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Festival Emoji Semiotics: Age-Based Variations in WeChat Moments

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ABSTRACT

Emojis in contemporary digital communication extend beyond affective cues to index intergenerational identities and social behaviors. Focusing on WeChat Moments, this study investigates generational differences in emoji use during festive interactions. We adopt a mixed-methods design: quantitative analysis of 1500 posts and in-depth interviews with 15 users aged 20–50. The analysis is grounded in Systemic Functional Linguistics and Multimodal Discourse Analysis, framed by the Digital Natives/Digital Immigrants perspective and informed by Communication Accommodation Theory, Diffusion of Innovations, and Cultural Dimensions Theory. We identify three semantic dimensions—usage patterns, interpretative cognition, and symbolic life cycle. Results show statistically significant age-based differences in frequency, category preferences, and combinatory styles. Interviews reveal systematic cognitive gaps: younger users frequently deploy ironic and playful stances through emojis, whereas older users interpret forms more literally and prefer conventional combinations. We further validate a three-phase Symbol Lifecycle Model using structural equation modeling, delineating an emotion-driven stage (20–30 years), a norm-sensitive stage (31–40 years), and a culture-identified stage (41–50 years) of emoji adoption. The study demonstrates how an integrated, multimodal approach can capture subtle sociolinguistic dynamics shaped by platform affordances and cohered socialization. Practically, the findings inform age-inclusive emoji design, platform communication guidelines, and initiatives that mitigate intergenerational misinterpretation. The proposed framework provides a scalable basis for future cross-cultural and cross-generational research on digital semiotics.

Keywords: Socio-Semiotics; Emojis; Generational Variation; WeChat Moments; Multimodal Discourse Analysis

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1. Introduction

In the digital age, emojis have evolved into a critical medium of cross-generational communication, particularly on social networking platforms such as WeChat Moments. While originally designed to express affective states, emojis now carry complex cultural and social meanings, functioning as semiotic resources for identity construction, relational positioning, and value signaling. Existing studies have identified clear age-related differences in emoji use, interpretation, and symbolic intent^[1,2]. However, much of this scholarship has centered on Western platforms like Twitter and Facebook, leaving a notable gap in our understanding of emoji usage in non-Western digital ecologies. Moreover, research on emoji use during culturally significant events—such as festivals—remains scarce, despite the heightened emotional and social salience of these occasions. Even when generational variation is documented, previous studies often lack an integrative theoretical lens that can explain the underlying socio-cognitive and cultural mechanisms, leading to fragmented or surface-level interpretations.

To address these gaps, this study investigates emoji usage among WeChat Moments users aged 20 to 50 in the context of major festive celebrations. It adopts a comprehensive theoretical framework that positions the Digital Natives vs. Digital Immigrants divide^[3] as the foundational socio-generational context. This is further enriched by three complementary perspectives: Communication Accommodation Theory^[4], which captures micro-level identity negotiation strategies; Diffusion of Innovations Theory^[5], which maps generational adoption trajectories; and Cultural Dimensions Theory^[6], which situates emoji practices within broader value systems. In addition, the study considers how platform-specific affordances such as context collapse^[7] mediate communicative choices across age cohorts. Although the present study centers on WeChat Moments as a paradigmatic case of relational communication, it also recognizes China's diverse digital ecology, where platforms such as Douyin, Xiaohongshu, and Weibo foster distinct communicative practices. Douyin and Weibo, characterized by algorithmic amplification, audiovisual expressivity, and public visibility, nurture more performative and viral modes of emoji use. Comparing these with WeChat's semi-private, relationship-oriented interactions would offer valuable insight into how socio-emotional meanings of emojis are re-

contextualized across media environments.

The study pursues three interrelated aims: (1) to systematically examine generational differences in emoji usage on WeChat Moments during festive communication; (2) to explore the cognitive mechanisms and cultural values underlying these differences; and (3) to propose and test a new "Symbol Lifecycle Model", which describes how emoji use changes from emotion-driven to norm-sensitive to culture-identified across adulthood.

2. Literature Review and Theoretical Framework

2.1. The Functional Evolution of Emojis and Contextual Dependency

The development of emojis can be described in three main stages. The first stage was the technological incubation period (1999–2010). It began in 1999 when Japanese engineer Shigetaka Kurita created 176 original emojis for the NTT DoCoMo mobile platform^[8]. At this time, emojis mainly served a functional purpose, helping to express emotions that were missing in early mobile text messages. Crystal^[9] characterized the symbols of this era as "quasi-linguistic" elements, emphasizing their compensatory function in addressing the absence of nonverbal cues.

The second stage was the standardization period (2010–2015). During this time, the Unicode Technical Committee accelerated its standardization work, giving emojis unified codes worldwide. In this period, emojis changed from simple "emotional markers" to more complex "meaning systems"^[10]. Functionally, they diversified: pragmatic functions emerged in Western business communication^[11], while in East Asian cultures, they maintained close ties with traditional cultural symbols.

The third stage is the cultural differentiation period (2015 to present). Here, emoji use has become clearly divided across generations. For example, Dresner and Herring^[1] found that younger users (aged 18–25) often created new meanings for emojis, while older users (55+) tended to use the original meanings. This kind of generational difference is common around the world, but it can look different in different cultures.

