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From Hype to Habit: An Integrative Review of Augmented Reality in Consumer Research

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Abstract

Augmented reality has evolved from a marketing curiosity into a maturing technology embedded in everyday consumption. While scholarly attention has expanded rapidly, the field remains fragmented across mechanisms, outcomes, and journey stages, and existing reviews have not fully addressed how AR effects unfold across time and boundary conditions. Drawing on integrative review methodology and concept-centric synthesis principles, this article synthesizes 107 empirical and conceptual studies published between 2010 and mid-2026 along three integrative axes: the consumer journey, cognitive-affective-behavioral mechanisms, and boundary conditions. We propose the AR Consumer Journey Integration Model that organizes mechanisms across four stages of pre-purchase, purchase, post-purchase, and re-engagement, alongside a five-dimensional structure for boundary conditions covering consumer, contextual, product, design, and temporal factors. We identify the temporal dimension and design quality as the most under-theorized dimensions in prior reviews. The contributions are twofold: an evidence-based integrative framework that links mechanisms, journey stages, and boundary conditions, and a managerial decision lens for AR deployment.

Keywords: Augmented reality; Consumer journey; Habituation; Boundary conditions; Spatial computing; Integrative review

1. Introduction

Within the past 15 years, augmented reality (AR), the real-time integration of digitally generated content into a user's physical environment, has shifted from a peripheral marketing curiosity to a mainstream commercial channel. IKEA Place introduced household furniture visualization on smartphones in 2017; Sephora and L'Oréal followed with virtual try-on for cosmetics. Tan et al. (2022) demonstrated, using field data from an international cosmetics retailer, that AR usage on a mobile shopping app generated higher sales for less-popular brands, narrow-appeal products, and higher-priced items, providing some of the field's earliest large-scale evidence of AR's commercial impact. The launch of Apple Vision Pro and the maturation of Meta Quest 3 in 2024 marked a further transition into the spatial-computing era, signaling that AR is moving from device-mediated, screen-based interaction toward ambient, head-worn engagement (Alex et al., 2025; Barari et al., 2026). Industry projections place the AR/VR sector at US$131.54 billion in 2023, with growth to approximately US$1.71 trillion by 2032.

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Despite this trajectory, AR consumer research remains theoretically fragmented. The field has produced a substantial corpus of empirical studies on individual mechanisms such as local presence, mental imagery fluency, psychological ownership, anticipated warmth, and habituation, but lacks an integrative framework that links three complementary perspectives. The first is the mechanisms through which AR shapes consumer cognition, affect, and behavior. The second is the journey stages across which these mechanisms unfold. The third is the boundary conditions under which AR's effects amplify, attenuate, or reverse. Existing reviews offer partial perspectives. Barari et al. (2026) provided the first quantitative meta-analysis comparing AR and VR across 18 constructs, organizing the field through four parallel theoretical lenses of decision fluency, spatial presence theory, the technology acceptance model, and experiential theory, plus a dark-side perspective. Their effect-size synthesis is an important benchmark, but by design the analysis treats theories in parallel rather than sequentially across the journey and excludes review papers from the corpus. Riar et al. (2023) systematized AR shopping research through cognitive, affective, social, and behavioral lenses, but limited the scope to the shopping stage and cut off the literature at 2022. Rauschnabel et al. (2022) defined AR marketing and proposed the BICK-FOUR framework of Branding, Inspiring, Convincing, and Keeping, an influential firm-side strategic typology rather than an evidence synthesis of consumer-side mechanisms. Wedel et al. (2020) viewed AR and VR primarily as research methods. Du et al. (2022) reviewed 99 articles from Web of Science through technology acceptance model (TAM) and stimulus-organism-response (S-O-R) lenses, with a narrower theoretical aperture and a pre-2023 cutoff. tom Dieck et al. (2024) offered a domain-specific synthesis for hospitality and tourism, and an earlier 2021 review did so for retail.

Two characteristics of the most recent research wave, published since the cutoffs of these earlier reviews, motivate the present synthesis. The first concerns substantive content. Several studies published between 2024 and mid-2026 have surfaced phenomena that previous frameworks struggle to absorb, including habituation dynamics in AR app usage (Söderström et al., 2024), augmentation quality as a second-order construct mediated by local presence (Schein et al., 2025), anticipated warm glow as a route to green consumption (Lavoye et al., 2025), information-controllability backfires under time pressure (Hoffmann et al., 2022), and multi-product presentation effects (Zhou et al., 2025). The second concerns organization. The consumer journey itself has not been used as the principal axis for organizing AR research, even though several recent contributions implicitly embed temporal logic. Most notably, the BICK-FOUR framework (Rauschnabel et al., 2022) orders firm strategies along a journey-like sequence but does not specify mechanism dynamics on the consumer side.

This article makes two contributions. We propose the AR Consumer Journey Integration Model (ACJIM), a three-axis framework that organizes 107 studies along four journey stages, three mechanism layers covering cognition, affect, and behavior, and five boundary-condition dimensions. ACJIM extends the BICK-FOUR framework of Rauschnabel et al. (2022) by overlaying a consumer-side mechanism layer. Through synthetic organization, we surface a boundary-condition structure spanning five dimensions and 23 sub-conditions, alongside an explicit temporal dynamics layer of habituation, post-purchase confirmation, and anticipated affect, dimensions that effect-size meta-analyses obscure by aggregating over time.

The remainder of this article is organized as follows. Section 2 reviews the theoretical foundations that have generated repeated empirical traction in the AR consumer literature. Section 3 describes the integrative-review method and search protocol. Sections 4 through 7 trace AR's effects across the four

journey stages. Section 8 maps the boundary conditions. Section 9 discusses theoretical and managerial implications. Section 10 concludes.

2. Theoretical Foundations

AR consumer research draws on a layered set of theoretical foundations rather than a single dominant paradigm. Five theoretical pillars have generated repeated empirical traction in recent work published between 2022 and mid-2026: situated and embodied cognition; mental imagery, processing fluency, and active inference; spatial and local presence; the stimulus-organism-response and technology acceptance frameworks; and habituation-tedium theory. We selectively rebuild these pillars here as a foundation for the journey-level synthesis in Sections 4 through 7.

