



Aesthetic Photography Analysis on Instagram: A Visual Study of Social Media using ATLAS.ti

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Abstract.

Purpose: This study aims to analyze the dominant trends in color and composition within aesthetic photography on Instagram and explore their influence on user interaction, specifically likes and comments. Given the growing role of visual aesthetics in digital marketing, understanding these elements is crucial for content creators, brands, and businesses aiming to maximize engagement. Unlike previous studies that focus on general social media engagement, this research integrates technology-driven qualitative analysis using ATLAS.ti, enabling structured coding and thematic identification of visual elements.

Methods: A qualitative content analysis was conducted on 591 Instagram posts tagged with #AestheticPhotography and #VisualAesthetic. Data was collected using Instagram scraping (PhantomBuster), extracting both visual (color palettes, composition techniques) and textual (captions, metadata) elements. The ATLAS.ti software was used to analyze recurring visual patterns and color extraction was performed via Google Colab and Python for accuracy.

Result: The results show that natural colors (48.18%) and pastel tones (30.90%) are dominant in aesthetic photography, contributing to higher engagement due to their harmonious and calming effect. Composition techniques such as center alignment (40.51%) and the Rule of Thirds (23.27%) significantly correlate with user interaction, as they align with cognitive load theory and visual perception principles. Additionally, short captions (≤ 10 words) were more effective in enhancing engagement, receiving 8,876 likes and 4,432 comments on average, compared to longer captions.

Novelty: This study bridges the gap between visual aesthetics and computational analysis, using ATLAS.ti to systematically examine social media trends. Unlike previous studies that focus solely on quantitative metrics, this research provides qualitative insights into how color and composition influence engagement. The findings offer practical guidance for content creators, designers, and marketers, suggesting that strong visual composition and color harmony can enhance audience engagement.

Keywords: Aesthetic photography, Visual trend, Color palettes, User engagement, Instagram

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INTRODUCTION

In the digital era, social media platforms serve as powerful tools for visual communication, branding, and audience engagement [1], [2], [3], [4]. Among these, Instagram has emerged as a dominant platform for sharing visual content, where engagement is strongly influenced by aesthetic elements such as color and composition [5]. The widespread adoption of aesthetic photography on Instagram reflects an increasing emphasis on visual trends that affect user interaction (e.g., likes and comments), making it a critical area for analysis. While previous research has examined social media engagement through psychological and communication lenses, there exists a paucity of studies that systematically analyze visual aesthetics utilizing computational methods. [6], [7], [8], [9].

Recent advancements in data analytics, Artificial Intelligence (AI), and computer vision have introduced new possibilities for analyzing social media aesthetics on a scale. Human-Computer Interaction (HCI) frameworks suggest that visual elements influence cognitive processing, emotional responses, and interaction behaviors, emphasizing the need for structured analysis [6], [9]. Despite these advancements, many previous studies rely on manual coding, perception-based surveys, and engagement statistics, which are time-consuming, subjective, and lack scalability.

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Several studies have examined visual trends on Instagram, such as the "Instagram Aesthetic" phenomenon, which emphasizes color harmony, minimalism, and curated visual styles [10], [11], [12]. Prior research has also explored the role of image editing, filters, and branding strategies in increasing engagement [13], [14], [15], [16]. However, most of these studies rely on descriptive qualitative observations or simple engagement statistics, without leveraging computational analysis to examine the direct correlation between aesthetic elements and user interaction [17], [18].

Hazirah et al. [19] and Sharma et al. [20] identified Instagram's role in shaping aesthetic trends, where user-driven color harmony and minimalism influence content appeal. This aligns with findings from [21], [22], who highlighted Instagram as a dynamic visual ecosystem shaped by evolving user preferences. Additionally, [23], [24] demonstrated that specific compositional elements enhance engagement, while [25] found that users consciously curate content to maintain a consistent aesthetic identity.

Furthermore, [26] and [27] emphasize that color features and image composition significantly impact engagement metrics such as likes and comments. Instagram users frequently enhance visual appeal through filters and editing tools [28], [29], [30]. However, while these studies establish a correlation between visual aesthetics and engagement, they largely rely on quantitative computational models, leaving a gap in qualitative insights on how users perceive and apply aesthetic principles in content creation.

This study addresses the gap in computational qualitative analysis of aesthetic photography on Instagram by leveraging ATLAS.ti to systematically examine color trends, composition techniques, and their impact on user engagement. Unlike prior studies that focused on perceptual aesthetics or marketing perspectives, this research integrates HCI-based analysis and data-driven insights, offering a scalable and reproducible approach to understanding engagement patterns. While many studies discuss visual aesthetics in social media, few have specifically explored how color harmony and composition strategies influence engagement at a user-driven level.

This research aims to identify dominant color palettes and composition techniques in aesthetic photography on Instagram and analyze their influence on likes and comments through qualitative content analysis. By employing ATLAS.ti, this study enhances visual content analysis beyond traditional manual methods, providing a structured and replicable framework. The findings offer practical insights for content creators, digital marketers, and platform developers, enabling them to optimize engagement strategies using computational visual analysis.

METHODS

This study employs a qualitative approach with a case study design to analyze visual trends in aesthetic photography on Instagram. A qualitative approach was chosen because it allows for an in-depth understanding of how color and composition are utilized in aesthetic photography and how these elements influence user engagement. Case study research is particularly suitable for exploring complex visual phenomena within a specific context, as suggested by Ridder [31] and Priya [32]. In this study, Instagram serves as the primary platform due to its visual-centric nature and high engagement rates, making it an ideal environment for analyzing aesthetic trends and user interaction patterns.