Previous research shows that how emojis are interpreted and used depends a lot on the context^[12]. In cross-

cultural communication, this dependency is shaped by broader cultural orientations: collectivist cultures tend to emphasize the social coordination function of emojis, while individualist cultures prioritize self-expression^[13]. However, much of this research focuses on Western platforms like Twitter and Facebook^[2]. This creates a gap, as we know less about how these dynamics work in non-Western settings like China's WeChat.

2.2. An Integrated Theoretical Framework for Explaining Generational Differences

Although previous studies have noted generational differences, they often do not have a comprehensive framework to explain where these differences come from and how they work together. To better explain these differences, this study proposes a model that places socio-cognitive roots in the background and uses several theories to explain the behaviors that can be seen.

The theory of "Digital Natives and Digital Immigrants", proposed by Prensky, offers a basic way to understand the generational gap in how people adopt digital technology^[3]. This theory suggests that people who grew up with digital media (digital natives) think and communicate in ways that are different from those who started using digital technology as adults (digital immigrants). Digital natives see technology as a natural part of life, like a "native" language^[3]. For them, using technology (like emojis) in digital communication is often a habit, not a conscious choice. They use it naturally to express subtle meanings, build relationships, and show their identity^[14]. Therefore, their creative and sometimes unexpected use of emojis can be seen as a form of play. They often change and create new meanings for symbols within their own peer groups. On the other hand, Digital immigrants first used digital technology as adults^[15]. Because of this, they often approach digital tools with a mindset from a time before digital technology was common. They often retain an "accent" from their past, translating traditional communication norms into the digital realm^[14]. Their use of emojis is more about adapting than being naturally fluent. As a result, they tend to use a smaller set of emojis, often taking their meanings literally. They usually follow the unwritten rules of digital etiquette on social media. Although some have criticized this definition for being too simple^[16], it is still a useful tool for under-

standing where basic differences in digital communication styles come from. It sets the stage for the following theories, which elaborate on the specific behavioral and cognitive mechanisms through which these digital native-immigrant dispositions are enacted.

At a micro-sociopsychological level, Giles et al.'s^[4] Communication Accommodation Theory (CAT) elucidates the strategic choices digital natives and immigrants make to manage their social identities. The theory suggests that people may change how they communicate to either fit in with others (convergence) or to stand out as part of a different group (divergence). Following this idea, Coupland et al.^[17] noted that younger people (digital natives) often use symbols in creative ways to create and strengthen their group identity. This can be seen as a form of "counter-socialization" through language. This process is especially clear in how emojis are used. Vandergriff's^[18] long-term study found that American college students (digital natives) often create new ways of using symbols about every 18 months. This helps them fit in with their friends while also setting them apart from older generations. In contrast, middle-aged users (digital immigrants) show a stronger tendency to follow standard rules. They often stick closely to professional norms, especially in formal settings like work emails^[11]. This seems to be a strategy to meet what they see as professional expectations.

From a broader, societal perspective, Rogers et al.'s^[5] Diffusion of Innovations Theory helps explain how quickly and in what ways new ways of using emojis spread among different groups, from Digital Natives to Immigrants. This theory divides technology users into five groups: Innovators, Early Adopters, Early Majority, Late Majority, and Laggards. When the study applies this model to emoji use, it tends to show clear differences between age groups, as seen in **Table 1**.

Hofstede's^[6] Cultural Dimensions Theory provides a deeper explanation of how the values linked to being a Digital Native or Immigrant combine with broader cultural values to influence how people interpret and use emojis. Two of these dimensions are especially relevant for this study:

The Uncertainty Avoidance dimension helps explain how different age groups see the risks of using emojis. For example, in cultures with high uncertainty avoidance (e.g., Japan), older users (Digital Immigrants) tend to be more

cautious with emojis and often follow established rules closely. In contrast, in cultures with low uncertainty avoidance (e.g., the U.S.), younger users (Digital Natives) are usually more willing to try new and different ways of using emojis. The Long-term Orientation dimension influences what meanings people give to symbols. In cultures that value

long-term traditions (e.g., China), older users (Digital Immigrants) often connect traditional festival emojis (e.g., “🍁” and “🍂” for the Mid-Autumn Festival) with cultural heritage. Meanwhile, younger users (Digital Natives) in cultures that focus more on the present may pay more attention to the immediate message an emoji sends.

Table 1. Generational Distribution of Emoji Adoption.

Group	Age Range	Percentage of Users	Characteristics
Innovators	18–24	2.5%	Rapid adoption, experimental use of new symbols; main source of semantic innovation.
Early Adopters	25–34	13.5%	Quickly follow innovations after confirming value, but use them more standardized.
Early Majority	35–44	34%	Adopt symbols only after societal consensus forms.
Late Majority	45–54	34%	Use symbols sparingly, mainly for practical purposes.
Laggards	55+	16%	Minimize usage or reject symbols entirely.

2.3. Research Gaps

A review of existing literature reveals several critical gaps in the study of generational differences in emoji usage, particularly within the Chinese digital context.

First, most studies adopt a static or cross-sectional perspective, treating generational differences as fixed categories rather than as evolving trajectories. This limits our understanding of how emoji use may shift across the life course. Longitudinal or life-stage-sensitive investigations are notably scarce, leaving unexplored how symbolic practices adapt as users age and engage with changing social and technological environments.