2.1 Embodied and Situated Cognition

Embodied and situated cognition theories propose that cognition is not abstract symbol manipulation but is grounded in bodily and environmental interaction (Barsalou, 2008; Niedenthal, 2007; Robbins & Aydede, 2009). For AR consumer research, Hilken et al. (2017) operationalized situated cognition through two perceptual elements. The first is simulated physical control, defined as users' ability to manipulate virtual content via gestures, gaze, or voice. The second is environmental embedding, defined as the visual integration of virtual content into the user's actual physical surroundings. Their experimental work showed that the conjunction of these two elements generates spatial presence, the conviction that virtual content is authentically situated in the user's physical reality, which mediates AR's effect on utilitarian and hedonic value perceptions and on decision comfort.

Subsequent work since 2024 has refined this lineage. Schein et al. (2025) developed an AR-specific construct called augmentation quality, with three first-order factors of design quality, interaction quality, and embedding quality loading on a second-order factor whose effect on downstream marketing outcomes is mediated by local presence. Wu et al. (2024) showed that AR embedding and embodiment attributes drive consumer-based brand equity in mobile AR shopping. Heller et al. (2019) extended the embodiment lens to multi-sensory AR, demonstrating that touch-based control generates stronger active-inference loops than voice-based control. The cumulative evidence positions situated cognition not merely as an explanatory frame but as a generator of falsifiable propositions about which AR design features should produce stronger consumer responses, with features closer to bodily action and closer to environmental fidelity exerting greater leverage.

2.2 Mental Imagery, Processing Fluency, and Active Inference

A second pillar concerns the cognitive work consumers must perform to evaluate offerings absent direct sensory contact. MacInnis and Price (1987) characterized mental imagery as the internal representation of sensory information that consumers generate when external stimuli are insufficient. Heller et al. (2019) labeled the cost of this work mental intangibility, the difficulty of forming a confident internal representation of an offering, and showed that AR reduces mental intangibility by externalizing imagery work. This reduction propagates downstream. In their experiments, multi-sensory AR with touch control reduced mental intangibility, increased decision comfort, and ultimately raised willingness-to-pay through a serial mediation pathway. Active inference theory, originally formulated within the broader free-energy framework for understanding perception (Friston, 2018), provides theoretical scaffolding for these effects by reframing perception as iterative hypothesis-testing, in which consumers act, predict, and update mental representations through sensory feedback loops.

Closely related, processing fluency theory (Reber et al., 2004) holds that ease of cognitive processing reinforces evaluative judgments. AR's vivid, spatially embedded presentation typically increases fluency and improves evaluations, except when fluency is disrupted by technical instability or perceptual incongruence. Hilken et al. (2022a) further differentiated AR from VR on the imagery dimension. AR enhances product-centric mental imagery, namely visualizing the focal object in one's space, whereas VR enhances context-centric imagery, namely visualizing the broader scene. This distinction anchors AR's distinctive value in product-evaluation tasks where the focal object dominates the imagined experience.

2.3 Spatial Presence and Local Presence

The presence construct has bifurcated as AR matured. Spatial presence (Wirth et al., 2007; Witmer & Singer, 1998) was originally formulated for fully immersive VR and captures the sense of being in a mediated environment. Local presence inverts the construct for AR. It captures the sense that virtual objects are here, in the user's physical space (Daassi & Debbabi, 2021; Verhagen et al., 2014). Schein et al. (2025) recently consolidated local presence as the central mediator through which augmentation quality affects marketing outcomes, placing it firmly at the explanatory core of AR consumer research. Boundary nuances complicate the picture. von der Au et al. (2023) showed that contextual congruence between virtual content and the physical place of use produces sometimes counter-intuitive presence outcomes. Overly familiar contexts may slightly reduce the sense of novelty-presence even as they raise plausibility.

2.4 Stimulus-Organism-Response and Technology Acceptance

The S-O-R framework (Mehrabian & Russell, 1974) and the technology acceptance model (Davis, 1989; Venkatesh & Davis, 2000) remain pervasive baseline frameworks across AR consumer research. Stimuli include AR's interactivity, vividness, augmentation, and information content. Organism states include affective and cognitive responses. Responses include purchase, word-of-mouth, and continuance. Söderström et al. (2024) recently used S-O-R as the backbone for studying AR habituation in a 394-user sample of IKEA Place users, demonstrating how stimulus-organism couplings differ across exposure tenures. Du et al. (2022) found in their systematic review that TAM and S-O-R were the two most-applied lenses among 99 articles. Both frameworks remain useful organizing scaffolds, yet recent reviewers have noted that they are insufficient on their own to explain AR-specific phenomena such as local presence asymmetries, time-dependent effects, and multi-stakeholder dynamics (Barari et al., 2026). We therefore treat S-O-R and TAM as foundational scaffolding to be combined with the AR-specific lenses described above.

2.5 Habituation-Tedium Theory

A fifth pillar, distinct from the older four because it has only recently entered the AR conversation, addresses how repeated exposure changes consumer responses. Habituation refers to the response decrement following repeated stimulus presentation (Easterbrook, 1959; Thompson & Spencer, 1966). Habituation-tedium theory (Tellis, 1997) extends classical habituation by positing that repeated exposure first reduces negative effects such as uncertainty and stress, and then shifts toward tedium. The theoretical fit between habituation-tedium and AR is strong precisely because AR's defining feature, the integration of vivid virtual content into the user's environment, is itself a salient stimulus susceptible to novelty decay. Söderström et al. (2024) brought this lens to AR marketing in their study of 394 IKEA Place users, finding that first-time users responded more strongly to vividness and

augmentation features through perceived usefulness, whereas habitual users were more affected by augmentation aspects and personalized recommendations through enjoyment. Although their study is the most direct empirical engagement with AR habituation in the present corpus, adjacent evidence sustains the temporal logic. Daassi and Debbabi (2021) reported that AR-app continuance intention depends on the combined sense of immersion, product presence, and perceived realism — antecedents whose salience plausibly shifts with exposure tenure. Heller et al. (2021), through the Technology-Enabled Engagement Process framework, characterized how repeated AR engagement accumulates into relational outcomes that differ qualitatively from first-use effects. Wang et al. (2023) documented continuance intention as a distinct downstream outcome of shared social AR experience, separable from initial adoption. The implication is twofold. Cross-sectional studies of AR effects systematically conflate first-time novelty responses with longer-run engagement, and managerial AR strategies that succeed at acquisition may fail at retention without temporal recalibration. This theoretical pillar supplies the temporal scaffolding that earlier reviews lacked and motivates both the journey-stage organization of Sections 4 through 7 and the inclusion of temporal and habituation factors in the boundary structure of Section 8. The AR-specific empirical base for habituation dynamics is thin — one longitudinal-style study supported by continuance-intention work — so the temporal axis we develop should be read as a partly forward-looking proposition rather than an evidence-settled axis on the order of presence or imagery fluency.