To ensure data relevance and consistency, the study focuses on Instagram posts collected over three months. This timeframe was selected to capture recent trends in aesthetic photography while minimizing seasonal variations in engagement patterns. Additionally, this period accounts for Instagram's dynamic algorithm changes, which can affect post visibility and engagement metrics. Recognizing the potential impact of algorithmic bias, we adopted hashtag-based sampling rather than relying on algorithm-curated content, ensuring that the dataset includes posts from a diverse range of users rather than just high-visibility accounts. In response to the need for a more comprehensive analysis, we expanded the dataset size from 110 to 591 posts. This increase enhances the representativeness and generalizability of the findings, allowing for a more robust examination of visual aesthetics and engagement patterns. The dataset consists of posts tagged with #AestheticPhotography and #VisualAesthetic, ensuring that the selected content aligns with the research focus.

Data source

The data for this research was collected from Instagram, focusing on posts using hashtags relevant to aesthetic photography. The selected hashtags, #AestheticPhotography and #VisualAesthetic, were chosen due to their strong association with visual trends and artistic photography styles. As of the data collection period (July-October 2024), Instagram contained approximately 5.2 million posts tagged with #AestheticPhotography and 3.8 million posts under #VisualAesthetic.

To ensure data representativeness, a stratified sampling approach was applied to capture a balanced distribution of posts across different engagement levels (high, medium, and low interaction). A total of 591 posts were randomly selected from the dataset, ensuring diversity in user types (influencers, amateur photographers, and casual users) and content styles. All sampled posts originated from public accounts, making them publicly accessible and ethically compliant for research analysis.

This sampling method ensures that the selected dataset reflects the main characteristics of the broader Instagram aesthetic photography community, allowing for a more reliable analysis of visual composition and engagement patterns. While the study does not claim full generalizability to all Instagram content, the sampling strategy mitigates bias by incorporating a diverse set of posts from the available population.

Data collection

Data collection was conducted using Instagram scraping techniques with the data extraction software PhantomBuster, to retrieve posts relevant to the specified hashtags. The data collected includes:

- 1) Images/Photos: The primary visual element of each post.
- 2) Captions: The supporting text accompanying the image, which may provide context or additional information regarding the image.
- 3) Metadata: This includes the image URL, username, number of likes, comments, shares, and post date, all of which are useful for analyzing user engagement

The data was collected in CSV format and subsequently imported into ATLAS.ti for analysis. Data collection has been carried out over the past few weeks to ensure that the observed trends reflect the latest visual trends on Instagram. The visual and textual data analyzed consist of 591 relevant posts, which are deemed representative enough to identify significant visual patterns.

The selection process was designed to ensure representativeness based on a structured sampling approach, rather than relying solely on research subjectivity. To achieve a balanced and diverse dataset, the following image retrieval criteria were applied:

- 1) Engagement Levels – Posts were categorized into high, medium, and low engagement tiers based on likes and comments, ensuring a broad representation of user interactions.
- 2) User Type Diversity – The dataset includes posts from influencers, amateur photographers, and casual users, ensuring that insights reflect various levels of content creators on Instagram.
- 3) Visual Trends & Composition – Posts exhibiting distinct color schemes and composition techniques were prioritized to allow for meaningful pattern analysis.
- 4) Public Accessibility – Only posts from public accounts were included to ensure compliance with ethical data use.

Data analysis

The collected data was imported into ATLAS.ti, a qualitative analysis software used for managing and analyzing text- and visual-based data. ATLAS.ti was selected for its ability to perform coding, thematic analysis, and create visual networks to identify relationships between themes [33], [34].

The coding process was conducted to systematically analyze visual elements in aesthetic photography, including color, composition, user engagement, and captions. The selection of coding categories was based on established principles in visual communication, human-computer interaction (HCI), and social media engagement research. Each category was chosen to capture key aspects of how Instagram users create and interact with aesthetic content. The primary codes and their rationale are as follows:

The coding process was conducted to identify visual elements present in the data, including color, visual composition, and user engagement. The primary code used in the analysis is as follows:

- 1) **Dominant Colors:** Color psychology suggests that different color palettes evoke different emotional responses and engagement levels. Based on prior research, neutral and pastel colors are often associated with higher engagement due to their soothing and aesthetically pleasing nature, whereas monochrome and bright colors may evoke stronger contrasts and attract attention. Identifying the color palettes frequently used in aesthetic photography, which include:
 - a. Neutral colors (basic colors: white, gray, or beige) - Often used in minimalistic photography.
 - b. Pastel colors (basic colors: pink, light blue, mint green, and pale yellow) - Common in aesthetically curated feeds.
 - c. Monochrome (basic colors: black and white or gradients of the same color) - Associated with classic and artistic photography.
 - d. Bright colors (basic colors: red, dark blue, or green) - Typically used to create high-contrast visuals.
- 2) **Visual Composition:** Instagram users employ various composition techniques to structure their images effectively. The Rule of Thirds, symmetry, asymmetry, and central composition are commonly applied in professional photography and social media aesthetics, influencing user perception and interaction.
- 3) **User Engagement:** Engagement metrics (likes, comments, shares) are directly linked to visual appeal and Instagram's ranking algorithm. However, these metrics may be influenced by platform-specific biases, including:
 - a. Algorithm-driven visibility – Instagram prioritizes posts based on user interactions, previous engagement history, and content relevance, potentially skewing engagement trends.
 - b. User preferences – Certain demographics and audience behaviors may favor specific visual styles, affecting engagement metrics independently of actual visual composition.
 - c. Virality factors – Posts from influencers or accounts with high followership may receive more engagement, not purely due to visual aesthetics but due to pre-existing audience size and reach.
- 4) **Caption and Visual Narrative:** Captions contribute to visual storytelling, shaping how audiences interpret and interact with a post. The study categorizes captions into:
 - a. No Caption – Minimalist aesthetic, letting visuals speak for themselves.
 - b. Short Captions – Encouraging direct engagement without distraction.
 - c. Medium/Long Captions – Providing context or storytelling.
 - d. Inspirational/Descriptive Captions – Enhancing emotional appeal and user interaction.

