

DOI: 10.5281/zenodo.12426941

APPEARANCE AESTHETICS AND EMOTIONAL OR AFFECTIVE RESPONSES IN PRODUCT AND FURNITURE DESIGN: A SYSTEMATIC LITERATURE REVIEW (2015-2025)

Xuhai Zhu¹, Mohd Shahrizal Dolah^{2*}, Rizal Rahman³, Yaning Lyu⁴

¹Faculty of Design and Architecture, Universiti Putra Malaysia 43400 UPM Serdang, Selangor Malaysia.
Email: zhuxuhai@hotmail.com, ORCID iD: <https://orcid.org/0009-0008-4107-0917>

^{2*}Faculty of Design and Architecture, Universiti Putra Malaysia 43400 UPM Serdang, Selangor Malaysia.
Email: shahrizal@upm.edu.my, ORCID iD: <https://orcid.org/0009-0004-5932-7398>

³Faculty of Design and Architecture, Universiti Putra Malaysia 43400 UPM Serdang, Selangor Malaysia.
Email: rizalrahman@upm.edu.my, ORCID iD: <https://orcid.org/0000-0001-9216-603X>

⁴Faculty of Design and Architecture, Universiti Putra Malaysia 43400 UPM Serdang, Selangor Malaysia.
Email: Luannabean@hotmail.com, ORCID iD: <https://orcid.org/0009-0004-7738-7773>

Received: 02/10/2025

Accepted: 10/03/2026

Corresponding Author: Mohd Shahrizal Dolah
(shahrizal@upm.edu.my)

ABSTRACT

This systematic review examines studies on appearance aesthetics and emotional or affective responses in product and furniture design from 2015 to 2025. Five databases were searched, including Web of Science, Scopus, ScienceDirect, EBSCO, and Wiley. After screening, 36 peer-reviewed journal articles were included. The review coded the studies by aesthetic cue categories, response categories, and cue-response co-occurrence patterns. The findings show that product and furniture studies have examined many visual cues, including form, geometry, complexity, surface, color, detail, and symbolic meaning. The response side is also broad, covering preference, liking, Kansei-based image words, value judgment, symbolic meaning, and implicit cognitive-affective measures. However, the evidence remains scattered. Most studies examine single cue groups or broad response terms, while fewer studies connect appearance cues, emotional response, and later evaluation within one research design. The review suggests that future research should develop clearer appearance structures and more connected response models, especially for furniture and service-related product settings.

KEYWORDS: Appearance Aesthetics; Product Design; Furniture Design; Emotional Response; Affective Response; Systematic Literature Review.

1. INTRODUCTION

In product and furniture design, appearance is usually the first point of contact. Users often view the visible form before they touch, sit on, or test a product. At this stage, they begin to judge product quality, usability, and design characteristics through appearance (Mugge et al., 2018). Aesthetic factors may influence later use behaviour (Wiecek et al., 2019).

Recent studies show that design affects users through different routes. Visual aesthetics can shape user evaluation through emotional response (Bhandari et al., 2019). Product design can also be understood through functional, aesthetic, and social-symbolic meanings. This point is relevant when users judge what a product can help them do or express (El Amri & Akrouf, 2020).

The difficulty is that this evidence is divided across research lines. One group of studies examines product form or geometry. Another group examines material, color, style, semantic meaning, or use context. The response terms are also mixed. Preference and liking appear in one set of papers.

Emotion, perceived value, image words, and symbolic meaning appear in another set. Product design research has already noted the need to better connect cognitive and affective user needs (Tavares et al., 2021).

This problem becomes more apparent in furniture research. Furniture is seen, used by the body, and placed in space. A chair, for example, may be judged through its form, material, sitting expectation, and relation to the setting around it. Product-based studies provide a basis for this topic. Furniture research still needs to explain more clearly how visible cues connect with user response.

Appearance aesthetics and emotional or affective responses in product and furniture design form the focus of this review. The literature is divided into visual cue categories and response categories.

Three research questions guide the review. The first question focuses on aesthetic cues. The second question focuses on emotional or affective responses. The third question connects both sides and asks what broader patterns can be found. Table 1 presents the research questions.

Table 1. Research Questions of the Review.