Second, while theoretical frameworks such as the Digital Natives vs. Immigrants distinction, Communication Accommodation Theory (CAT), Diffusion of Innovations (DOI), and Hofstede’s Cultural Dimensions offer valuable insights, they are often applied in isolation. As Vanden Abeele et al.^[19] note, there is a growing need for integrated models that account for both the socio-cognitive foundations of generational identity and the observable behavioral patterns across communicative contexts. A unified theoretical approach could more effectively bridge micro-level interactional dynamics with macro-level cultural patterns.

Third, current research focuses mostly on Western platforms. In fact, over 80% of studies use data from Twitter or Facebook^[2]. Although a few studies have looked at non-Western contexts—for example, Yang’s^[20] work on Chinese social media and Lou et al.’s^[21] research on Weibo—their scope is often limited. Also, while some recent studies have looked at generational differences on specific plat-

forms, they often have limitations. For instance, Metallo & Agrifoglio’s^[22] work focuses on Twitter (a Western platform), and Liu et al.’s study^[23] on WeChat does not provide a detailed analysis of multimodal communication like emoji use.

Most notably, research on WeChat Moments remains strikingly limited, despite the platform being China’s most widely used social media space, with over 1.2 billion active users. The communicative practices on WeChat Moments—particularly during festive and culturally charged occasions—are likely to differ substantially from those on Western platforms, owing to variations in communicative norms, collectivist value orientations, and high-context interactional patterns. This absence of empirical attention restricts the generalizability of existing findings and overlooks the distinctive sociolinguistic dynamics that characterize emoji use in non-Western digital environments. To address these gaps, the present study investigates emoji usage during festive periods on WeChat Moments through a multimodal analytic lens and within an integrated theoretical framework. By doing so, it aims to advance a more culturally inclusive and developmentally informed understanding of digital symbolic communication.

This study seeks to address the following research questions:

- (1) What are the significant generational differences in emoji usage on WeChat Moments during festive periods, particularly in terms of frequency, category preference, and combination style?
- (2) How do users from different age groups differ in their cognitive interpretations and social motivations when

using emojis, including aspects such as emotional expression, identity signaling, and social risk management?

- (3) To what extent is the proposed Symbol Lifecycle Model supported by empirical data, and how does it reflect the developmental progression of emoji adoption across early, middle, and later adulthood?

3. Method

3.1. Research Design

This study employed a sequential mixed-methods design to investigate generational differences in emoji usage. The research unfolded across three interrelated phases, each aligned with a specific research question. In the first phase, a quantitative content analysis was conducted to address Research Question 1. A corpus of 1500 WeChat Moments posts was systematically collected and statistically examined to identify significant generational variations in emoji usage patterns, including frequency, category preferences, and combinatorial styles. The second phase adopted a qualitative approach to address Research Question 2. Semi-structured interviews were conducted to uncover the underlying cognitive mechanisms and social motivations shaping these observed patterns—such as emotional expression, social risk management, and cultural identity construction. In the final phase, the quantitative and qualitative datasets were integrated to develop and statistically validate the proposed Symbol Lifecycle Model using Structural Equation Modeling (SEM). This integrative, model-building stage sought to establish a comprehensive theoretical framework that explains how the principal factors influencing emoji use evolve across adulthood, thereby providing a dynamic account of generational variation in digital symbolic communication.

3.2. Corpus

Quantitative data were collected through systematic sampling of WeChat Moments posts that contained at least one emoji. WeChat Moments, known for its strong social ties and the phenomenon of “context collapse”—where users share content with overlapping personal, familial, and professional audiences—provides a rich environment for examining generational differences in communicative behavior.

Recognizing this socio-contextual complexity was essential for interpreting the observed emoji usage patterns.

The study implemented a set of standardized web-scraping protocols to extract posts along with relevant metadata, including users’ age, gender, timestamp, and the complete text and emoji content. A total of 1,500 Moments posts were collected from users aged 20–30, 31–40, and 41–50 years. To ensure balanced representation, at least 500 posts were sampled from each age group. Within each group, gender ratios were controlled to maintain near parity, with deviations limited to within 10%. For instance, in the 20–30 age group, approximately 225–275 posts were contributed by male users and an equivalent number by female users. This stratified sampling design ensured both demographic balance and analytical robustness.

Data collection took place between December 2024 and February 2025, a period encompassing major Chinese and international festivals such as the Winter Solstice (December 21, 2024), Christmas Eve (December 24, 2024), Christmas Day (December 25, 2024), New Year’s Day (January 1, 2025), Lunar New Year’s Eve (January 28, 2025), the Spring Festival (January 29, 2025), the Lantern Festival (February 12, 2025), and Valentine’s Day (February 14, 2025). These festivals, representing both Eastern and Western cultural traditions, provided a diverse range of communicative contexts for emoji use, allowing for the observation of cross-cultural and temporal variations in digital symbolic expression.

Prior to data collection, participants were informed about the study’s purpose, procedures, and potential implications through an online announcement on WeChat Moments. An informed consent form, written in accessible language, enabled users to decide voluntarily whether to participate after reviewing the information. Only data from users who provided explicit consent were included. Participants were also informed of their right to withdraw at any time without penalty.