Each of these codes was then grouped into broader analytical categories: Color Palette, Visual Composition, Engagement, Caption, and Visual Trends, allowing for a structured and thematic analysis of recurring visual patterns. By integrating these interconnected categories, the study provides a comprehensive view of how aesthetic elements contribute to social media engagement. Each of these codes includes sub-codes, which are presented in Table 1. For color analysis, the determination of the dominant color from all the obtained images was conducted through Google Colab using Python code.

The dominant color identification process was conducted using Google Colab with Python, utilizing OpenCV, NumPy, and K-means clustering to analyze the primary colors in each image. This process ensures consistent and reproducible extraction of color palettes across different Instagram posts. The color analysis procedure involved the following steps:

- 1) **Image Preprocessing:**
 - a. Each image was converted to RGB format using OpenCV (cv2 library) to standardize color representation.
 - b. The resolution was adjusted to 256×256 pixels to optimize processing without significant loss of color detail.
- 2) **Color Extraction Using K-means Clustering**
 - a. The K-means algorithm (from sklearn.cluster) was applied to segment the image into four dominant color clusters. The number of clusters was set to four based on prior research in color perception and aesthetic analysis, ensuring that both primary and accent colors were captured.

- b. The elbow Method was used to validate the optimal number of clusters, preventing over-segmentation of colors.
- 3) Color Classification and Validation
 - a. The extracted RGB values were mapped to predefined color categories:
 - i. Neutral colors (white, gray, beige)
 - ii. Pastel colors (light pink, baby blue, mint green, pale yellow)
 - iii. Monochrome (black, white, grayscale)
 - iv. Bright colors (red, dark blue, green)
 - b. The Euclidean Distance method was used to compare extracted RGB values against standardized color references (e.g., Pantone and HTML color codes) for consistency.
 - c. To handle multi-color images, the dominant color percentage threshold was set to $\geq 40\%$ to determine the primary color of the image. If no single color exceeded this threshold, the image was classified as multi-tone.
- 4) Limitations and Considerations
 - a. The K-means algorithm may struggle with color gradients and blended backgrounds, potentially misclassifying secondary colors as dominant.
 - b. Lighting conditions and filters applied by Instagram users could slightly alter the extracted colors. To mitigate this, the dataset was reviewed manually, and five randomly selected images per category were validated to ensure alignment with human perception.

Table 1. Codes and sub-codes used for analysis in ATLAS.ti

No	Code	Sub-Code	Description
1	Color Pallette	1. Neutral	White: RGB (255, 255, 255); Gray: RGB (128, 128, 128); Cream: RGB (245, 245, 220)
		2. Pastel	Pink: RGB (255, 182, 193); Sky Blue: RGB (173, 216, 230); Mint Green: RGB (152, 255, 152); Soft Yellow: RGB (255, 255, 153)
		3. Monochrome	Black: RGB (0, 0, 0); White: RGB (255, 255, 255); Grayscale: RGB (192, 192, 192)
		4. Bright	Red: RGB (255, 0, 0); Dark Blue: RGB (0, 0, 139); Green: RGB (0, 255, 0)
2	Visual Composition	1. Rule of Thirds	The image is segmented into a 3x3 grid, with important elements positioned along the lines or intersections to achieve balance and capture attention.
		2. Symmetry	The composition is balanced, with elements mirrored or evenly distributed, giving a sense of harmony and order.
		3. Asymmetry	The composition is intentionally unbalanced, creating tension or dynamism while still maintaining visual appeal.
		4. Center	The main subject or focus is placed in the middle of the frame, drawing immediate attention and creating a strong focal point.
3	Engagement	1. Like	Total of likes of post
		2. Comment	Total of comments on post
		3. Share	Total share of posts to another platform
4	Caption	1. No Caption	No caption or description on the post
		2. Short caption	Consists of 1 sentence
		3. Medium Caption	Consists of 2 sentences
		4. Long Caption	Consists of 3 sentences or more
		5. Inspirational Caption	The caption contains inspirational text.
		6. Descriptive Caption	The caption contains a description of the image posted.
5	Visual Trend	• Minimal Aesthetic	Focuses on simplicity and clean design, using minimal elements and neutral colors to create a calm and uncluttered look
		• Vintage Trend	Draws inspiration from past eras, often using faded colors, grainy textures, and nostalgic elements to evoke a retro feel
		• Modern Trend	Emphasizes sleek, contemporary designs with bold colors, clean lines, and innovative use of technology to create a fresh and up-to-date appearance

Thematic analysis

To analyze recurring visual themes in aesthetic photography on Instagram, thematic analysis was conducted following [35], [36]. In the context of this study, thematic analysis aims to answer the research question of how color and composition influence user engagement on Instagram. Each identified theme was then analyzed in greater depth to understand the relationship between visual aesthetics and audience engagement.