NO.	Research Questions
RQ1	What aesthetic cues have been examined in studies of product and furniture design?
RQ2	What emotional or affective responses have been examined in relation to product and furniture appearance?
RQ3	What patterns and gaps can be identified in the literature on appearance aesthetics and emotional or affective responses in product and furniture design?

2. METHODOLOGY

2.1 Sources and search

This review adopted a systematic literature review design and followed the PRISMA 2020 guideline (Page et al., 2021). Records were collected from Web of Science (WOS), Scopus, ScienceDirect,

EBSCO and Wiley. The search revolved around four relevant terms: product/furniture, appearance/form, aesthetics, and emotional response. Each database required a slightly different syntax, but the core search meaning was kept consistent across sources. Table 2 presents the final search strategy.

Table 2. Database Search Strategy and Query Syntax.

Database	Search Terms	Context Search
WOS	((TS=(product OR furniture) AND TS=(emotion OR affective OR perception) AND TS=(form OR appearance) AND TS=(aesthetic) AND (DT= ("ARTICLE")) AND DOP=(2015-01-01/2025-12-31))	TOPIC (Searches title, abstract, keyword plus, and author keywords.) (SCI-EXPANDED) & (SSCI) & (A&HCI)
SCOPUS	TITLE-ABS-KEY ((product OR furniture) AND (emotion OR affective OR perception) AND (form OR appearance) AND aesthetic) AND PUBYEAR > 2014 AND PUBYEAR < 2026 AND (LIMIT-TO (DOCTYPE , "ar"))	Searches title, abstract, keyword;
Science Direct	(product OR furniture) AND (emotion OR affective OR perception) AND (form OR appearance) AND aesthetic	Title, abstract or author-specified keywords; Publication years: 2015-2025; Article;
EBSCO	AB (product OR furniture) AND AB (emotion OR affective OR perception) AND AB (form OR appearance) AND AB (aesthetic)	Abstract; Publication years: 2015-2025; Article;
WILEY	(product OR furniture) AND (emotion OR affective OR perception) AND (form OR appearance) AND aesthetic	Abstract; Publication years: 01.2015-12.2025; Journal;

2.2 Eligibility criteria

The screening criteria were defined and then conduct a comprehensive review. The research should be in the field of product or furniture design,

and it is also necessary to explore the aesthetic cues in appearance forms and the many emotional reactions they elicit. Table 3 summarizes the included and excluded criteria.

Table 3. Inclusion and exclusion criteria applied in study screening.

Phase	Inclusion	Exclusion
Title and abstract screening	Product/furniture design context; appearance/form/aesthetic cues addressed; emotional/affective or user-response outcome reported.	Non-target domain; cues not central; no relevant outcome; outside review scope.
Full-text eligibility assessment	Peer-reviewed journal article; sufficient information for extraction; relevant to appearance aesthetics and emotional, affective, perceptual, or evaluative responses.	Conference/proceeding; insufficient information; cues not central; insufficient relevance.

2.3 Study selection procedure and PRISMA flow

The selection process began by retrieving all records from the five databases. Duplicate records were removed first. The remaining records were screened for titles and abstracts, and the studies that

still met the criteria were then read in full. At the full-text stage, exclusions were recorded according to the reasons shown in Table 3. The final review included 36 studies. Figure 1 presents the PRISMA flow diagram.

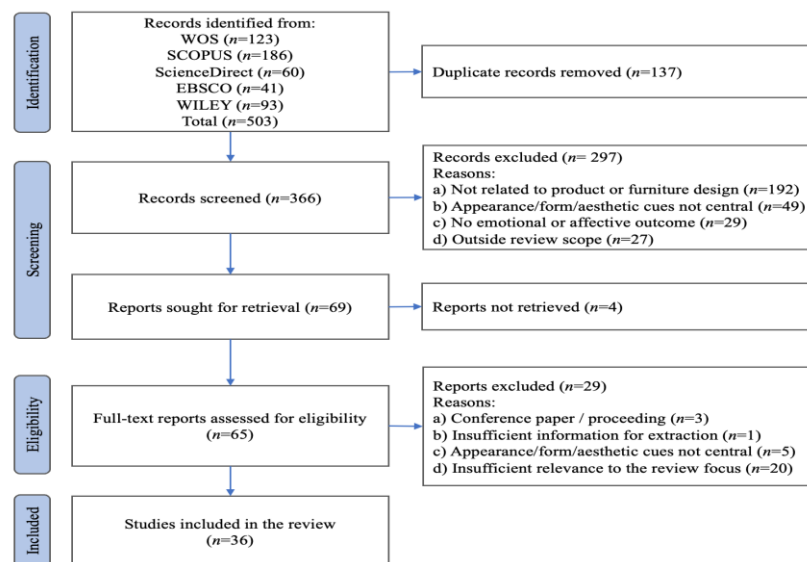


Figure 1. PRISMA flow diagram.