The five pillars are typically deployed in parallel or in isolation in extant AR consumer research. Existing reviews map them to outcome variables but do not orchestrate them across the consumer journey. The integrative framework introduced in Section 3 overlays these mechanisms onto a journey time-axis to surface stage-specific dominant theories, with situated cognition and active inference dominating the purchase stage, and habituation-tedium dominating re-engagement.

3. Method: An Integrative Review Approach

We adopted an integrative review method (Torraco, 2016) following the procedural guidance of Palmatier et al. (2018) and the concept-centric matrix logic of Webster and Watson (2002). The integrative method is appropriate when the goal is to critique, integrate, and synthesize a body of research on a maturing topic, with an emphasis on theory-development rather than effect-size aggregation (Snyder, 2019).

The candidate corpus was assembled through multi-source search. First, we conducted a systematic search of business and consumer-research databases including ABI/INFORM, Scopus, Web of Science, and EBSCO Business Source Complete, using the combined query of augmented reality OR AR, intersected with consumer OR marketing OR retail OR shopping OR purchase. Second, we conducted backward and forward citation tracing from a seed set of 11 anchor articles spanning 2017 to mid-2026: Hilken et al. (2017), Yim et al. (2017), Heller et al. (2019), Hilken et al. (2020), Sung (2021), Hoffmann et al. (2022), Rauschnabel et al. (2022), Söderström et al. (2024), Schein et al. (2025), Lavoye et al. (2025), and Barari et al. (2026). Third, we conducted author-page tracking of seven prolific AR consumer scholars to capture in-press work. The search was finalized in May 2026, extending the literature window beyond the data collection cutoff of the most recent published meta-analysis (Barari et al., 2026). Among studies published or made available after that cutoff and incorporated into the present synthesis are Lavoye et al. (2025), Zhou et al. (2025), Alex et al. (2025), Racat et al. (2026), and Zhu et al. (2026).

Papers were retained if they addressed AR-specific consumer phenomena, excluding pure technology-development, healthcare, or industrial AR studies that lack consumer outcomes; were peer-reviewed or in-press in indexed journals or conference proceedings; were published in English; and reported either empirical evidence or substantive conceptual development. Following PRISMA-inspired logic (Page et al., 2021), 209 candidate items entered identification, were reduced to 174 after removing 35 duplicates (the same paper indexed under multiple library entries), then to 145 after topic screening (excluding non-consumer or technology-development papers), then to 130 after assessing methodological quality and journal authority, and finally to a synthesis corpus of 107 unique studies after deeper eligibility review. Three tiers were assigned. Tier 1 contains 42 studies that are extensively engaged in the synthesis. Tier 2 contains 40 studies that are deeply discussed in support of specific mechanisms. Tier 3 contains 25 studies cited in passing for background or historical context.

Following Webster and Watson (2002), we organized the corpus through a concept-centric matrix in which 17 core constructs were cross-tabulated against the included papers. Each empirical study was tagged on five dimensions: journey stage, mechanism layer covering cognition, affect, and behavior, boundary condition implicated, tier, and study type. The resulting matrix made evident which mechanisms had been studied repeatedly in which stages, where contradictions existed, and where theoretical or empirical gaps remained. From this matrix we derived the three-axis ACJIM framework and the five-dimensional boundary structure that organize Sections 4 through 8 (see Figure 1). Coding was conducted by a single coder. Where the synthesis description of a construct diverged from its operationalization in the primary work, the source paper was re-read and the matrix entry adjusted to the primary-work usage.

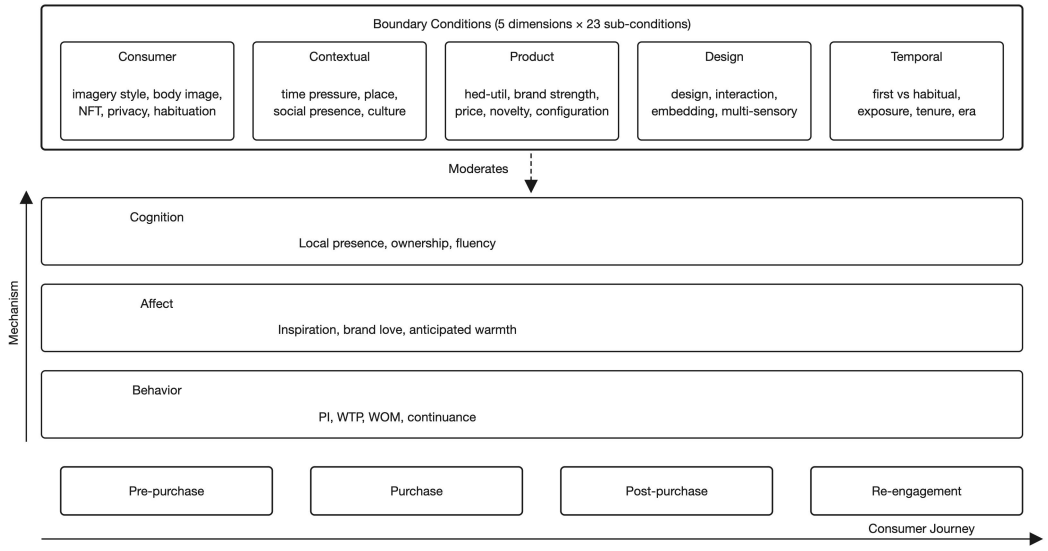

Figure 1. The AR Consumer Journey Integration Model (ACJIM).

4. Pre-Purchase Stage: From Awareness to Consideration

The pre-purchase stage spans the cognitive and affective work consumers undertake before committing to a transaction. It encompasses encountering a product, exploring its possibilities, imagining its fit, and forming an intention to try or to purchase. AR's most distinctive contribution at this stage is its capacity to externalize imagination, substituting concrete spatially embedded simulation for the abstract mental work consumers must otherwise perform.