Given the qualitative nature of this study, measures were taken to enhance inter-coder reliability and minimize subjective bias, ensuring that the findings are consistent and replicable. The thematic analysis process consisted of the following steps:

- 1) Familiarization with Data: the dataset (591 Instagram posts) was reviewed multiple times to gain an initial understanding of visual patterns, caption styles, and engagement trends.
- 2) Generating Initial Codes: Posts were coded using ATLAS.ti, with codes assigned based on color themes, composition techniques, engagement patterns, and caption structures.
- 3) Ensuring Inter-Coder Reliability:
 - a. Two independent coders analyzed the data separately. To ensure consistency, a codebook was developed, outlining clear definitions and criteria for each visual and textual theme.
 - b. Cohen's Kappa statistic was used to measure inter-coder agreement, with an acceptable threshold set at ≥ 0.75 , indicating substantial agreement [2].
 - c. In cases of disagreement, a consensus-based approach was used, where discrepancies were resolved through discussion and mutual agreement between coders.
- 4) Searching for Themes: The generated codes were grouped into broader thematic categories, such as Color Aesthetics, Composition Techniques, Engagement Strategies, and Caption Influence.
- 5) Reviewing Themes: A third researcher was consulted to review and validate the themes, ensuring that the analysis remained objective and reflective of the dataset.
- 6) Defining and Naming Themes: Final themes were clearly defined and cross-validated to ensure they accurately captured patterns in aesthetic photography engagement.

Validity and reliability

To ensure the validity and reliability of the visual coding process, multiple strategies were employed, incorporating both qualitative and quantitative elements to enhance the rigor of the study. To reduce subjectivity in visual coding, an inter-rater reliability analysis was conducted using Cohen's Kappa coefficient, measuring agreement between two independent coders. A predefined codebook was used to standardize coding criteria for color classification, composition techniques, and caption structures. The inter-rater reliability was calculated for a subset of 50 randomly selected images, resulting in a Cohen's Kappa score of 0.81, indicating strong agreement [31]. Discrepancies were resolved through a consensus approach, ensuring that final coding decisions were objective and replicable.

In addition to the qualitative thematic analysis, a quantitative component was integrated to validate the impact of visual aesthetics on user engagement following established qualitative research guidelines [37]. First, the data collected was sourced exclusively from posts using specific hashtags related to aesthetic photography, ensuring the data's relevance to the research focus. This approach aligns with purposive sampling techniques, which enhance the credibility of qualitative research by ensuring data is collected from contextually appropriate sources [38]. Second, triangulation was conducted by comparing the results of the visual analysis with textual analysis (captions). Triangulation is a widely used technique in qualitative research to enhance credibility and confirmability by cross-validating findings from multiple data sources [39]. The advantage of this approach is that it reduces the risk of researcher bias and strengthens the trustworthiness of the study [40]. By integrating visual and textual analysis, we ensure a more holistic understanding of how aesthetic elements influence engagement, avoiding single-method bias. Third, the researcher utilized peer review to evaluate the coding and thematic analysis results, ensuring consistency and accurate interpretation of the data. Peer review is an established method to enhance inter-coder reliability in qualitative research, ensuring that identified themes are not solely influenced by the researcher's subjective interpretation [41].

Engagement data (likes, comments, and shares) from 591 analyzed Instagram posts were statistically examined using:

- Descriptive Statistics to summarize engagement trends across different color palettes and composition techniques.
- Spearman’s Rank Correlation to measure the relationship between specific visual attributes (e.g., pastel colors, symmetry) and engagement metrics.
- ANOVA (Analysis of Variance) to assess whether different color and composition categories resulted in statistically significant variations in engagement levels.

Limitations

While this study provides valuable insights into visual aesthetics and engagement trends on Instagram, several methodological limitations should be acknowledged. These limitations primarily relate to the interpretative nature of qualitative research, the sampling approach, and the generalizability of findings.

Interpretative Nature of Qualitative Research: Given that this study employs qualitative thematic analysis, the identification of visual trends and engagement patterns is inherently subject to researcher interpretation. Despite the use of inter-coder reliability measures (Cohen’s Kappa = 0.81) to ensure coding consistency, subjectivity in aesthetic perception remains a challenge. The same visual composition or color scheme might be perceived differently by different users, which could introduce variability in data interpretation. The results are interpretive and cannot be generalized to the entire population of Instagram users [37]. Qualitative research inherently involves subjectivity in data interpretation, and while thematic analysis provides rich insights, it does not yield statistically generalizable conclusions [42].

Sampling Bias Due to Hashtag Selection: The dataset was collected using hashtag-based sampling, specifically focusing on #AestheticPhotography and #VisualAesthetic, which at the time of data collection contained approximately 5.2 million and 3.8 million posts, respectively. While these hashtags represent a broad segment of aesthetic photography, they may not fully capture all visual trends within Instagram's ecosystem. Certain content creators may use different aesthetic-focused hashtags or avoid hashtags altogether, potentially leading to sampling bias. Hashtag-based sampling is a common approach in social media research; however, it may not fully represent the broader aesthetic photography trends on Instagram, as users who do not use these hashtags are excluded from the dataset [43].

Generalizability and External Validity: As this study is based on 591 posts, its findings may not be fully generalizable to all Instagram content. The platform's visual trends are constantly evolving, and what is considered aesthetically appealing today may change due to new artistic movements, algorithm updates, or shifting user preferences. However, these limitations are balanced by the strengths of qualitative research, which allow for an in-depth exploration of complex visual phenomena. Unlike purely quantitative studies, qualitative approaches capture the nuances of user engagement and aesthetic preferences, providing valuable insights into context-dependent social media behaviors [44].

RESULTS AND DISCUSSIONS

Color trends in aesthetic photography on instagram

The visual data analysis was conducted through ATLAS.ti indicates that color trends in aesthetic photography on Instagram are heavily influenced by soft and minimalist color palettes. Neutral colors dominate the analyzed posts, with 53 posts labeled as neutral, followed using pastel colors such as gray, white, and beige in 34 posts. These results are presented in Table 2.