2.4 Data extraction

After final inclusion, each article was read, coded, and entered into the extraction table. The extracted information covered publication details, research purpose, aesthetic cues, response variables, research methods, and relevance to the review focus. No meta-analysis or statistical pooling was conducted. The papers differed in purpose, method, measurement and design such that direct quantitative synthesis was not appropriate. Findings were organized through a structured extraction and cross-analysis. The analysis moved from aesthetic cues to response categories, features of the research method and wider gaps across the field.

2.5 Coding procedure

The coding process followed a predefined

coding structure based on the three research questions. First, each study is coded based on the main aesthetic cues. The cue categories included global form, geometry, style, material, color, detail, and curvature. Second, each study is coded according to the main response variables. The responses cover categories such as preference, emotional imagery, perceived value, symbolic impression, implicit processing, function-related evaluation and so on. Third, compare the cue code and the response code to find co-occurrences. Some studies examined multiple cue/response types and adopt a multi-label coding method. When a paper has several measurement terms, code according to the main analytical focus of the article rather than every single word used in the scale.

3. RESULTS

3.1 Overview of the included studies

The final sample contains 36 peer-reviewed journal articles. To make the later tables easier to

follow, each article was assigned an ID from S01 to S36. This coding was useful because many articles contributed to more than one category. Table 4a lists the included studies by year, title, and reference.

Table 4a. Included studies and IDs.