4.1 Cognitive Mechanisms at Pre-Purchase

The dominant pre-purchase mechanism is local presence, defined as the sensation that a virtual object is real and present in the user's physical environment (Daassi & Debbabi, 2021; Schein et al., 2025; Verhagen et al., 2014). Local presence emerges when AR successfully integrates virtual content into the consumer's surroundings, reducing the abstraction gap that conventional online media impose. Hilken et al. (2017) showed that local presence functions as the central mediator linking AR's two design properties of simulated physical control and environmental embedding to utilitarian and hedonic value perceptions, with the latter further translating into decision comfort. Schein et al. (2025) refined this account by demonstrating, across five studies, that local presence is itself driven by a second-order augmentation quality construct comprising design, interaction, and embedding sub-factors. The implication is that a vivid AR experience matters less in isolation than the integrated quality of how virtual content marries the user's environment.

A complementary cognitive mechanism is mental imagery fluency. Chylinski et al. (2019), in their study of how AR augments customer mental imagery ability at the retail frontline, demonstrated that AR augments consumers' ability to mentally visualize products. The benefit accrues particularly to consumers with naturally weaker imagery skills, who gain disproportionately from the externalized scaffolding AR provides. Hilken et al. (2022a) extended this insight by contrasting AR with VR. AR enhances product-centric imagery, that is, visualizing the focal object in one's space, whereas VR enhances context-centric imagery, that is, visualizing the broader scene. This finding anchors AR's distinctive value at the pre-purchase stage of product evaluation.

4.2 Affective Mechanisms at Pre-Purchase

Beyond cognitive scaffolding, AR generates affective responses that shape pre-purchase consideration. Inspiration, defined as the elevation of motivation and aspiration (Thrash & Elliot, 2003), appears as a distinctive AR-mediated state. Hilken et al. (2022a) found that AR-induced product-centric imagery fluency translates into inspiration, which then drives both intent to try and onward purchase intention. Zanger et al. (2022) demonstrated experimentally that AR product presentations elicit greater pleasure than conventional presentations, with pleasure subsequently mediating brand attitude and purchase intention. Jessen et al. (2020) labeled the related phenomenon the "playground effect," capturing how AR's combination of sensory richness and interactive possibility evokes a state of creative engagement that traditional digital interfaces cannot match.

4.3 Behavioral Outcomes at Pre-Purchase

The pre-purchase behavioral outcomes most studied are awareness uplift and intention to try. Sung (2021) demonstrated that AR mobile advertising generates shared social experiences that translate into viral diffusion, providing a route to awareness that pre-AR formats cannot replicate. Rauschnabel (2018) found that smart-glasses adoption intention is predicted not only by perceived usefulness but by hedonic and symbolic gratifications, suggesting that AR awareness in the pre-Vision-Pro era was already partly affective rather than purely informational.

4.4 Pre-Purchase Boundary Nuances

Two boundary conditions warrant emphasis at this stage. Place of use matters for pre-purchase AR effects. von der Au et al. (2023) found that the contextual congruence between virtual content and the physical place where AR is used produces sometimes counter-intuitive presence outcomes. A virtual

sofa in one's living room is plausible but, for some users, less novel; the same sofa visualized in a classroom is implausible but novelty-rich. Imagery processing style further moderates AR's pre-purchase effects. Hilken et al. (2017) found that consumers with verbal rather than visual processing dispositions benefit disproportionately from AR's spatial-presence-mediated effect on utilitarian value, because AR compensates for a weaker mental-imagery toolkit.

5. Purchase Stage: Evaluation, Decision, and Transaction

The purchase stage is where AR's commercial value becomes most measurable, manifested in conversion uplifts, willingness-to-pay shifts, and reductions in return rates. Tan et al. (2022), analyzing field data from an international cosmetics retailer's mobile app, provided the seminal commercial evidence. AR usage was associated with higher sales for less-popular brands, narrow-appeal products, and higher-priced items, suggesting that AR's marginal value increases where pre-purchase uncertainty is greatest.

5.1 Cognitive Mechanisms at Purchase

Two cognitive mechanisms dominate purchase-stage AR effects. The first is psychological ownership. Defined as the feeling that an object is "mine" (Pierce et al., 2001), psychological ownership is unusual in AR settings precisely because the focal object is virtual. Yet Carrozzi et al. (2019), in a study of shared AR holograms, demonstrated that AR's interactivity and customization properties induce ownership feelings sufficient to shift behavioral intentions. Heller et al. (2019) showed that the multi-sensory variant of AR, particularly touch-based control over voice, strengthens this ownership pathway by reducing mental intangibility. Reduced intangibility then increases decision comfort and ultimately willingness-to-pay through serial mediation.

The second is perceived diagnosticity, defined as consumers' belief that the information available is sufficient to evaluate the product. Tarafdar et al. (2024) demonstrated, using a combination of laboratory experiments and field data, that AR product presentation increases diagnosticity for complex technology products and that this increase translates directly into higher sales. The diagnosticity pathway is moderated by attentional and contextual factors discussed in Section 5.4 and Section 8.2; under conditions of time pressure or environmental crowding, the same controllability that ordinarily enhances diagnosticity can become a cognitive burden (Hoffmann et al., 2022).

5.2 Affective Mechanisms at Purchase

Two affective mechanisms intersect with purchase decisions. Empowerment, the sense of agency and control over one's decision process, emerges most strongly in social AR settings. Hilken et al. (2020) showed that shared AR enables a form of dual empowerment in which the recommender feels enabled to influence the recipient and the recipient feels enabled by having a co-decision partner. Barhorst et al. (2021) documented a related phenomenon. When AR successfully blends real and virtual cues, consumers enter a flow state in which the temporal boundaries of the decision process dissolve, increasing both engagement and intention to act.

5.3 Behavioral Outcomes at Purchase

Beyond Tan et al.'s (2022) field evidence on sales uplift, AR's behavioral effects at purchase have been documented in three further patterns. AR closes "imagination gaps" along the path to purchase. Hilken et al. (2022b) combined field and experimental evidence to show that AR fills the cognitive gaps consumers face at specific decision junctures, particularly for size, fit, and contextual

appropriateness. AR also raises willingness-to-pay through the multi-sensory pathway documented by Heller et al. (2019). And AR shifts decision composition. Yim et al. (2017) found that AR's combined interactivity and vividness made consumers more likely to choose offerings they would otherwise have screened out.

