 to 65). The analytical sample comprised 200 participants.

Because of item nonresponse, listwise deletion reduced the effective sample to 193 cases for the Need for Cognition CFA (7 incomplete cases, 3.5%), 188 for Persuasion Knowledge (12, 6.0%), and 182 for Consumer Vulnerability (18, 9.0%). Combining the indicators of the three instruments in the final SEM reduced the sample to 166 complete cases, so 34 participants (17.0%) had at least one missing item. Missingness was item-level and scattered across instruments rather than concentrated in a single scale, and it increased with the number of indicators jointly required, as expected under listwise deletion. Complete and incomplete cases were not compared on sociodemographic characteristics, and no test of the missing-completely-at-random assumption was conducted; the estimates should therefore be read under the assumption that incomplete cases did not differ systematically from complete ones.

B. Participant Characteristics

Table I summarizes the analytical sample (n = 200). Mean age was 30.8 years (SD = 9.11). The sample was balanced by sex (49.5% men, 50.0% women); most participants had completed secondary education (43.5%) or some level of university education (44.0%), were single (59.0%), and worked in the public (35.0%) or private (34.5%) sector.

TABLE I
SOCIODEMOGRAPHIC CHARACTERISTICS OF THE ANALYTICAL SAMPLE (N = 200)

Variable	Category	n	%
Age (yrs)	M = 30.8, SD = 9.11, range = 18–65		
Sex	Men	99	49.5
	Women	100	50.0
	Pref. not to answer	1	0.5
Education	Primary	18	9.0
	Inc. secondary	7	3.5
	Secondary	87	43.5
	Inc. university	37	18.5
	University	40	20.0
	Postgraduate	11	5.5
Marital status	Single	118	59.0
	Married	32	16.0
	In a relationship	40	20.0
	Divorced/sep.	3	1.5
	Widowed	7	3.5
Employment	Unpaid household	6	3.0
	Unemployed	9	4.5
	Private sector	69	34.5
	Public sector	70	35.0
	Student	28	14.0
	Self-employed	18	9.0

Note. Percentages are computed over n = 200 and may not sum to 100% because of rounding.

C. Measurement Models

1) Need for Cognition. The two-factor model (n = 193) showed adequate fit (Table II). Loadings ranged from .657 to .747 for General Cognitive Motivation and from .690 to .812 for Deliberation. Reliability was adequate (α = .783 and .874; ω = .783 and .876). AVE was .586 for Deliberation and .479 for General Cognitive Motivation, slightly below .50 but accompanied by composite reliability above .70, which supports acceptable convergent validity [44]. HTMT between the two dimensions was .742.

2) Persuasion Knowledge. The three-factor model (n = 188) showed adequate fit. Loadings ranged from .629 to .826, reliability was adequate (α = .845 to .866; ω = .845 to .868), and AVE values were .525, .578, and .569. HTMT ratios were elevated (cognitive-evaluative = .847; cognitive-tactical = .893; evaluative-tactical = .908); the last two exceed the .85 criterion and the last also exceeds .90 [45], so discriminant validity among the first-order dimensions was not established. This result indicates substantial shared variance among the dimensions and, together with the theoretical considerations in Section II-D, motivated the second-order specification.

3) Consumer Vulnerability. The three-factor model (n = 182) showed the weakest fit of the three instruments: robust CFI = .928 and TLI = .907 met the .90 benchmark, and SRMR = .073 was acceptable, but RMSEA = .088 (90% CI [.063, .113]) exceeded the .08 benchmark. Loadings ranged from .600 to .829 and reliability was acceptable (α = .760 to .871). AVE was .450 for Cognitive Vulnerability, below .50, and .563 and .630 for Economic and Situational Vulnerability. HTMT was low to moderate between Cognitive Vulnerability and the other dimensions (.467 and .277) but high between Economic and Situational Vulnerability (.813). Although this value is below the .85 threshold, it indicates that the distinction between these two dimensions is only moderately supported. Taken together, these results support treating the vulnerability structure as preliminary.