IDs	Title of included studies	Reference
S01	Applying cluster analysis for consumer's affective responses toward product forms	(Hsu et al., 2015)
S02	Application of Kansei Engineering and Box-Behnken response surface methodology for shape parameter design: A case study of wine glass	(Kittidecha & Marasinghe, 2015)
S03	A study that applies aesthetic theory and genetic algorithms to product form optimization	(Lo et al., 2015)
S04	Consumers' perceptions and preference profiles for wood surfaces tested with pairwise comparison in Germany	(Manuel et al., 2015)
S05	Beyond "Pink It and Shrink It" Perceived Product Gender, Aesthetics, and Product Evaluation	(Tilburg et al., 2015)
S06	Functionality and Aesthetics of Furniture - Numerical Expression of Subjective Value	(Antal et al., 2016)
S07	Form defines function: Neural connectivity between aesthetic perception and product purchase decisions in an fMRI study	(Chattaraman et al., 2016)
S08	Influence of curvature and expertise on aesthetic preferences for mobile device designs	(Ho et al., 2016)
S09	Investigating the influence of product perception and geometric features	(Perez Mata et al., 2016)
S10	The Effect of Stylistic Product Information on Consumers' Aesthetic Responses	(Schnurr & Stokburger-Sauer, 2016)
S11	Fuzzy-based Taguchi method for multi-response optimization of product form design in Kansei engineering: A case study on car form design	(Sutono et al., 2016)
S12	Using event related potentials to investigate visual aesthetic perception of product appearance	(Ding et al., 2017)
S13	The Role of Minimalist Aesthetics in Influencing Consumer Preferences for Furniture Design	(Poon, 2017)
S14	Application of Aesthetic Principles to the Study of Consumer Preference Models for Vase Forms	(Lo, 2018)
S15	Does Sustainable Perceived Value Play a Key Role in the Purchase Intention Driven by Product Aesthetics? Taking Smartwatch as an Example	(J. Wang & Hsu, 2019)
S16	An investigation into the effects of product design on incremental and radical innovations from the perspective of consumer perceptions: Evidence from China	(Xue, 2019)
S17	Dark is durable, light is user-friendly: The impact of color lightness on two product attribute judgments	(Hagtvedt, 2020)
S18	An Aesthetic Measurement Approach for Evaluating Product Appearance Design	(Liu et al., 2020)
S19	Post-adoption buffering effects of innovative product aesthetics	(Nagel & Schumann, 2020)
S20	Understanding the relationships between aesthetic properties and geometric quantities of free-form surfaces using machine learning techniques	(Petrov et al., 2020)
S21	Revisiting Berlyne's inverted U-shape relationship between complexity and liking: The role of effort, arousal, and status in the appreciation of product design aesthetics	(Althuisen, 2021)
S22	Integrating aesthetic and emotional preferences in social robot design: An affective design approach with Kansei Engineering and Deep Convolutional Generative Adversarial Network	(Gan et al., 2021)
S23	Effects of Design Aesthetics on the Perceived Value of a Product	(Shi et al., 2021)
S24	A quantitative aesthetic measurement method for product appearance design	(Hu et al., 2022)
S25	Color Design Decisions for Ceramic Products Based on Quantification of Perceptual Characteristics	(Y. Wang et al., 2022)
S26	On the Prediction of Product Aesthetic Evaluation Based on Hesitant-Fuzzy Cognition and Neural Network	(X. Wu et al., 2022)
S27	Drawn to the gloss: Examining the effect of product reflection on product aesthetics	(Sharma & Kumar, 2023)
S28	Interactive Evolutionary Design of Handbag Integrating Bamboo Weaving Material	(Y. Wu & Han, 2023)
S29	Which aesthetics works, classical or expressive? How and when aesthetic appearance enhances green consumption	(He et al., 2024)
S30	Use of eye-tracking technology for appreciation-based information in design decisions related to product details: Furniture example	(Ilhan & Togay, 2024)
S31	Revealing the synergy between formal aesthetics and product semantics: Exploring the impact of visual form on product perception	(Sunstrum et al., 2024)
S32	Consumer Perceptions of Cultural Sustainability in Neo-Chinese Furniture: A Text Mining Analysis of Online Reviews from JD and Tmall	(Chen et al., 2025)
S33	Constraint-Aware and User-Specific Product Design: A Machine Learning Framework for User-Centered Optimization	(Deng, 2025)
S34	Toward Emotional Design Feature Evaluation in Craft Development: Understanding the Top-Selling Chinese and Japanese Ceramic Teapots	(Li et al., 2025)
S35	Understand and quantify the consumers' cognitive behavior for the appropriateness features of product aesthetics through the eye-tracking technique	(Singh & Sarkar, 2025)
S36	A Method for the Front-End Design of Electric SUVs Integrating Kansei Engineering and the Seagull Optimization Algorithm	(Zhang et al., 2025)

Table 4b. Methodological orientation of the included studies.

Methodological orientation	Definition	k	%	Study IDs
Quantitative empirical studies	Experiments, surveys, rating tasks, pairwise comparison, conjoint analysis, Kansei evaluation, or statistical analysis based on user or expert responses	16	44.4	S01, S04, S05, S06, S08, S09, S10, S14, S15, S16, S17, S19, S21, S27, S29, S31
Physiological or eye-tracking quantitative studies	fMRI, ERP, eye-tracking, or physiological indicators used to measure visual, cognitive, or aesthetic processing	6	16.7	S07, S12, S18, S23, S30, S35
Computational or model-based quantitative studies	Machine learning, genetic algorithms, fuzzy methods, neural networks, response surface methodology, optimisation, evolutionary design, or algorithm-based design evaluation	12	33.3	S02, S03, S11, S20, S22, S24, S25, S26, S28, S33, S34, S36
Text-mining or secondary-data quantitative studies	Online reviews or text data analysed through text mining or coded content analysis	1	2.8	S32
Case-based or conceptual studies	Case discussion, historical interpretation, or conceptual analysis without primary numerical testing	1	2.8	S13

Table 4b shows that most included studies used quantitative or numerically coded methods. Quantitative empirical studies formed the largest group, with 16 studies. Computational or model-based studies also appeared often, with 12 studies. Six studies used physiological or eye-tracking methods. Only one study used text-based secondary

data, and one study was mainly case-based. This pattern shows that appearance aesthetics and user response are often studied through rating scores, coded responses, physiological indicators, or numerical models. This pattern provides a basis for future quantitative model-based research on appearance and user response.