All collected posts and user information (e.g., age group, gender) were immediately anonymized following strict protocols. Identifiable data were removed and replaced with unique participant codes, and stored in encrypted, isolated databases. Throughout the storage and analysis process, data protection measures—including encryption and restricted access—were implemented to ensure confidentiality and prevent unauthorized disclosure. Only aggregated

and anonymized data were used for reporting purposes.

For the qualitative component, semi-structured interviews lasting 30–45 minutes were conducted with 15 participants, either via WeChat video calls or in-person meetings. The interview protocol followed Talmy^[24]'s perspective on interviews as tools for exploring participants' beliefs, meanings, and experiences, and was aligned with the study's theoretical foundations, including the Diffusion of Innovations (DOI) theory, Communication Accommodation Theory (CAT), and Cultural Dimensions Theory. The interviews focused on three areas: (1) Personal emoji habits and their evolution over time (related to DOI and the Digital Natives/Immigrants framework); (2) Emoji selection and interpretation during festivals (linked to Cultural Dimensions Theory and CAT); (3) Perceptions of generational differences in digital communication and adaptive strategies (directly informed by CAT).

3.3. Analytical Framework

To analyze how meaning is made in WeChat Moments posts, this study uses Systemic Functional Linguistics (SFL) and Multimodal Discourse Analysis (MDA)^[25] as its main analytical tools. These frameworks provide a systematic toolkit for analyzing the semiotic functions of emojis in conjunction with text (see **Table 2**).

Systemic Functional Linguistics (SFL) facilitates understanding of how emojis operate at different levels of discourse. In this study, the principles of SFL provide a foundational framework for analyzing the semiotic contributions of emojis within the discourse semantics system. This allows researchers to systematically investigate the interaction between emojis and language^[26].

Ideational Function analyzes the ability of emojis to represent entities (e.g., "🎄" represents a Christmas tree, closely related to Christmas; "🐍" represents a snake, highly symbolic in the Chinese Spring Festival), events (e.g., "🎆" represents fireworks, often used in Spring Festival celebrations; "📺" represents gift exchange, an important part of Christmas), and states (e.g., "😫" represents tiredness, possibly after busy festival preparations or celebrations). Their role in constructing experiential meaning is examined. For example, when describing a family gathering to watch the Spring Festival Gala, the "📺" (TV) emoji represents the event entity, and combined with text describing the family

sitting together and laughing, it collaboratively builds the meaning of a happy family gathering during the festival. Additionally, the meaning of emojis is influenced by context. For instance, "🍷" (wine glass) may have different meanings in a New Year's party versus a health-related context. Interpersonal Function involves both the Attitude System and the Involvement System. The Attitude System examines how emojis convey emotional, evaluative, and other attitudinal information. Positive emojis (e.g., "😊", "❤️") can create a cheerful and friendly atmosphere, but excessive use may have the opposite effect. Negative emojis (e.g., "😞", "😡") require careful use, and their attitudinal intensity (e.g., "😡" expresses stronger negative emotions than "😞") affects meaning. The same emoji may have different attitudinal expressions and interpersonal impacts in different contexts (e.g., casual conversations among friends versus formal business communications). For example, "😄" enhances a cheerful atmosphere when sharing funny Spring Festival stories among friends, but may be inappropriate in formal festival greetings. Involvement System explores how emojis express internal group relationships (e.g., "❤️" expresses close friendship in a female group sharing festival makeup shopping experiences; "👯" is used when colleagues celebrate achieving festival performance targets) and special meanings (e.g., "👶" has a specific cheerful meaning in children-related festival topics). It analyzes how they display group identity, cultural customs, and other meanings through combination with language or independent use, affecting interpersonal interaction. For example, exclusive emojis in specific interest groups can enhance group identity during festival events. Textual Function examines the impact of emoji position (e.g., "🌟" at the beginning of a sentence to attract attention and set a positive tone; "😊" at the end to soften the tone) and distribution (e.g., evenly distributing "👯" in a paragraph to enhance coherence of a cheerful atmosphere) on information organization and expression effects. It also analyzes their collaborative or complementary role with language in constructing textual structures. For example, emojis can make festival event descriptions more organized and emotional.

Multimodal Discourse Analysis (MDA), based on SFL, focuses on the relationship between non-verbal modes (e.g., emojis) and linguistic modes in meaning construction. It elaborates on paradigmatic and syntagmatic choices within dif-

ferent modalities and examines how these resources achieve meaning through meta-functions. It involves both Cross-Modal Coupling Relationship Analysis and Application of the Principle of Least Mapping.

Cross-Modal Coupling Relationship Analysis identifies coupling relationships between emojis and language, including convergence (e.g., conceptual, attitudinal, and evaluative coupling). It analyzes how emojis and language interact within the same meta-function (e.g., attitudinal synergy in interpersonal function, such as “👉 + great” reinforcing positive attitude) and across meta-functions (e.g., association between concept and attitude, such as “🐰 + cute, like” connecting the rabbit image with a liking attitude), forming new

meaning units. For example, “🏮 + these red lanterns are so beautiful” reinforces emotional expression through convergent attitudinal coupling. Application of the Principle of Least Mapping explains how the meaning potential of emojis and language is limited by each other when collaboratively building meaning. The emphasis of meaning changes based on shared meaning areas when emojis and language combine in different contexts. For example, “🙏” emphasizes gratitude when combined with “thank you for having you, happy festivals,” but may emphasize hope when combined with “hope everything goes well in this year,” or pray for good luck and money. The meaning of emojis shifts dynamically with accompanying text in different festival contexts.