TABLE II
FIT, RELIABILITY, AND VALIDITY OF THE MEASUREMENT MODELS

Model	**CFI**	**TLI**	**RMSEA [90% CI]**	**SRMR**
NFC (n = 193)	.981	.974	.053 [.000, .091]	.038
PK (n = 188)	.967	.959	.059 [.032, .083]	.038
CV (n = 182)	.928	.907	.088 [.063, .113]	.073
Dimension	**α**	**ω**	**AVE**	**Loadings**
Gen. cog. motivation	.783	.783	.479	.657–.747
Deliberation	.874	.876	.586	.690–.812
Cognitive PK	.847	.846	.525	.629–.806
Evaluative PK	.845	.845	.578	.746–.789
Tactical PK	.866	.868	.569	.665–.826
Cognitive vuln.	.760	.764	.450	.600–.715
Economic vuln.	.831	.835	.563	.600–.829
Situational vuln.	.871	.872	.630	.775–.803

Note. NFC = need for cognition; PK = persuasion knowledge; CV = consumer vulnerability. CFI, TLI, and RMSEA are robust estimates. α = Cronbach's alpha; ω = McDonald's omega; AVE = average variance extracted; Loadings = range of standardized loadings.

D. Final Structural Model and Sample-Size Adequacy

The final model converged on n = 166 complete cases with 116 free parameters. It showed acceptable but not excellent fit: scaled $\chi^2(549) = 789$, $p < .001$; robust CFI = .913; robust TLI = .905; robust RMSEA = .056 (90% CI [.047, .065]); SRMR = .070. The RMSEA-based power analysis [51] indicated power above .99 for the test of close fit (H0: ε = .05 vs. Ha: ε = .08) and for the test of not-close fit (H0: ε = .05 vs. Ha: ε = .01); the minimum n needed for power of .80 was 48 and 70, respectively. This analysis concerns global fit only and does not establish power for individual paths, particularly the smallest one (β = −.217). Given the low case-to-parameter ratio, parameter estimates should be regarded as preliminary and require replication in larger samples.

E. Direct Paths and Indirect Associations

Table III reports unstandardized (B) and standardized (β) estimates. General Cognitive Motivation was positively associated with Deliberation (B = .783, SE = .120, β = .793, $p < .001$, $R^2 = .629$) and with Persuasion Knowledge (B = .559, SE = .110, β = .793, $p < .001$, $R^2 = .629$), supporting H1 and H2. Both standardized coefficients equal .793 to three decimals; because β rescales B by the ratio of the latent standard deviations of predictor and outcome, identical β values can accompany different B values and standard errors. These values were verified against the estimation output. Deliberation was negatively associated with Economic Vulnerability (B = −.168, SE = .061, β = −.217, p = .006; R^2 = .047), supporting H3, and Persuasion Knowledge was negatively associated with Situational Vulnerability (B = −.447, SE = .124, β = −.324, $p < .001$; $R^2 = .105$), supporting H4. The explained variance in both vulnerability outcomes was modest.

The indirect association of General Cognitive Motivation with Economic Vulnerability through Deliberation was negative and significant (β = −.172, 95% CI [−.294, −.049], p = .008), as was the indirect association with Situational Vulnerability through Persuasion Knowledge (β = −.257, 95% CI [−.379, −.135], $p < .001$), consistent with H5 and H6. These results describe statistical indirect associations and do not establish causal mediation.

TABLE III
DIRECT PATHS AND INDIRECT ASSOCIATIONS IN THE FINAL SEM (N = 166)

Relation	***B***	***SE***	**β**	**95% CI (β)**	***p***
Direct paths					
GCM → Deliberation	.783	.120	.793	[.678, .909]	<.001
GCM → PK	.559	.110	.793	[.678, .908]	<.001
Deliberation → EV	−.168	.061	−.217	[−.367, −.066]	.006
PK → SV	−.447	.124	−.324	[−.473, −.174]	<.001
Indirect associations					
GCM → Delib. → EV	−.132	.050	−.172	[−.294, −.049]	.008
GCM → PK → SV	−.250	.067	−.257	[−.379, −.135]	<.001

Note. GCM = general cognitive motivation; PK = persuasion knowledge; EV = economic vulnerability; SV = situational vulnerability; B = unstandardized estimate; SE = robust standard error; β = standardized estimate. Confidence intervals refer to the standardized estimates. Unstandardized 95% CIs for the indirect associations: [−.229, −.035] and [−.380, −.119]. R^2 = .629 (Deliberation), .629 (PK), .047 (EV), .105 (SV). Indirect associations are not evidence of causal mediation.