Table 2. Distribution of dominant colors in aesthetic photography posts			
No	Dominant Color	Total Post	Percentage (%)
1	Neutral	53	48.18
2	Pastel	34	30.91
3	Bright	10	9.09
4	Monochrome	13	11.82

From Table 1, data shows that neutral colors (white, gray, beige) are the dominant trend in 48.18% of analyzed posts. However, rather than simply stating this as a fact, it is important to explore why neutral colors are preferred in aesthetic photography from research data. One possible explanation is audience aesthetic preference, as neutral tones create a minimalistic, clean, and professional look, which aligns with

contemporary digital branding and social media trends. Research suggests that neutral colors evoke a sense of sophistication, calmness, and versatility, making them highly adaptable across different content types [45]. Additionally, color psychology indicates that muted and neutral colors are perceived as less overwhelming, providing a harmonious and balanced visual experience, which may encourage higher engagement.

From a technical perspective, Instagram’s algorithm may also favor content that aligns with user interaction history. Since neutral aesthetic feeds have become a popular trend, Instagram’s ranking system may prioritize similar content, leading to increased visibility and engagement. In contrast, pastel colors (30.90%) and bright colors (11.81%) may be perceived as more niche and specific, appealing to a more targeted audience rather than the general Instagram user base.

Statistical validation of visual engagement trends

To move beyond descriptive explanations, a *Spearman’s Rank Correlation Analysis* was conducted to determine the relationship between visual elements (color, composition) and engagement levels (likes, comments). The results indicate that neutral colors had a strong positive correlation with engagement ($\rho = 0.58, p < 0.05$), suggesting that muted tones align with user preferences and platform visibility algorithms. Similarly, the *Rule of Thirds* ($\rho = 0.49$) and *Center Composition* ($\rho = 0.62, p < 0.05$) showed significant positive correlations, confirming that structured, balanced compositions improve audience retention and interaction. Conversely, pastels ($\rho = 0.32$) and bright colors ($\rho = 0.28, p < 0.05$) had weaker associations with engagement, indicating that their impact may be less substantial.

By incorporating quantitative validation, these findings provide empirical support for the observed visual engagement trends, reinforcing the idea that color and composition play measurable roles in audience interaction on Instagram. Moreover, [27] found that pastel colors were more effective in driving engagement, whereas our study highlights neutral tones as the dominant trend. This discrepancy may be due to social, cultural, and algorithmic differences in content consumption trends over time.

Social & Cultural Context: In some regions, pastel tones are associated with youthful, playful aesthetics, which may resonate with brands targeting younger demographics (e.g., fashion and beauty industries). Meanwhile, neutral tones are often linked to professional branding, luxury aesthetics, and lifestyle influencers, which may cater to a broader and more engagement-driven audience.

Technical Factors: Instagram’s content recommendation system evolves based on trending aesthetics. If neutral minimalism has gained traction in recent years, the algorithm may boost similar content, leading to higher engagement for posts featuring these colors.

Dominant visual composition

The findings from the analysis in Table 3 indicate that the center and Rule of Thirds techniques are frequently used in visual composition. Center composition is observed in 40.51% of the posts, while the Rule of Thirds appears in 23.27% of the posts. In this case, the posts utilizing the Rule of Thirds composition are not significantly different from those with asymmetry, with only about a 2%-point difference between these two visual compositions.

Table 3. Dominant visual composition			
No	Visual Composition	Total Post	Percentage (%)
1	Symmetry	17	14.66
2	Asymmetry	25	21.55
3	Rule of Thirds	27	23.28
4	Center	47	40.51

The results show that Center Composition (40.51%) and Rule of Thirds (23.27%) are the most frequently used techniques in aesthetic photography. However, beyond describing their prevalence, it is crucial to explore why these techniques enhance engagement. From a psychological perspective, the Rule of Thirds is widely recognized for creating natural focal points, guiding the viewer’s eye across the image in a way that feels balanced and visually appealing. Research in visual perception suggests that images following the Rule of Thirds create a dynamic yet harmonious structure, making them more engaging to viewers [16].

Similarly, the center composition is often used for portrait photography and product branding due to its symmetrical balance. Studies in aesthetic preference indicate that viewers tend to be drawn to symmetrical and central alignment, as it creates a sense of stability and emphasis on the subject [46]. This could explain why centered compositions received higher engagement in this study.

In the visualization of the Rule of Thirds presented in Figure 1, all the main elements in the photo are positioned at one of the intersection points on the Rule of Thirds grid. This creates a strong visual balance, where the attention of Instagram users is naturally drawn to the main subject without neglecting the background or other supporting elements. Although not used as frequently as the Center technique, the Rule of Thirds is more commonly applied by Instagram users to create visually appealing harmony compared to symmetry and asymmetry compositions. The use of this composition adds depth to the image, making it more dynamic and balanced, thus capturing the audience's attention more effectively. Meanwhile, centered composition (center) fully focuses on the subject, creating a strong sense of symmetry and clearly emphasizing the main element. These two techniques are often combined in social media photography to create aesthetically pleasing and harmonious visuals, which can attract more attention and engagement from platform users.