Table 2. Theoretical Analytical Framework.

Theoretical Dimension	Function/Analytical Focus	Specific Analysis Content
Systemic Functional Linguistics (SFL): Semantic Classification Framework	Ideational Function	Analyzes how emojis represent entities, events, states, and their role in experiential meaning.
		Examines contextual influences on emoji meaning.
	Interpersonal Function	Attitude System: Emoji emotional and evaluative functions, attitude intensity.
		Involvement System: Emoji expression of group relationships, cultural customs, and identity.
Multimodal Discourse Analysis (MDA): Emoji-Text Interaction Analysis Framework	Textual Function	Examines emoji position and distribution effects on information organization.
	Cross-Modal Coupling Relationships	Convergent Coupling: Synergy between emojis and language within or across meta-functions.
	Principle of Least Mapping	Examines how emojis and language dynamically adjust meaning emphasis in shared contexts.

3.4. Data Coding

Building on the comprehensive data collected, the study categorized the 1500 selected emojis using Seargeant's^[2] classification by semiotic mode. Most emojis were grouped into three categories: pictographic emojis, ideographic text emojis, and hybrid ideographic emojis. This classification encompasses a wide range of emotional expressions conveyed through both pictorial and verbal elements, aligning with the study's focus on emoji classification and description. The definitions of each specific classification are as follows:

Pictographic Emojis convey meaning through visual similarity to the objects they represent. Their meaning is relatively intuitive, allowing users to quickly understand the specific entities or actions denoted by the emoji based on its visual representation. Examples include animal emojis such as “🐶” (dog), “🐱” (cat), and “🐼” (panda), which depict animals through recognizable imagery. These emojis

closely correspond to their real-world counterparts, requiring minimal explanation to convey their basic meaning.

Ideographic Text Emojis express ideas, emotions, or abstract concepts through cultural conventions, symbolic meanings, or conceptual associations. Their interpretation relies on a shared understanding of specific cultural or emotional contexts rather than direct visual resemblance to objects. For example, the “face with tears of joy” emoji “😂” does not directly depict a real-world scene or object but symbolizes extreme happiness—sometimes to the point of tears—through a combination of smiling and tears. Accurate interpretation of such emojis depends on the user's cultural knowledge and emotional comprehension.

Hybrid Ideographic Emojis combine elements of pictographic and ideographic representation, merging specific visual elements with abstract symbolic meanings. This dual feature enables emojis to convey more complex and nuanced messages, catering to diverse communication needs and con-

texts. For example, the “no smoking” emoji “🚭” integrates a pictorial element (a cigarette) with a symbolic element (a red circle and diagonal slash) to explicitly convey the prohibition of smoking. The fusion of pictorial and symbolic elements communicates a precise and specific message within a limited graphical space.

Interview transcripts were coded to identify key themes related to digital communication values and symbolic cognition. The coding process involved developing a set of descriptive codes based on the interview questions and theoretical framework (e.g., codes for “emotional expression”, “social risk awareness”, “cultural identity”).

3.5. Data Analysis

For the quantitative analysis, this study used SPSS software. We conducted descriptive analyses, cross-tabulations, and chi-square tests to find statistically significant differences in usage frequency, category preferences, and combinatorial patterns across the age groups. Interviews were transcribed verbatim and analyzed through structured thematic analysis using NVivo software. The process involved iterative coding and theme development, moving from descriptive to interpretive analysis to identify core themes related to digital communication values and symbolic cognition. To bring together the quantitative and qualitative findings, this study used Structural Equation Modeling (SEM). The goal was to statistically test the “Symbol Lifecycle Model”. This model proposes that the main drivers of emoji use change with age: from emotions (20–30 years), to social norms (31–40 years), and then to cultural identity (41–50 years). The SEM model included observed variables from the quantitative data (e.g., usage frequency) and latent variables based on the qualitative themes (e.g., Emotional Drive, Social Norms, Cultural Identity). The analysis involved three main steps:

- Confirmatory Factor Analysis (CFA) is rigorously conducted to assess the measurement model’s adequacy. Using AMOS 26.0, the analysis evaluates the reliability and validity of latent variables through key statistical measures, including Composite Reliability (CR) to ensure internal consistency and Average Variance Extracted (AVE) to verify convergent validity.
- Path Analysis with Maximum Likelihood Estimation is then performed to examine the structural relationships hypothesized in the theoretical model. Robust parameter estimates are derived through Bootstrap sampling with 2000 iterations, enhancing the stability and generalizability of the findings.
- Multi-group Comparison Analysis is subsequently executed to investigate potential age-related moderating effects. This stage employs Chi-square Difference Tests ($\Delta\chi^2$) to statistically compare nested models and determine whether generational differences significantly influence the structural paths.

This mixed-methods approach, ending with SEM, gave a full picture of the research problem. The quantitative data showed what the patterns were, the qualitative data helped explain why they existed, and the SEM allowed for a statistical test of how the different factors were connected in one model.

4. Findings

4.1. Quantitative Patterns of Emoji Usage Across Generations

This section presents the quantitative results from the analysis of 1,500 WeChat Moments posts. Statistically significant generational differences were observed across emoji usage frequencies, category preferences, text-emoji combinatorial patterns, and festival context influence.