F. Correlations Among Vulnerability Dimensions

Cognitive Vulnerability correlated with Economic Vulnerability ($r = .423$, $p = .005$) and with Situational Vulnerability ($r = .348$, $p = .012$), and Economic and Situational Vulnerability showed a stronger association ($r = .823$, $p < .001$). These are standardized latent covariances, not directional paths (Fig. 1).

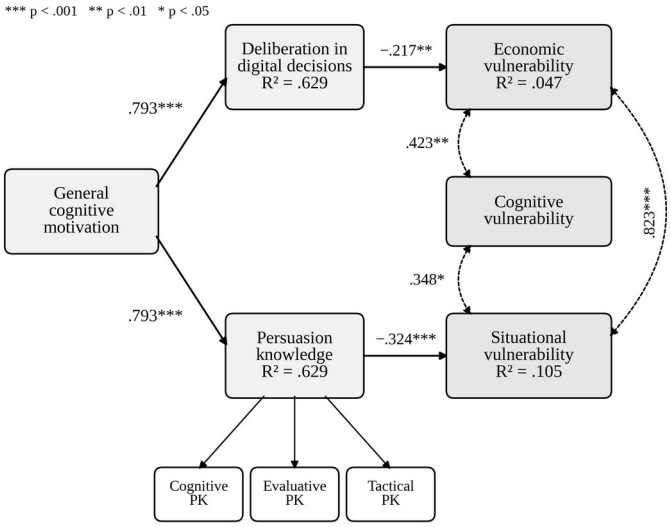


Fig. 1 Final structural model of the two parallel pathways. Values are standardized estimates. Solid arrows are structural paths; dashed double-headed arrows are correlations among vulnerability dimensions. Persuasion knowledge is a second-order factor. Item indicators and residuals are omitted.

IV. Discussion

This study examined whether a general disposition toward effortful thinking relates to digital consumer vulnerability through two distinguishable, capability-specific pathways. The results are broadly consistent with this premise: general cognitive motivation was associated with two applied capabilities, deliberation and persuasion knowledge, each of which was in turn associated with a different facet of vulnerability. At the same time, neither pathway accounted for more than a limited share of the variance in vulnerability.

The strong associations linking general cognitive motivation to both capabilities are consistent with the Elaboration Likelihood Model, whereby a preference for effortful thinking inclines individuals toward central-route processing [11], [10]. The findings extend evidence that need for cognition translates into information search [12] and shapes responses to personalized digital content [13], [4] by suggesting that the same disposition may also underlie a resistance-oriented capability such as persuasion knowledge. In the Honduran context, where digital retail coexists with an informal and unevenly regulated commercial landscape, this pattern may be reinforced by risk-avoidance motives: verifying a seller's legitimacy, comparing prices, or checking other buyers' experiences can function as safeguards where formal recourse after a poor purchase is limited.

The negative association between deliberation and economic vulnerability, and the corresponding indirect association, are consistent with the expectation that effortful evaluation before purchase accompanies reduced exposure to financially straining decisions. This aligns with Guo and Wu's [14] view of deliberation as a process aimed at resolving uncertainty about a product's value and with literature connecting weaker self-regulation to compulsive or debt-generating purchasing [16], [15]. The modest explained variance indicates that income, access to credit, and financial socialization plausibly account for much of what the model leaves unexplained.

The association between persuasion knowledge and situational vulnerability was somewhat stronger. One interpretation, consistent with evidence that vigilance against manipulation fluctuates with available cognitive resources [23], [5], is that recognizing persuasive tactics may operate as a comparatively efficient, well-rehearsed cue that remains accessible when deliberate reasoning is compromised by fatigue or time pressure. Persuasion knowledge would then need only to interrupt automatic responding long enough for a more considered reaction. This account is speculative and requires designs that manipulate cognitive load, but it is consistent with work linking situational strain to reduced skepticism [8] and with the cognitive-accessibility pathway described for manipulative interfaces [2], [25].

A central feature of the model is that persuasion knowledge was linked to situational rather than economic vulnerability, while deliberation followed the reverse pattern. Recognizing that a message is designed to persuade does not, by itself, resolve the economic trade-offs of a purchase: a consumer may identify an urgency appeal as a tactic and still buy because of unmet desires or easy credit. Deliberation, by contrast, is oriented from the outset toward judging whether a purchase is warranted and affordable. Treating both capabilities as a single protective factor would obscure this distinction.