5.4 Purchase-Stage Boundary Conditions

Three boundary conditions are particularly consequential at the purchase stage. Time pressure and crowding can reverse AR's typically positive effects. Hoffmann et al. (2022) demonstrated that highly controllable AR information, while ordinarily beneficial, becomes a cognitive burden under time pressure or crowded retail conditions, undermining purchase intention. Brand strength and product positioning moderate AR's value. While Tan et al. (2022) found that weaker brands and narrow-appeal products gain most, Zhu et al. (2026) recently showed that AR can undermine luxury perceptions when the visual closeness AR provides reduces the symbolic distance that high-end brands rely on. Luxury and AR may not be straightforward allies, an asymmetry that the boundary-condition analysis in Section 8.3 and the mechanism account in Section 9.3 develop further. Single-product versus multi-product configurations also differ in AR's effectiveness. Zhou et al. (2025) found that AR's effects amplify in multi-product presentations where AR's spatial-arrangement capabilities can showcase configurational fit, suggesting that bundling and cross-selling benefit disproportionately from AR.

6. Post-Purchase Stage: Confirmation, Affect, and Sharing

The post-purchase stage encompasses the consumer's experience after acquiring or using a product. It includes confirmation that the choice was sound, the cultivation of affective ties to the brand, and decisions about whether to share the experience with others. AR's post-purchase footprint is less studied than its pre-purchase and purchase effects, but the emerging body of work points to two distinctive AR mechanisms: anticipated affective gain and brand-relational closeness.

6.1 Cognitive Confirmation

At the cognitive level, AR can either reinforce or undermine post-purchase confirmation, depending on the alignment between AR-mediated pre-purchase impressions and the actual product. When AR provides high embedding fidelity (Schein et al., 2025), the post-purchase product matches the AR-rendered expectation, supporting confirmation and reducing cognitive dissonance. The same psychological-ownership mechanisms that strengthen purchase intentions (Carrozzi et al., 2019) carry forward into post-purchase, where ownership feelings established during AR-mediated decision-making provide a cognitive anchor that resists the dissonance generated by minor product imperfections. Conversely, when AR understates a product's physical limitations, such as the absence of haptic weight feedback or color accuracy under different lighting, consumers may experience post-purchase mismatch. Pfaff and Spann (2023) documented a related pattern in which AR can backfire when product evaluation context invites comparisons that the AR rendering cannot withstand. The closer AR matches the actual experience, the smoother the post-purchase confirmation; the further AR overstates the product, the more pronounced the dissonance reduction work consumers must subsequently perform.

6.2 Affective Mechanisms at Post-Purchase

Post-purchase affect is where recent research has surfaced AR's most distinctive contributions. Three affective constructs warrant specific attention.

Brand love and brand closeness have emerged as proximal post-purchase outcomes of AR engagement. Rauschnabel et al. (2024) demonstrated, across multiple studies, that AR marketing fosters brand love by inducing a sense of psychological closeness between consumer and brand, operationalized through Aron et al.'s (1992) inclusion-of-other-in-the-self structure. The mechanism turns on AR's capacity to bring brand assets into the consumer's intimate physical space, producing a relational quality that ordinary digital media cannot replicate.

Anticipated warm glow, the foretasting of moral or emotional satisfaction from a future act, has emerged as a route through which AR drives sustainable consumption. Lavoye et al. (2025) demonstrated that AR can establish self-proximity to virtual green products, generating anticipated warm glow that mediates intention to purchase environmentally responsible offerings. This finding extends AR's affective repertoire beyond hedonic pleasure to include anticipatory moral affect, opening a route for AR in sustainability marketing that prior reviews did not foreground.

Self-concept extension completes the affective trio. Javornik et al. (2021) studied AR face filters and showed that the augmented self-image evokes both ideal-self exploration and authentic self-expression, with downstream effects on well-being. Post-purchase, this self-extension can crystallize into stronger brand identification when the AR-augmented self has been associated with a particular brand's products. Together, the three affective constructs suggest that AR's post-purchase value lies in consolidating relational and identity ties between the consumer and the brand rather than in reaffirming product utility.

6.3 Behavioral Outcomes at Post-Purchase

Post-purchase behavioral outcomes most studied are word-of-mouth and social sharing. Sung (2021), in field and experimental work, found that AR mobile advertising spreads virally because the AR experience is itself a shareable event. A screenshot or video of an AR engagement carries social capital that text-based content does not. Hilken et al. (2017) similarly documented that AR-enhanced service experiences generate stronger word-of-mouth intentions than non-AR equivalents. Nawres et al. (2024) extended this evidence to luxury contexts, although their findings, together with those of Zhu et al. (2026) on luxury closeness, complicate the picture of where AR-induced sharing helps versus harms premium brand positioning. The asymmetry between the affective benefits AR offers post-purchase and the symbolic costs it can impose on premium brands surfaces as a recurring theme in the boundary-condition analysis of Section 8.

7. Re-Engagement Stage: Habituation, Loyalty, and Continuance

The re-engagement stage of repeated use, repeated purchase, and sustained loyalty is the field's most under-theorized juncture and, simultaneously, the stage where AR's commercial economics ultimately depend. Recent work by Söderström et al. (2024) has begun to articulate temporal dynamics that earlier reviews could not absorb, motivating this stage's distinct treatment.

7.1 Habituation as the Dominant Mechanism

Söderström et al. (2024), studying 394 IKEA Place users in the United States, applied cue-utilization theory (Easterbrook, 1959) and habituation-tedium theory (Tellis, 1997) to demonstrate that AR's effects evolve over time and across user populations. Their key finding is that the dominant drivers of purchase intention differ between first-time users and habitual users. For first-time users, vividness and

the perceived usefulness of AR augmentation dominate. For habitual users, enjoyment and the perceived informativeness of personalized recommendations become more important. The implication is double-edged. On one hand, AR's novelty premium decays with repeated exposure, validating the classical habituation prediction. On the other hand, AR is not displaced by familiarity but rather changes its effective payload. Habitual users continue to engage but for different reasons, with implications for how AR features should be prioritized over the customer lifetime. The pattern suggests that AR app design should evolve along the same temporal axis as the customer relationship, rather than treating early-stage and late-stage users as a homogeneous population. As Section 2.5 notes, AR-specific habituation evidence beyond Söderström et al.'s single-app study remains thin, and the trajectory we outline here should be read in part as a forward-looking proposition that future longitudinal and panel designs will need to test directly.