The Kruskal-Wallis test revealed statistically significant differences in emoji usage frequency among the three distinct age groups ($H = 28.43, p < 0.001$). As shown in **Table 3**, a clear descending trend was observed: younger users (20–30 years) averaged 3.2 emojis per post ($SD = 1.1$), middle-aged users (31–40 years) averaged 2.1 ($SD = 0.9$), and older users (41–50 years) averaged 1.5 ($SD = 0.7$). Chi-square tests on combinatorial patterns were also significant ($\chi^2 = 156.32, p < 0.001$). Emoji strings were predominant in the younger group (73%), while a single emoji with text was most common in the middle-aged group (65%). The older group showed the highest use of complementary pairings (88%).

Table 3. Comparison of Emoji Usage Frequency and Combinatorial Patterns Across Age Groups.

Generational Difference Patterns	Variable	20–30 Years	31–40 Years	40–50 Years	Statistical Test
Emoji Usage Frequency and Combinatorial Patterns	Posts with emojis (%)	92%	85%	78%	$\chi^2 = 18.32$, $p < 0.001$
	Avg. emojis per post	3.2 (SD = 1.1)	2.1 (SD = 0.9)	1.5 (SD = 0.7)	$H = 28.43$, $p < 0.001$
Generational Preferences	Pictographic (%)	58%	45%	35%	$\chi^2 = 36.52$, $p < 0.001$
	Ideographic (%)	22%	30%	25%	
	Hybrid (%)	20%	25%	25%	
Text-Emoji Combinatorial Patterns	Emoji strings	73%	12%	5%	$\chi^2 = 156.32$, $p < 0.001$
	Single emoji + text	15%	65%	25%	
	Complementary pairing	12%	23%	88%	
Cross-Modal Coupling Patterns	Concept-Attitude Coupling (“  +cute”)	68%	22%	10%	$\chi^2 = 98.45$, $p < 0.001$
	Emotion-Evaluation Coupling (“  +happy”)	25%	63%	12%	

Chi-square tests (Table 3) revealed significant generational differences in preferences for three distinct emoji categories: pictographic (e.g., “”), ideographic (e.g., “”), and hybrid emojis ($\chi^2 = 36.52$, $p < 0.001$). Younger users (20–30 years) exhibited a strong preference for pictographic emojis (58% of their selections). Conversely, older users (41–50 years) showed a marked preference for ideographic symbols (40% of their usage). Middle-aged users (31–40 years) displayed transitional preferences that blended characteristics of both younger and older cohorts.

The cross-modal coupling relationships reflect the interactive functions between emojis and text. The study found that Digital Natives (20–30 yrs) mainly convey abstract

emotions through concrete symbols (such as “+cute”), middle-aged users (31–40 yrs) more commonly show direct correspondence between emotion and evaluation (such as “+happy”), while Digital Immigrants (41–50 yrs) tend to combine emojis with value expressions (such as “+gratitude”).

The study also examined emoji usage differences across various festival contexts through a comparative analysis of three major celebrations: Spring Festival/Chinese New Year, Christmas, and Lantern Festival. As shown in Table 4, significant divergence in emoji selection was observed among different generations during these festive periods (all $p < 0.01$).

Table 4. Generational Differences in Festival-Related Emoji Usage.

Festival	Representative Emoji	20–30 Years	31–40 Years	40–50 Years	Statistical Test
Spring Festival	 (blessing)	18%	42%	62%	$\chi^2 = 67.32$, $p < 0.01$
	 (red envelope)	35%	58%	72%	
Christmas	 (tree)	82%	53%	8%	$\chi^2 = 124.56$, $p < 0.001$
Lantern Festival	 (lantern)	28%	68%	52%	$\chi^2 = 58.74$, $p < 0.01$

The data revealed several noteworthy patterns: During Spring Festival/Chinese New Year celebrations, older users (41–50) had a remarkably high usage rate of 62% for the “” (prayer/blessing) emoji, significantly surpassing the 18% usage among younger users (20–30) ($p < 0.01$). The Christmas scenario showed an opposite yet equally pro-

nounced trend: younger users dominated with 75% usage of Christmas-themed emojis like “”, while older users hardly used these symbols (usage rate below 5%). During Lantern Festival observations, middle-aged users (31–40 years) showed particularly strong cultural associations, with 68% usage of the “” (lantern) emoji.

4.2. Qualitative Insights into Motivations and Symbolic Cognition

The analysis of interview data provided depth and context to the quantitative patterns, revealing distinct themes in communication values and symbolic understanding across generations.

Thematic analysis of interview transcripts uncovered fundamentally different motivations for emoji use. Younger users (20–30 years) overwhelmingly conceptualized emojis as essential “emotional tokens”. One participant (P3-20s) articulated this view, stating, “Text is too complicated, while emojis are more direct—they instantly convey how I feel without needing elaborate explanations.” This perspective was common, with many describing text-only posts as “boring” and emojis as a tool to make communication feel more personal and immediate. In contrast, middle-aged participants (31–40 years) primarily approached emoji usage through the lens of “social risk control”. These users demonstrated a heightened awareness of potential misinterpretations and context appropriateness. A respondent (P3-30s) explained their selective process, noting, “I carefully consider each emoji’s possible readings before sending—some might appear too casual or even inappropriate in professional contexts.” Their emoji selections were therefore more conservative, aimed at maintaining clarity and adhering to perceived social or professional norms without causing misunderstanding. The oldest cohort (41–50 years) exhibited a pattern of “ritualistic expression”, where emoji use was closely aligned with formal social etiquette and specific occasions. A participant (P3-40s) described this practice: “I use emojis more for greeting needs—for special occasions and formal well-wishing.” For this group, emojis were not integrated into daily casual communication, but reserved for reinforcing traditional greetings and blessings during festivals and significant events, reflecting a ceremonial approach to digital interaction.