These findings also bear on AI-mediated commerce, although the model did not test an AI-specific mechanism. Algorithmic recommendation and targeting increase the volume, timing precision, and personalization of persuasive stimuli [1], [4], [5]. The results suggest that consumer protection in such environments may depend on at least two human capabilities: the disposition to evaluate purchases deliberately, which algorithmic convenience may bypass, and the ability to recognize persuasion, which repeated algorithmic exposure may tax. Whether these capabilities operate differently when persuasion is delivered by AI systems rather than by conventional advertising remains an open question that requires direct measurement of algorithmic exposure.

Cognitive vulnerability correlated positively with both economic and situational vulnerability without receiving a structural path. The strong association between economic and situational vulnerability ($r = .823$), together with their HTMT of .813, indicates that these facets share substantial variance, possibly reflecting financial constraint that becomes

consequential under contextual pressure; it also indicates that their empirical separation should be treated with caution. The weaker associations involving cognitive vulnerability are compatible with a multidimensional, partially overlapping view of consumer vulnerability [28], [6].

The modest variance explained in economic (R^2 = .047) and situational (R^2 = .105) vulnerability should be read as evidence that deliberation and persuasion knowledge are partial, non-exhaustive protective factors within a wider set of conditions. Income, financial literacy, impulsivity, access to credit, and prior purchase experience are plausible omitted factors consistent with the Consumer Vulnerability Framework [28]. Measurement error in a newly developed scale may also have attenuated the associations.

Theoretically, the study treats need for cognition and persuasion knowledge not as generic moderators of isolated advertising outcomes but as differentiated capabilities associated with distinct facets of vulnerability within one model, and it provides evidence from a Central American population characterized by informal, social-commerce-mediated purchasing [1], [21]. Practically, educational programs delivered through universities or consumer-protection bodies could address price and seller comparison and the recognition of persuasive tactics, such as artificial urgency or unverified social proof, as related but distinct skills. Because these capabilities explained only a limited share of vulnerability, such efforts should complement, not replace, oversight of deceptive digital practices, and any intervention should be evaluated before implementation.

Several limitations restrict interpretation. First, the cross-sectional design means that the indirect associations reflect estimated pathways consistent with the hypothesized sequence, not a confirmed temporal or causal order; alternative orderings cannot be ruled out. Second, the final SEM was estimated on 166 complete cases with 116 free parameters; although global power was adequate, the low case-to-parameter ratio limits the precision of individual estimates. Third, listwise deletion removed 17% of the screened sample, and complete and incomplete cases were not compared; full-information maximum likelihood or multiple imputation would be preferable in future work [47]. Fourth, the Consumer Vulnerability instrument was developed ad hoc without a formal content-validity study, its CFA showed RMSEA above .08, Cognitive Vulnerability showed AVE below .50, and Economic and Situational Vulnerability were highly related; the vulnerability structure is therefore preliminary and requires independent psychometric validation. Fifth, discriminant validity among the Persuasion Knowledge dimensions was not established, and alternative specifications were not formally compared. Finally, the convenience sample, recruited online, plausibly overrepresents digitally active consumers, and all measures were self-reported, which introduces possible common method variance.

Future research should use longitudinal or experimental designs to test whether deliberation and persuasion knowledge precede lower vulnerability, estimate the model in larger samples with modern missing-data methods, validate the Consumer Vulnerability scale through expert review, pilot testing, and independent CFA, compare second-order, correlated-factor, and bifactor specifications of persuasion knowledge, incorporate financial literacy, income, and credit access, and measure exposure to algorithmic recommendation directly. Replication in other emerging digital markets would clarify how far the present pattern generalizes.

V. Conclusion

This study examined how a general disposition toward effortful thinking relates, through two applied pathways, to digital consumer vulnerability among adult consumers in Honduras. Within the limits of a cross-sectional design, deliberation in digital purchase decisions and persuasion knowledge each showed a distinguishable negative association with a different facet of vulnerability, economic and situational respectively, while cognitive vulnerability remained an interrelated but structurally distinct dimension. These results suggest that consumer protection in digital and increasingly AI-mediated markets may rest on at least two separate capabilities rather than a single global one. The associations accounted for a modest share of the variance, and the vulnerability measure and sample size warrant caution; the findings are therefore preliminary and specific to the sample, design, and context examined here.

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