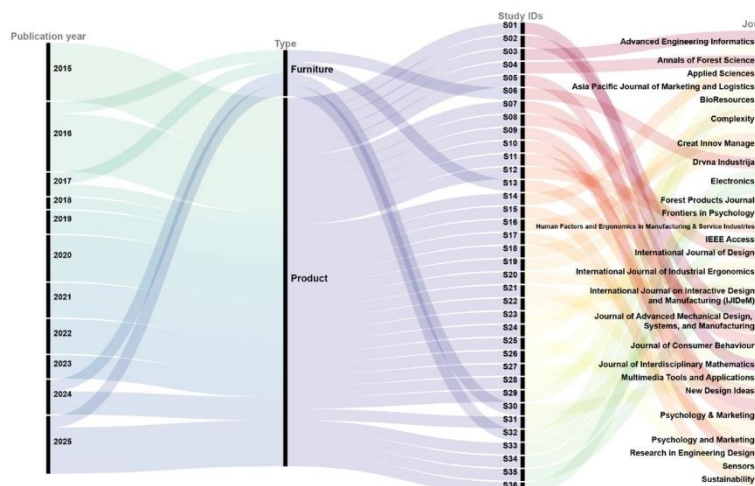


Figure 2. Sankey diagram of basic information.

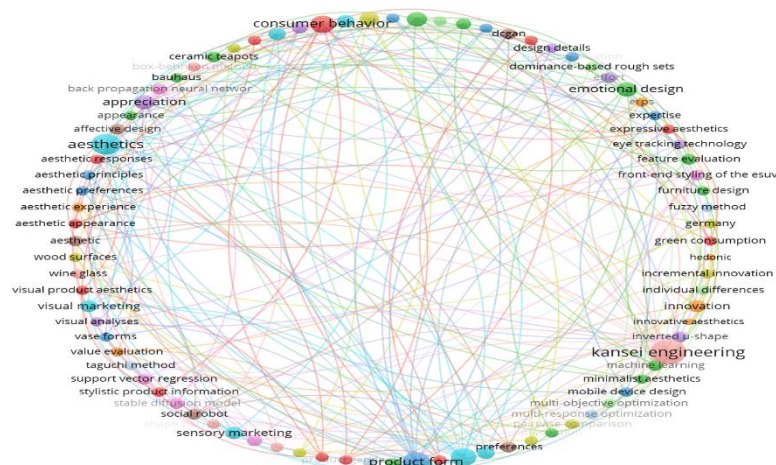


Figure 3. Keyword network of the included studies.

Figures 2 and 3 are the results of reading pre-coding samples and subsequent discussions. Figure 2 presents the year, type, research ID, and journal distribution, with publication times ranging from 2015 to 2025, and product design has a higher frequency than furniture design. Figure 3 presents the keyword structure, and words like aesthetics, product form, consumer behavior, kansei engineering, and emotional design are the main research terms. The two graphics present a stable state of domain production, but pay more attention to product forms rather than the specific styles of furniture.

3.2 Results for RQ1: Aesthetic cues examined in the literature

RQ1 examined the visible aesthetic cues used in the reviewed studies. During coding, several papers could not be assigned to a single cue category. For example, a study might discuss both form and semantic meaning, or both surface and color. Multi-label coding was therefore used to keep the coding closer to the way the original studies framed their objects. Table 5 reports the cue categories, definitions, frequencies, shares, and study IDs.

Table 5. Aesthetic cue categories.

Aesthetic cue category	Definition	k	%	Study IDs
Global form-related cues (GF)	Overall form, general visual appearance, and global shape.	10	27.8	S01, S03, S06, S07, S12, S15, S18, S22, S23, S33
Geometric and proportional cues (GP)	Shape parameters, contour, proportion, height, geometric quantities, free-form geometry, and front-end form	7	19.4	S02, S09, S11, S14, S20, S31, S36
Function-signalling and appropriateness-related appearance cues (FA)	Visible appearance cues linked to function, usability, appropriateness, or innovation.	5	13.9	S06, S07, S16, S19, S35
Stylistic, semantic, and symbolic cues (ST)	Style, product semantics, gender-coded or symbolic meaning, classical/expressive appearance, and cultural symbolism	5	13.9	S05, S10, S29, S31, S32
Complexity and simplicity cues (CX)	Complexity, simplicity, minimalism, and order-related composition	5	13.9	S13, S21, S24, S26, S31
Material, surface, and craft-related cues (MS)	Wood surface, surface finish, bamboo weaving, decoration, and craft details.	5	13.9	S04, S27, S28, S32, S34
Color and gloss-related cues (CL)	Color features, color combinations, color lightness, gloss, and reflection	4	11.1	S17, S25, S27, S34
Detail- and component-related cues (DT)	Furniture details, such as lid, spout, handle, body, and other visible parts	3	8.3	S30, S34, S35
Curvature-related cues (CR)	Curvature, rounded edges, and rounded contour	2	5.6	S08, S31