7.2 Continuance Antecedents

Daassi and Debbabi (2021) provided complementary evidence on AR continuance intention, finding that the combined sense of immersion, product presence, and perceived realism drives users' intentions to reuse AR applications. The construct triad they identify represents the durable substrate on which long-term AR engagement rests. When any of these elements degrades through poor tracking, low-quality models, or occasional crashes, continuance intention drops sharply. The corollary is that infrastructural quality is more important to retention than to acquisition. A clunky AR experience may still capture first-time users via novelty, but it will struggle to retain them. Schein et al.'s (2025) augmentation quality construct provides a more granular operationalization of what infrastructural quality entails: design quality affects visual believability, interaction quality affects responsiveness, and embedding quality affects spatial reliability. Each of the three sub-factors has independent effects on local presence, and degradation in any one can disrupt the continuance pathway.

7.3 Loyalty and Continuance Behaviors

Heller et al. (2021), through their Technology-Enabled Engagement Process framework, demonstrated that AR's engagement behaviors of repeat use, sharing, and contributing content accumulate into loyalty in ways that depend on the reciprocity between technology and consumer. Wang et al. (2023) showed that social AR applications generate continuance intention through shared social experiences, suggesting that the social layer is a distinct retention mechanism from the cognitive-affective layers documented earlier in the journey. The social layer also scales with network effects: each shared AR engagement potentially recruits new users into the same retention pathway, a self-reinforcing loop that AR applications without social features cannot replicate.

7.4 Boundary Conditions at Re-Engagement

The re-engagement stage is where temporal boundary conditions dominate. The first-time-versus-habitual contrast (Söderström et al., 2024) is the most prominent. Exposure frequency and tenure (Daassi & Debbabi, 2021) further moderate retention. Spatial-computing era device generation, that is, whether users are engaging through smartphones, head-worn pass-through devices, or older tablet-based AR, likely produces order-of-magnitude differences in re-engagement patterns, although the empirical evidence on Vision-Pro-era AR is still emerging.

8. Mapping the Boundary Conditions of AR's Effects

A central contribution of this review is the systematic organization of boundary conditions across five dimensions and 23 sub-conditions. This boundary structure extends the four-level moderator analysis of Barari et al. (2026), which covered technology, customer, product, and cultural levels, by adding two consequential dimensions of AR design quality and temporal-habituation factors and by sub-dividing several existing categories. Whereas Barari et al. tested 14 moderators in their meta-analytic frame, the expanded structure makes explicit a number of moderators that effect-size aggregation obscures. Figure 2 visualizes the relative dominance of each boundary dimension across the four journey stages, highlighting that AR design quality and temporal factors carry the greatest weight at distinct stages of the journey.

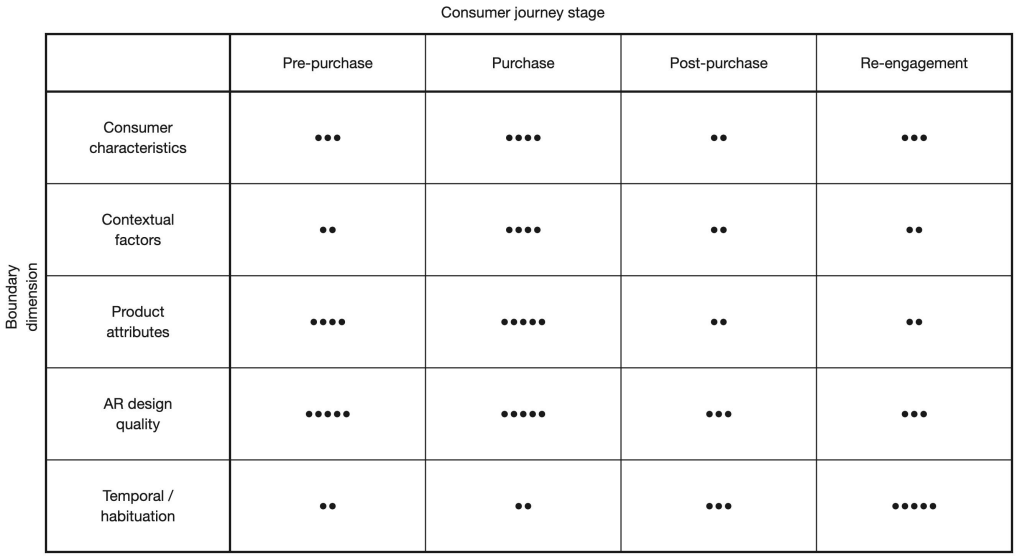

Figure 2. Boundary Dimensions Across Consumer Journey Stages.

8.1 Consumer Characteristics

Five consumer-characteristic moderators emerge from the corpus. Imagery processing style, contrasting verbalizers with visualizers, interacts with AR's spatial-presence pathway. Hilken et al. (2017) showed that verbal-style consumers benefit disproportionately from AR's externalization of imagery work, because AR compensates for a weaker mental-imagery toolkit. Body image and self-discrepancy shape AR try-on receptivity. Yim and Park (2019) and Javornik et al. (2021) documented stronger AR adoption among consumers with weaker body-image self-evaluations, for whom AR's private trial environment removes social-pressure barriers. Need for touch (Peck & Childers, 2003) introduces a complex moderation. High-instrumental-need-for-touch consumers find AR an incomplete substitute for physical touch (Gatter et al., 2022), while high-autotelic-need-for-touch consumers may experience AR as a hedonically rich complement (Racat et al., 2026). Privacy concern attenuates AR's benefits across stages. Cowan et al. (2021) showed that privacy-concerned consumers avoid AR face filters, and Hilken et al. (2017) found that privacy concerns dampen the spatial-presence-to-decision-comfort pathway. Finally, habituation level dictates which AR features matter to which users (Söderström et al., 2024).

8.2 Contextual Factors

Five contextual moderators warrant attention. Time pressure and crowding can reverse AR's benefits. Hoffmann et al. (2022) demonstrated that highly controllable AR information becomes a cognitive burden under these conditions. Place of use (von der Au et al., 2023) produces sometimes counter-intuitive effects. AR performance depends on the congruence between virtual content and the user's physical surroundings, with overly familiar contexts sometimes reducing novelty perceptions. Social presence, namely whether consumers engage with AR alone or accompanied, also matters. Hilken et al. (2020) showed that shared AR creates dual empowerment effects but also surfaces impression-management concerns in public-visibility settings. Cultural context moderates broader receptivity. Barari et al. (2026) found cross-cultural variation in AR responses, and the systematic review by Du et al. (2022) of 99 articles in Web of Science suggests that the Chinese-market AR literature, centered on platforms such as Taobao and Douyin, may produce systematically different findings from the Western corpus.