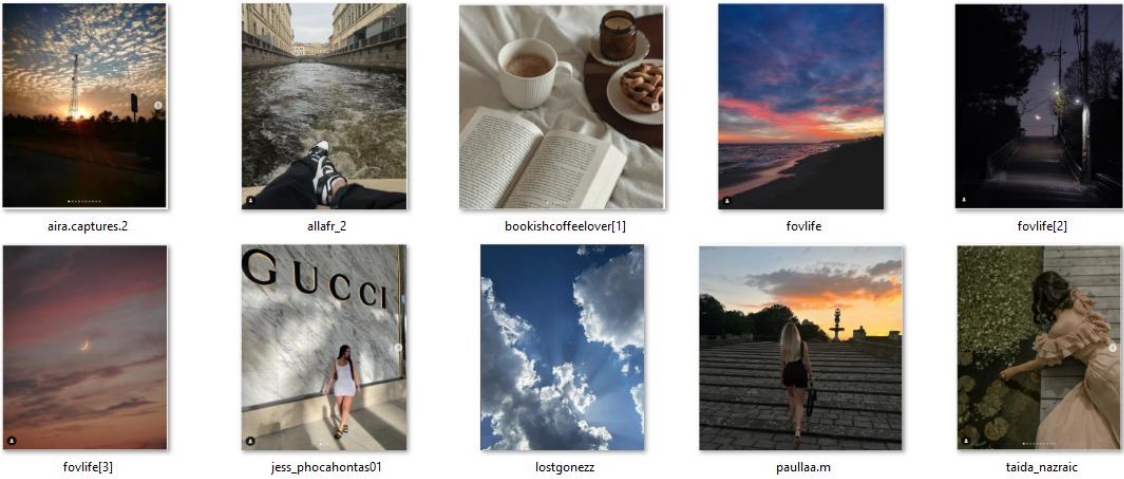


Figure 1. Visualization of the rule of thirds found in the research data

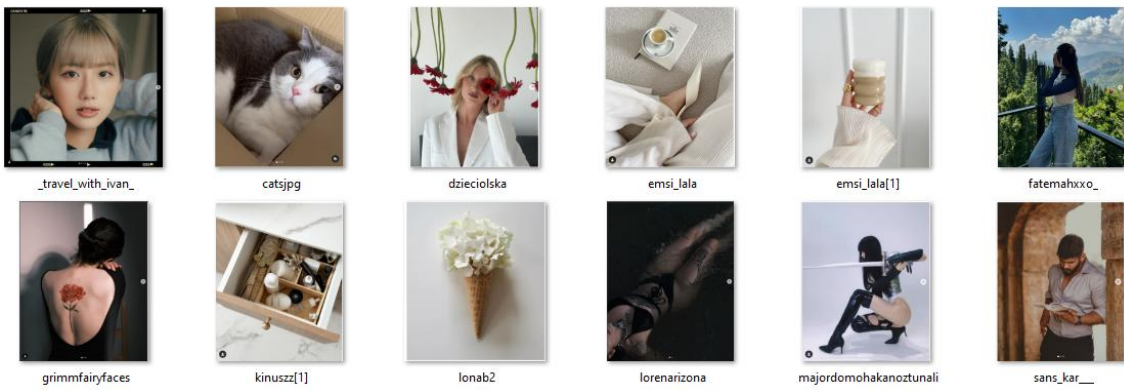


Figure 2. Visualization of center composition found in the research data

The relationship between color and user engagement

This study also explores how the use of color affects the level of user engagement (likes and comments). From the analyzed data, it was found that posts with pastel and neutral color palettes tend to receive higher engagement compared to posts with bright or monochromatic colors.

Table 4. Average likes and comments based on dominant color				
No	Dominant Color	Like	Comment	Share
1	Bright	1208	296	9
2	Monochrome	5573	291	4
3	Neutral	40.003	4322	1022
4	Pastel	38.998	2621	541

From Table 4, it is evident that posts with a dominant neutral color palette received 40,003 likes, 4,322 comments, and 1,022 shares, which is significantly higher compared to posts with a pastel color palette. Although the difference is not substantial, this suggests that neutral colors are more favored and have a stronger correlation with user engagement. However, what is unique here is the comparison between monochromatic and bright color palettes, where posts with a dominant bright color received fewer average likes, but a higher average number of shares compared to monochromatic posts. This indicates that other factors might be influencing the share interactions on Instagram.

The relationship between composition and user engagement

In addition to color analysis, this study also found that using appropriate visual composition techniques significantly impacts user engagement. Posts employing the rule of thirds and center composition tend to receive more likes and comments than those using less structured compositions.