Note. This table uses multi-label coding. One study may appear in more than one category. Therefore, k and Share (%) exceed the total number of included studies and 100%.

3.3 Results for RQ2: Emotional or affective responses examined in the literature

The response categories were coded in a broad design-research sense. In addition to direct emotional

responses, the coding included aesthetic preference, Kansei-based responses, value judgment, symbolic interpretation, and implicit cognitive-affective measures when they were linked to product appearance.

Table 6. Emotional or affective response categories.

Emotional or affective response category	Definition	k	%	Study IDs
Aesthetic preference and liking (AP)	<ul style="list-style-type: none"> Preference, liking, or appreciation Attractiveness, beauty judgment, or overall aesthetic evaluation 	20	55.6	S01, S03, S04, S08, S10, S12, S13, S14, S18, S20, S21, S22, S24, S26, S27, S28, S30, S33, S34, S36
Affective imagery and Kansei based responses (AI)	<ul style="list-style-type: none"> Emotion-laden image words or Kansei descriptors Emotional preference structures linked to product form 	11	30.6	S01, S02, S09, S11, S18, S22, S25, S31, S33, S34, S36
Perceived value and evaluative judgment (PV)	<ul style="list-style-type: none"> Subjective value, desirability, or willingness to own Purchase intention, adoption attitude, or overall product evaluation 	10	27.8	S05, S06, S07, S09, S15, S16, S19, S23, S29, S32

Semantic and symbolic impressions (SS)	<ul style="list-style-type: none"> Perceived gender, style meaning, product semantics, or naturalness Cultural, appropriateness, symbolic, or semantic interpretations 	8	22.2	S05, S09, S10, S25, S29, S31, S32, S35
Implicit cognitive affective processing (IC)	<ul style="list-style-type: none"> Arousal, effort, ERP/fMRI, eye-tracking, or physiological indicators Other implicit cognitive-affective measures during aesthetic processing 	7	19.4	S07, S12, S18, S21, S23, S30, S35
Function and quality related appraisal (FQ)	<ul style="list-style-type: none"> Functionality, durability, user-friendliness, or appropriateness Quality-related appraisal shaped by appearance-related cues 	5	13.9	S06, S07, S16, S17, S35

Note. Multi-label coding was used. One study could be assigned to more than one response category. Therefore, the totals for k and Share (%) exceed 36 and 100%.

When conducting a research measurement, coding is based on the analytical focus of the study, rather than each measured term.

In Table 6, aesthetic preferences and liking are relatively common. Affective imagery and Kansei-based responses ranked second, followed by

perceived value and evaluative judgment. This pattern indicates that many product and furniture studies have also shifted from visual cues to preferences, imagery words, or evaluations, without conducting more in-depth process-based measurements.

3.4 Co-occurrence between cue and response categories

Table 7. Co-occurrence matrix of RQ1 and RQ2 coding categories.

RQ1	k	RQ2						Most frequent co-occurrences
		AP	AI	PV	SS	IC	FQ	
GF	10	6	4	4	0	4	2	AP (6); AI / PV / IC (4)
GP	7	3	5	1	2	0	0	AI (5); AP (3); SS (2)
FA	5	0	0	4	1	2	4	PV (4); FQ (4); IC (2)
ST	5	1	1	3	5	0	0	SS (5); PV (3)
CX	5	4	1	0	1	1	0	AP (4); AI / SS / IC (1)
MS	5	4	1	1	1	0	0	AP (4); AI / PV / SS (1)
CL	4	2	2	0	1	0	1	AP (2); AI (2); SS / FQ (1)
DT	3	2	1	0	1	2	1	AP (2); IC (2); AI / SS / FQ (1)
CR	2	1	1	0	1	0	0	AP / AI / SS (1)
Total	46	23	16	13	13	9	8	Overall co-occurrences = 82

Note. The totals exceed 36 because multi-label coding was used. A single study could be coded into more than one RQ1 category and more than one RQ2 category. The matrix shows coding co-occurrence rather than causal or statistical association.