8.3 Product Attributes

Five product attributes moderate AR's effectiveness. The hedonic-versus-utilitarian contrast plays out asymmetrically. Hedonic products gain from AR's visual appeal plus presence (Zhang et al., 2023), whereas utilitarian products benefit primarily from presence-mediated information value. Brand strength moderates in the direction documented by Tan et al. (2022): less-popular brands gain more, suggesting AR is a substitution for brand-equity-based confidence. Price tier moderates ambiguously. While Tan et al. (2022) found higher AR returns for higher-priced products, Zhu et al. (2026) showed that AR can erode luxury brand essence by collapsing the symbolic distance that premium positioning relies on (Section 9.3 develops the underlying symbolic-distance and haptic-authenticity mechanisms). Product novelty and category familiarity moderate AR's educational versus reassurance roles. Single-product versus multi-product configurations also matter. Zhou et al. (2025) demonstrated that AR's effects amplify in multi-product presentations where AR's spatial-arrangement capabilities can showcase configurational fit.

8.4 AR Design Quality

Schein et al. (2025) provided the most systematic decomposition of design quality into four sub-conditions. Design quality, encompassing visual fidelity, lighting, and shadow accuracy, and interaction quality, encompassing responsiveness and gesture fluidity, drive local presence directly. Embedding quality, encompassing spatial accuracy and scale consistency, is the under-emphasized sub-factor that often differentiates a usable AR experience from a noticeably broken one. Multi-sensory richness (Heller et al., 2019), the degree to which AR engages senses beyond the visual, emerged as a separate sub-condition with the strongest evidence on willingness-to-pay through the active-inference pathway.

8.5 Temporal and Habituation Factors

This is the most under-theorized boundary dimension in prior reviews and the one most consequential to AR's long-term commercial trajectory. First-time-versus-habitual user effects (Söderström et al., 2024) shift dominant feature relevance over the customer lifetime. Exposure frequency and tenure introduce non-monotonic dynamics that meta-analyses aggregating across cross-sectional studies cannot capture. Spatial-computing era device generation, namely whether engagement is mediated by phones, tablets, or head-worn pass-through devices, likely introduces an order-of-magnitude shift in usage patterns, although Vision-Pro-era empirical evidence remains scarce.

Because the present corpus contains only one direct AR-habituation study (Söderström et al., 2024) supplemented by indirect continuance-intention evidence (Daassi & Debbabi, 2021; Heller et al., 2021; Wang et al., 2023), we treat this dimension as the most under-developed in the empirical sense as well as the most under-theorized.

8.6 Cross-Dimensional Interactions

The most theoretically interesting moderations are interactions among the five dimensions. Imagery processing style interacts with embedding quality such that verbal-style consumers gain more from AR only when embedding is high. Time pressure interacts with information controllability such that high control under time pressure backfires (Hoffmann et al., 2022). Habituation level interacts with augmentation quality such that habitual users are more sensitive to augmentation richness than to novelty. Brand strength interacts with price tier in the divergent findings of Tan et al. (2022) and Zhu et al. (2026), suggesting that AR's effect on weak-brand higher-priced products may differ qualitatively from its effect on strong-brand higher-priced products. Place of use interacts with social presence such that public-place AR use produces impression-management costs that private use does not. The systematic study of these cross-dimensional interactions, rather than isolated main-effect moderations, is among the most pressing methodological frontiers in the field.

9. Discussion

The integrative synthesis presented in Sections 4 through 8 yields six observations that, taken together, constitute the substantive theoretical contribution of this review.

9.1 Six Integrative Observations

First, the dominance of AR mechanisms shifts systematically across the consumer journey. Cognition, particularly local presence and mental imagery fluency, dominates the pre-purchase stage. At the purchase stage, cognition through psychological ownership and diagnosticity couples with affective empowerment to drive decision comfort, willingness-to-pay, and conversion. Post-purchase, affective constructs ascend; brand love, anticipated warm glow, and self-extension take primacy. By re-engagement, habituation dynamics dominate, with feature relevance shifting from novelty to personalization. The implication is that "what makes AR work" cannot be answered without specifying when in the journey the question applies.

Second, augmentation quality (Schein et al., 2025) functions as a universal moderator across all stages, but its sub-factors carry differential weight. Embedding quality is most consequential at pre-purchase, design quality at purchase, and interaction quality at re-engagement. Treating augmentation quality as a single construct, as some practitioner discussions tend to do, obscures these differential leverages.

Third, mechanism cascades are non-uniform. The conventional cognition-to-affect-to-behavior pathway predominates at pre-purchase and purchase, but post-purchase often runs in reverse, with affect feeding back into cognition through confirmation processes, and re-engagement involves behavior-to-cognition feedback loops as habituation reshapes perceived stimulus value. Static path-analytic models miss these directional shifts.

A fourth observation concerns habituation, the most under-theorized temporal dimension. Söderström et al.'s (2024) demonstration that AR effects evolve with exposure means that a cross-sectional study with first-time users will systematically overstate the long-run effects, a caveat that applies retrospectively to much of the existing AR-effects literature. The observation rests on a

thin AR-specific empirical base—one direct habituation study supported by three continuance-intention studies — and its full articulation awaits the longitudinal and panel designs the field has yet to deploy at scale.

Fifth, the visual-haptic asymmetry is an unresolved sensory tension at the heart of AR. AR's strength lies in vivid visual augmentation; its persistent limitation is the absence of tactile and proprioceptive feedback. Heller et al. (2019) showed that multi-sensory AR with touch control reduces this asymmetry but does not eliminate it. For products where touch is functional rather than ornamental, AR's commercial value is bounded by this gap.

A sixth and final observation concerns the spatial-computing transition. Vision Pro from 2024 onward marks a phase change rather than an incremental upgrade. Head-worn pass-through devices shift AR from active-attention engagement, in which consumers consciously decide to invoke AR, to ambient consumption, in which AR is the default visual layer. The empirical literature has not yet caught up with this shift, leaving a substantial conceptual frontier that includes the convergence between AR and AI-driven personalization that head-worn always-on devices will likely make routine.