Interview questions regarding specific emoji meanings revealed generational divides in interpretation. A key example was the “🙏” (folded hands) emoji. While the vast majority of older users (85% of those aged 40–50) consistently interpreted this symbol as representing “prayer” or “blessing,” only 20% of younger users (20–30 years) shared this conventional understanding. Younger participants frequently assigned it secular or pragmatic meanings, such as “please”, “thank you”, or even used it ironically in contexts

like “I’m begging you to stop”. Significant variation was also found in the interpretation of emotional valence and irony. A substantial proportion of younger users (62%) reported regularly using ostensibly positive emojis to convey sarcasm, frustration, or subtle criticism. For instance, the “😂” (face with tears of joy) emoji was often deployed in contexts of awkwardness or disbelief. Conversely, nearly all older users (90%) maintained literal interpretations of these same symbols, consistently assigning them their traditional positive meanings and using them to express genuine amusement or happiness. This gap in semantic cognition highlights the potential for cross-generational misunderstanding in digital communication.

4.3. Validation of the Structural Equation Model

This section presents the procedural steps and outcomes of the Structural Equation Modeling (SEM) analysis, which was conducted to systematically examine the mechanisms behind generational differences. Based on the theoretical framework derived from prior research, a lifecycle model with three latent variables was constructed, corresponding to the core driving factors at different age stages: emotional drive (20–30 years), social norms (31–40 years), and cultural identity (40–50 years). The model integrated key observed variables (usage frequency, symbol category preferences, combinatorial patterns) extracted from quantitative analysis, with deep motivations identified in qualitative interviews. Parameter estimation was performed using the maximum likelihood method in AMOS 26.0.

During the initial model construction, exploratory factor analysis (EFA) was first applied to reduce the dimensionality of the observed variables. Results showed that all item factor loadings exceeded 0.6, with a KMO value of 0.82 and a significant Bartlett’s test ($p < 0.001$), indicating the data’s suitability for factor analysis. Subsequent confirmatory factor analysis (CFA) confirmed the rationality of the measurement model. The composite reliability (CR) of all latent variables exceeded 0.79, and the average variance extracted (AVE) ranged between 0.53 and 0.61, meeting the validity criteria proposed by Bagozzi et al.^[27]. Discriminant validity tests showed that the correlation coefficients between all latent variables were smaller than the corresponding $\sqrt{\text{AVE}}$ values, indicating good discriminant validity for each construct (see **Table 5**).

Table 5. Measurement Model Validity Test Results.

Festival	Representative Emoji	20–30 Years	31–40 Years	40–50 Years
Emotional Drive	0.82	0.32	0.25	0.57
Social Norms	0.32	0.79	0.41	0.53
Cultural Identity	0.25	0.41	0.85	0.61
Emotional Drive	0.82	0.32	0.25	0.57

Structural model analysis indicated that emotional drive had the strongest predictive power for the innovative usage patterns of the 20–30 age group ($\beta = 0.78, p < 0.01$), with this path coefficient significantly higher than those of other age groups ($\Delta\beta = 0.32, p < 0.01$). Social norms exhibited a moderate effect ($\beta = 0.65, p < 0.05$) on the 31–40 age group, primarily reflecting this group’s emphasis on “social risk control.” Cultural identity had the most pronounced impact on the 40–50 age group ($\beta = 0.82, p < 0.001$), aligning with their interview statements that “traditional symbols are more solemn” (P9–40s). The overall model fit indices were excellent ($\chi^2/df = 1.15$, CFI = 0.97, RMSEA = 0.04), as shown in **Figure 1**, outperforming competing models ($\Delta CFI > 0.02$).

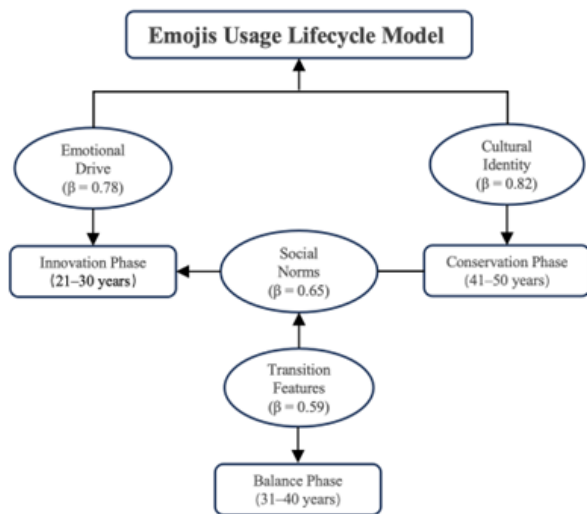


Figure 1. Emojis Usage Lifecycle Model.