The co-occurrence matrix shows unbalanced cue-response relationships. Cues related to overall form (k= 10) appear most frequently, followed by geometric and proportional cues (k= 7). Functional - signal, style/symbol, complex/simple and material/surface cues each appear 5 times. On the reaction side, aesthetic preference and liking dominate, followed by emotional imagery, perceived value, symbolic impression and implicit cognition - emotional processing. That is to say, studies often link visible cues with liking, emotional imagery, and evaluation, while implicit processing and function-related evaluation are less concerned with them. This trend is consistent with recent work on form,

complexity, and surface cues (Althuisen, 2021; Sharma & Kumar, 2023; Sunstrum et al., 2024).

3.5 Results for RQ3: Main patterns and gaps

The first two result sections describe the two sides of the review: cue categories and response categories. Table 7 then places them in the same matrix. This step is important because it shows where the literature is dense and where it is thin. Table 8 uses that cross-dimensional reading to summarise the main gaps found across the 36 studies. These gaps were derived from the coded categories, frequency results, and co-occurrence matrix.

Table 8. Key gaps identified from the reviewed studies.

Gap dimension	Current focus in the reviewed studies	Main limitation	Implication for future research
Research methods	<ul style="list-style-type: none"> Mainly experiments, survey-based evaluations, Kansei-related work, and computational or physiological approaches A small number of case-based and text-mining studies also appear Representative studies: S01, S02, S07, S12, S13, S22, S30, S32, S36 	<ul style="list-style-type: none"> Less use of integrated designs Limited testing of cue-response–outcome chains 	<ul style="list-style-type: none"> More systematic designs are needed Aesthetics and response variables should be linked more clearly
Emotion-related measures	<ul style="list-style-type: none"> Frequent use of liking, preference, Kansei words, and broad affective terms Emotion is often treated as an end response Representative studies: S01, S02, S10, S21, S22, S31, S34 	<ul style="list-style-type: none"> No stable shared emotion structure Measures vary across studies 	<ul style="list-style-type: none"> Clearer and more structured emotion measures are needed
Overall appearance measurement	<ul style="list-style-type: none"> Many studies examine form, geometry, surface, style, color, or details Most cues are studied separately Representative studies: S08, S17, S24, S27, S30, S31, S35 	<ul style="list-style-type: none"> Limited integration into one overall appearance structure Naming and levels remain uneven 	<ul style="list-style-type: none"> More integrated measurement of overall appearance is needed

Note. The points in this table summarise the main patterns found across the 36 reviewed studies.

The main weakness is not the lack of research. The weaker point is the connection between studies. The evidence on visual form and product perception is that appearance cues often work in concert, not in isolation (Sunstrum *et al.*, 2024). Emotional design research holds a similar view on response variables; a review of the literature also showed that the application of cue groups and response measures together with response structures was more separate (Gan *et al.*, 2021). The synthesis in Table 8 focuses on three aspects: response methods, emotion-related measures, and overall appearance measurement.

4. DISCUSSION

4.1 What this review shows about appearance aesthetics research

Research reviewed shows that the appearance aesthetics are not just about the product looking pretty; the visual beauty of the product can affect users' attitudes and behaviors (Peng *et al.*, 2025). Early studies linked product form to emotional responses (Hsu *et al.*, 2015). Later work involved product-perceived geometric features (Perez Mata *et al.*, 2016). Other studies have involved style or meaning, stating that appearance changes not only affect users' liking of the product, but also affect users' interpretation of the product (Schnurr & Stokburger-Sauer, 2016). Recent studies have also discussed surface reflection, gloss, and product meaning (Sharma & Kumar, 2023; Sunstrum *et al.*, 2024).

The foundation of this field is clear, but experience has not developed evenly. Product design appears more often than furniture design. Furniture is used with the body and placed in a space. Users will judge

its suitability based on posture, materials, comfort experience, and the environment. Product-based research is still applicable, but furniture research requires more testing on specific objects (Chen *et al.*, 2025; Ilhan & Togay, 2024). Recent research is also the case, and when mentioning the importance of function, users' reactions to aesthetic products may change (Lin & Chang, 2021).