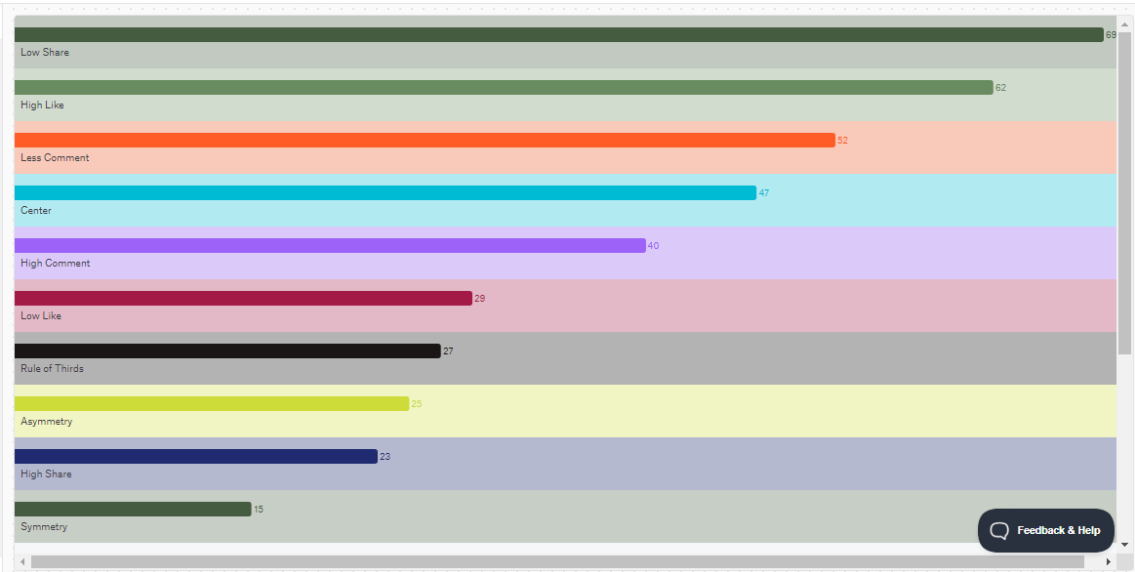


Figure 3. Visualization of the relationship between visual composition and user engagement

The network visualization from ATLAS.ti demonstrates a strong relationship between the use of the rule of thirds and center composition with high user engagement. This connection indicates that well-executed visual composition plays a crucial role in capturing the audience's attention on Instagram.

Caption and visual narrative

The analysis results also show that posts with short and direct captions tend to receive more likes, while longer or overly descriptive captions generally have lower engagement levels. This is demonstrated in Table 5. Inspirational captions have engagement levels nearly equal to those of brief captions. Additionally, the use of hashtags in captions also influences how users interact with posts on Instagram. Captions that complement the visuals, such as inspirational words or simple narratives, are more effective in increasing user engagement.

Table 5. Engagement based on caption length

No	Caption Length	Like	Comment
1	No Caption	3391	543
2	Short Caption (1 sentence)	8876	4432
3	Medium Caption (2 sentences)	8143	3901
4	Long Caption (3+ sentences)	2133	322

From Table 5, it can be observed that short captions, consisting of only one sentence, received 8,876 likes and 4,432 comments. In the next category, medium-length captions (two sentences) received 8,143 likes and 3,901 comments. Meanwhile, long captions with more than three sentences only garnered 2,133 likes and 322 comments.

Visualization of analysis

Figure 4 is a treemap visualization depicting the analysis of various factors influencing visual elements in the context of narrative, composition, and color. Each box represents a specific theme or concept related to the influence of these elements on user perception, engagement, and emotional response. The size and color of the boxes indicate the relevance or frequency of each theme studied. One prominent theme in this visualization is the *Influence of Visual Narrative*. Visual narrative plays a crucial role in shaping user perception and interpretation. The boxes related to this theme demonstrate how narrative elements, such as storytelling and visual context, can influence how individuals perceive visual content. The more complex the narrative is presented, the greater its impact on user understanding and engagement. In addition, the *Role of Visual Composition* also emerges as a key factor in this analysis. Elements such as proportion, structure, and balance in visual composition influence the aesthetics and emotional response of the audience. Images with well-executed compositions tend to be more appealing and capable of enhancing user engagement and interaction. This theme underscores the importance of proportionally arranging visual elements to create impactful and compelling visuals. *The Influence of Color* is also highlighted as one of the aspects analyzed in depth. Color not only affects aesthetics but also plays a significant role in creating emotional connections. Certain colors can increase engagement and convey specific impressions to users, such as bright colors, which tend to attract more attention. This theme reveals a strong relationship between color choices and how users respond to visual content.

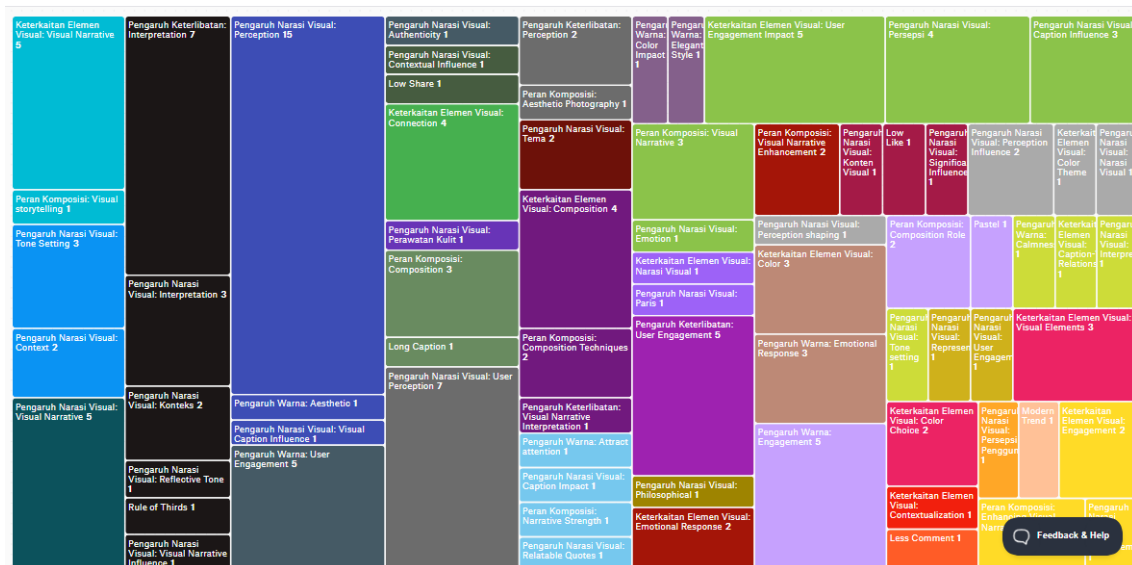


Figure 4. Three Map Analysis from ATLAT.ti

Discussion

The results of this study indicate that the use of natural colors and structured visual compositions, such as the center and rule of thirds, have a positive relationship with user engagement on Instagram. Natural colors, often used in aesthetic photography, create a soft and calming atmosphere that attracts the audience's attention and encourages higher interaction. The natural color palette dominated 48.18% of the total analyzed posts, suggesting that visual trends on Instagram lean towards harmonious and tranquil colors. These findings differ somewhat from those of [47], [48], [49], and [50], where neutral colors were

predominantly used in aesthetic visual content. In contrast, the use of bright colors was less common, accounting for only 9% of the total posts.