9.2 Theoretical Implications

The ACJIM framework integrates the field's five theoretical pillars rather than substituting for them. Situated cognition, mental imagery, presence theory, S-O-R and TAM, and habituation-tedium each retain explanatory power within particular journey stages and mechanism layers. Their integration is what was missing. By overlaying mechanism layers onto journey stages and conditioning both on boundary dimensions, ACJIM makes explicit a set of stage-specific dominant theories, a structure that earlier reviews, organizing by theoretical lens or by outcome variable, could not reveal. The boundary structure further extends the effect-size moderator framework of Barari et al. (2026) with two consequential dimensions of design quality and temporal-habituation factors and nine additional sub-conditions, providing a richer testbed for future moderation research.

A specific theoretical implication concerns the relationship between ACJIM and the BICK FOUR framework of Rauschnabel et al. (2022). Whereas BICK FOUR organizes firm-side strategic goals along a journey-like sequence, ACJIM organizes consumer-side mechanisms across the same temporal axis. The two are complementary rather than competing. Practitioners can use BICK FOUR to choose strategic objectives, then use ACJIM to identify which consumer mechanisms each objective depends on. One concrete possibility is mapping each BICK FOUR objective onto its dominant ACJIM mechanisms: branding draws principally on local presence and inspiration in the pre-purchase stage; inspiring draws on imagery fluency and pleasure across pre-purchase and purchase; convincing draws on diagnosticity, ownership, and decision comfort at purchase; and keeping draws on habituation management, brand love, and continuance throughout post-purchase and re-engagement. Future work integrating the two frameworks could yield an end-to-end blueprint linking firm strategy to consumer experience.

9.3 Managerial Implications

Three cross-cutting principles emerge from the synthesis. The first is stage-matched feature prioritization. AR features that drive first-time engagement, including vividness, novelty, and augmentation richness, are not the same features that drive long-term retention, which depend more on personalization, recommendation, and infrastructural reliability. Marketing teams investing in AR should plan feature roadmaps on a habituation calendar rather than treating AR as a unitary capability.

The second principle is boundary-aware deployment. AR's effects depend systematically on consumer characteristics, contextual factors, product attributes, design quality, and temporal dynamics. A successful AR deployment in cosmetics retail, where Tan et al. (2022) documented strong effects, does not transfer mechanically to luxury watches, where Zhu et al. (2026) documented value erosion. Deployment decisions should be checked against the relevant boundary conditions in Section 8 before scaling.

The third principle is fidelity-as-expectation-management. Because AR sets expectations that the actual product must subsequently meet, embedding fidelity is not just an aesthetic choice but a post-purchase risk-management decision. Practitioners should treat AR's representational accuracy as a contract with the consumer.

To illustrate these principles concretely, consider three deployment archetypes. For a furniture retailer using room-placement AR such as IKEA Place, the framework suggests prioritizing embedding quality (B4) at pre-purchase, planning content refresh on a habituation calendar (B5) at re-engagement, and accepting that first-time spike effects (Söderström et al., 2024) will not persist without ongoing feature evolution. For a cosmetics retailer using face-tracking try-on similar to the platforms studied by Tan et al. (2022), the framework suggests focusing AR investment on weaker brands and narrower-appeal items where uncertainty-reduction yields the highest sales lift, while exercising caution for premium tier positioning.

The third archetype, the luxury brand, warrants a fuller theoretical reading before the managerial recommendation, because the AR–luxury tension reflects a structural mismatch rather than a contingent design problem. Two complementary mechanisms appear to operate. The first is symbolic-distance collapse: luxury brands derive part of their value from aspirational inaccessibility — physical, financial, and experiential distance between consumer and object — and AR's signature accomplishment of placing the object "here, in my space" directly erodes that distance. Zhu et al. (2026) captured the resulting downshift in perceived premium with the phrase "closer feels cheaper," a mechanism that aligns with classical accounts in which luxury symbolic returns scale with perceived exclusivity. The second mechanism is haptic-authenticity exposure: luxury offerings are partly indexed by tactile cues — material weight, finish, craftsmanship — that AR's visual-only rendering necessarily omits. Where mass-market AR can substitute high-fidelity visualization for the missing senses without material loss, luxury AR risks foregrounding what it cannot deliver, making the gap between rendered object and imagined physical artefact perceptually salient. The two mechanisms connect to the visual-haptic asymmetry raised as the fifth observation in Section 9.1 and clarify why luxury is not simply a low-effect AR context but a potentially effect-reversing one. The framework therefore advises caution for luxury AR deployments: pre-purchase visualization benefits may be outweighed by symbolic-distance erosion and post-purchase brand-essence damage, and the empirical pattern documented by Zhu et al. (2026) and corroborated for luxury contexts by Nawres et al. (2024) suggests that 3D static visualization or in-store experiential alternatives may serve premium brands better than full AR integration.

Cross-cutting all three archetypes is the principle that AR is a stage-specific tool, not a universally beneficial channel.

10. Conclusion

Augmented reality consumer research has matured from a peripheral curiosity to a substantive subdiscipline within marketing and consumer scholarship. This integrative review has synthesized 107

empirical and conceptual studies along three integrative axes of the consumer journey, mechanism layers, and boundary conditions, and has made two contributions: the ACJIM framework that links mechanisms, journey stages, and boundary conditions, and a five-dimensional boundary structure that maps where AR's effects amplify, attenuate, or reverse. The transition from "hype" to "habit" that titles this review captures both the field's trajectory and its remaining theoretical demands. As AR devices move from smartphones to head-worn pass-through hardware and as AR experiences shift from novel demonstrations to daily routines, the next decade of AR consumer research will need frameworks capable of capturing temporal dynamics, sensory completeness, cultural variation, and managerial economics simultaneously. We hope ACJIM offers a starting point for that integration.

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Data Availability Statement

This research is a literature review and does not involve primary data collection. All cited studies are publicly available through their respective publishers; the concept-centric synthesis matrix used to organize the corpus is available from the author upon reasonable request.

Ethics Statement

This review does not involve human subjects or animal research. The author declares adherence to standard publication ethics throughout the conduct and reporting of this review and confirms there are no conflicts of interest associated with this work.

Conflicts of Interest

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