4.2 Implications for overall appearance measurement

Many studies focus on one visual cue when examining appearance. Some studies focus on curvature (Ho *et al.*, 2016). Some studies focus on color lightness (Hagtvedt, 2020). Other studies on gloss, fit, or furniture details (Ilhan & Togay, 2024; Sharma & Kumar, 2023; Singh & Sarkar, 2025). These studies are useful, but they mainly explain single-cue effects and do not yet form a stable way to measure overall appearance.

Product appearance has been measured through quantitative methods (Hu *et al.*, 2022). Formal aesthetics has also been studied together with product semantics (Sunstrum *et al.*, 2024). These studies show progress, but visual cues still need to be organized more clearly, especially in furniture research. In furniture design, the overall look may be more important than single colors, materials, or small details. Product form research supports this object-level appearance view (Perez Mata *et al.*, 2016).

Furniture appearance should be studied as a set of related visual cues, not just individual details.

4.3 Directions for future research

Many studies take appearance cues, user reactions

or follow-up assessments as separate parts. Future research should integrate these parts into one research design. This is important because appearance first affects emotional response, and then affects subsequent judgments.

Emotional reactions need to be measured more clearly. Quite a few reviewed studies still use words like preference, like to conduct measurements. The measurement methods have a certain effect, but cannot always clearly explain the emotional processes behind users' judgments. Recent studies on visual aesthetic objects have shown that emotion may originate from images, memories, experiences, and evaluations (Van Der Lee & Van Enschoot, 2024). This provides support for furniture appearance studies to adopt a clearer emotional structure.

The method selection should be adapted to the research purpose. Eye tracking, ERP, and EEG can help explain the visual information processing process in users' aesthetic judgments (Ding et al., 2017; P. Wang et al., 2024). Computational models can be used to organize complex appearance data (X. Wu et al., 2022). Survey and rating methods remain useful for larger user samples (J. Wang & Hsu, 2019). The main task is not to replace one method with another, but more importantly, to connect different methods with the same appearance response framework. Recent evidence also suggests that product visual aesthetics may change with product type, user status, and environment (Peng et al., 2025). For furniture studies, this means that visual appearance should be tested in its use setting, not only as an isolated design feature.

This methodological pattern supports the use of quantitative model-based research when the aim is to test relationships among appearance cues, emotional response, and later evaluation.

4.4 Limitations of the review

This systematic review has limitations. The search was conducted in 5 databases, covering journal articles published from 2015 to 2025. This scope allowed the review to be focused, but some relevant studies may have been missed, especially many studies outside these databases or existing in books and conference papers.

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This review identified inclusion and exclusion criteria, only included studies on product or furniture design, appearance, aesthetics, emotion, and other aspects, excluded studies on architecture, interior design and other aspects that did not focus on products or furniture. The coding process had certain limitations; this review used broad coding categories to compare studies with different objects, measures, and methods. This allows cross-study comparison, but the details of individual studies may be simplified.

5. CONCLUSION

This review includes 36 studies. Regarding appearance aesthetics in product and furniture design, the study found that there is no lack of research, showing a scattered state. Some studies focus on form, geometry, complexity, surface, color, details, or the meaning of symbols, while other studies focus on preference, liking, semantic terms, value judgment, the meaning of symbols, or the degree of implicit cognition. However, the cue group, response measures and subsequent outputs are often studied separately. Future research should regard the appearance value as the overall visual structure, not just pay attention to the individual cue effect (Sunstrum et al., 2024). Existing evidence also shows that the aesthetic effect will change with the different response types and contexts (Peng et al., 2025).

Product visual aesthetics can influence consumers' attitudes and behaviors, but its effect may vary depending on product characteristics, response types and usage scenarios (Peng et al., 2025). When functionality is more important, users' responses to aesthetic products may also differ (Lin & Chang, 2021). Therefore, visual aesthetics needs to be considered together with broader user evaluations, such as usability, attractiveness, emotional distress and workload (Sauer & Sonderegger, 2022). For service scenarios such as seating, etc., the furniture and product is judged based on usage, space, and experience in these scenarios. Hospitality research points out that the physical environment and environmental aesthetics shape guests' experience and satisfaction (Almohammad et al., 2025; Nanu et al., 2024).

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