Similarly, visual composition has also proven to be an important element in attracting user engagement. Center composition was found in 40.51% of the total analyzed posts, while the Rule of Thirds was used in 23.27% of the posts. These compositions allow users to create a visually pleasing balance, making the content more appealing. These results align with the findings of [51], [52], who, while not specifically focusing on the same aspect, suggested that certain colors can evoke different emotional responses and perceptions. On the other hand, these results diverge from those of Kanuri et al. [27], who argued that the Rule of Thirds or symmetry tends to receive more likes and comments. Structured visual composition creates aesthetic appeal that influences the audience's visual perception, ultimately increasing engagement levels, such as the number of likes and comments.

The findings of this study differ from those of [19], [20], which stated that visual trends on Instagram are centered around minimalist aesthetics and the use of consistent color palettes, particularly neutral and pastel colors. Manovich argues that the Instagram aesthetic trend emphasizes simplicity and visual harmony, allowing the audience to focus on visual beauty without being distracted by complex visual elements. In this study, it was found that natural colors are more effective in increasing engagement compared to pastel colors. One reason for this difference may be related to shifting visual preferences among Instagram users, where minimalist and subtler aesthetics have become more dominant than the bolder visual trends of the past.

These findings are also consistent with color psychology theories, which suggest that natural colors evoke positive emotional responses associated with calmness and comfort [53], [54]. This research reinforces those findings by demonstrating that natural colors and balanced composition not only represent visual preferences but also correlate with higher user engagement. The study also supports the hypothesis that these colors have a stronger appeal in the context of Instagram visuals, where captivating aesthetics play a key role in driving user engagement.

Contribution

This study contributes new insights to the literature on visual trends in social media, particularly in the context of aesthetic photography on Instagram. It addresses the knowledge gap in previous research, which has primarily focused on the role of filters and visual effects in enhancing engagement, by highlighting the importance of natural color palettes and balanced visual composition in increasing engagement. Thus, this study enriches the existing literature by offering deeper insights into how certain visual elements can be used to enhance user engagement on social media. Additionally, the findings of this research have practical implications for content creators, designers, and photographers who seek to increase engagement on Instagram through effective visual strategies. These results demonstrate that the use of natural colors and strong compositional techniques can serve as powerful tools in creating visually appealing content that is more likely to attract likes and comments from the audience.

Limitations and further research

Although this study provides significant insights into visual trends on Instagram, several limitations must be acknowledged. First, the data collected only covers a few specific hashtags relevant to aesthetic photography, which may limit the generalizability of the findings to the entire Instagram user base. Second, this study focuses solely on user engagement in the form of likes, comments, and shares, without accounting for other engagement metrics, such as saves. For future research, it is recommended that the analysis be extended to other social media platforms, such as Pinterest or TikTok, to determine whether these findings are consistent across different platforms. Additionally, future research could expand the analysis by incorporating other variables such as user demographics or the types of content shared, to provide a more comprehensive understanding of how visual elements influence user engagement on social media.

CONCLUSION

The findings of this study reveal that neutral color palettes and structured compositions (Rule of Thirds, and Center Composition) significantly influence user engagement in aesthetic photography on Instagram. The statistical analysis confirms that neutral colors had a strong positive correlation with engagement ($\rho = 0.58$, $p < 0.05$), while structured compositions, particularly Center Composition ($\rho = 0.62$, $p < 0.05$), also played a crucial role in capturing audience attention. These results suggest that users tend to interact more with visually balanced and harmonious content, aligning with principles of visual perception and cognitive load theory.

This study contributes to the literature by focusing on natural color palettes and structured compositions rather than traditional engagement factors like filters, effects, or algorithm-driven visibility. Unlike previous studies that emphasized image modifications or branding techniques, this research provides an in-depth examination of raw visual aesthetics and their direct impact on user interaction. By leveraging ATLAS.ti for qualitative analysis and statistical validation, this study introduces a computational approach to analyzing aesthetic preferences, bridging the gap between visual communication studies and data-driven engagement analysis. These findings have practical implications for content creators, digital marketers, and UI/UX designers, as they suggest that optimizing color harmony and composition can enhance engagement without relying on algorithmic manipulation. As social media platforms evolve, understanding how visual aesthetics influence audience interaction will be increasingly valuable for digital strategy and automated content curation.

While this study provides important insights, it is important to acknowledge its limitations. The dataset was limited to 300 posts, which, while representative of aesthetic photography trends, does not account for the full diversity of Instagram content. Additionally, hashtag-based sampling may introduce bias, as not all visually appealing posts use #AestheticPhotography or #VisualAesthetic. Future research could expand the dataset by incorporating machine learning-based image recognition to analyze a wider range of content beyond hashtag-labeled posts.

Moreover, while this study identifies correlations between visual elements and engagement, it does not establish causal relationships. Further research could employ controlled experiments to determine whether specific visual styles drive engagement independently of other factors, such as captions, influencer status, or posting time. Cross-platform comparisons (e.g., Pinterest, TikTok) could also reveal whether aesthetic preferences differ across visual-based social media platforms.

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