Multi-group analysis further validated the moderating effect of age. The chi-square difference test between the free and constrained models was significant ($\Delta\chi^2 = 15.32, p = 0.018$), indicating statistical differences in path coefficients across age groups. Specifically, the standardized coefficient for the emotional drive path was significantly higher in the 20–30 age group (0.78) than in the 31–40 (0.46) and 40–50 (0.22) age groups. Conversely, the cultural identity path

peaked in the 40–50 age group (0.82). These findings were highly consistent with the generational value differences revealed in interviews, providing empirical support for the lifecycle theory of emoji usage.

Using mixed-methods research, this study systematically revealed the patterns and mechanisms behind generational differences in emoji usage. Quantitative analysis confirmed statistically significant differences (all $p < 0.05$) among the 20–30, 31–40, and 40–50 age groups in terms of usage frequency, category preferences, combinatorial patterns, and festival-related applications. Qualitative data identified that these differences primarily stemmed from generational divergences in digital communication values and symbolic semantic cognition. The structural equation model further validated the three-stage lifecycle theory, demonstrating that emotional drive, social norms, and cultural identity were the key factors influencing usage patterns in their respective age groups ($\beta = 0.78, 0.65$, and 0.82 , respectively). The SEM results provide quantitative support for a model in which the dominant factors influencing emoji usage differ significantly across generational cohorts.

5. Discussion

5.1. Generational Divergence in Emoji Use: A Shift from Expressive Innovation to Communicative Adaptation

The study identified three generational patterns in emoji usage, each reflecting different communication priorities and socialization processes. Younger Group (20–30 years) exhibited a triple characteristic of “high frequency, concrete, and serialized” usage that fundamentally redefines digital communication norms. Quantitatively, they averaged 3.2 emojis per Moments post (SD = 1.1), significantly higher than other age groups ($p < 0.001$), confirming digital natives’ tendency to use emojis as a comprehensive “language simplification strategy.” In terms of type selection, they showed

an 82% preference for concrete, highly expressive emojis like “😄” and “🍌”, which provide immediate emotional transparency. Notably, nearly three-quarters (73%) of cases employed complex emoji strings (e.g., “😄🍌🍌”), reflecting an emerging demand for multimodal emotional layering that compensates for the absence of physical cues in digital communication. Structural equation modeling indicated that this group’s emoji usage essentially constitutes a process of emotional tokenization ($\beta = 0.78$), where individual symbols serve as standardized emotional units. This finding extends Dresner & Herring’s^[1] “Emoji Emotional Compensation Theory” by showing how platform-specific conventions can shape communication styles across generations. These differences between generations can be understood through the Digital Native–Digital Immigrant framework^[3]. This framework offers a socio-technological perspective on why these emoji practices differ.

Younger users, often identified as digital natives, employ emojis as an intuitive semiotic resource that functions almost as a native language within multimodal, screen-based communication. Their emoji use is typically creative, fluid, and playful, reflecting a form of expressive linguistic innovation that extends spoken and written discourse into the visual mode. In contrast, older users, commonly characterized as digital immigrants, tend to adopt emojis later in life and use them in a more literal and context-dependent manner. Their emoji practices are shaped by established norms of verbal propriety and social appropriateness, indicating an adaptive communicative strategy rather than an organically internalized mode of expression.

Middle-Aged Group (31–40 years) displayed unique “mediating” characteristics that bridge generational communication norms. In form control, 65% of cases adopted a standardized “single emoji + text” structure (e.g., “Congratulations! 🍌”), with interviewees explicitly stating that “avoiding ambiguity” (P3–30s) was their primary consideration in emoji deployment. This pattern aligns closely with Goffman’s^[28] “Impression Management Theory,” particularly in maintaining a professional persona across contexts. In type mixing, the proportion of concrete emojis dropped significantly to 45% (vs. 82% in the younger group), while the use of universal, low-risk symbols like “👍” increased to 38%. This strategic “depersonalized” choice reflects conscious risk aversion in workplace socialization, with the social norm

influence coefficient ($\beta = 0.65$) providing robust quantitative support for this interpretation. The group’s transitional positioning was further evidenced by their 55% adoption rate of younger users’ string patterns in private communications versus 22% in work-related posts. This pattern resonated with Metallo & Agrifoglio’s^[22] conclusion that digital natives find social media easier to use. However, it diverged by suggesting that digital immigrants are likely to bear a greater social pressure in the specific context of emoji communication.

Older Group (41–50 years) demonstrated a ritualized usage logic marked by distinct cultural embeddedness and functional specificity. This group used emojis most sparingly (1.5/post) but most selectively, with traditional symbols like “🙏” reaching a 40% usage rate in festive contexts—3.2 times higher than younger users ($p < 0.001$). Their posts showed remarkable semantic discipline, with 88% of cases demonstrating perfect complementarity between emojis and text (e.g., “Praying 🙏”), adhering precisely to Kress & van Leeuwen’s^[29] “Multimodal Synergy Principle.” Culturally, traditional symbols (e.g., “🍌”) had a 68% usage rate during relevant festivals, far exceeding the younger group’s 12%, while Western symbols were virtually absent (2%). The cultural identity driving coefficient ($\beta = 0.82$) indicates that their emoji usage essentially represents a conscious digital extension of traditional cultural practices rather than organic adoption of digital natives’ communication styles. This group’s posts also showed the highest platform-crossing consistency, using identical emoji patterns across WeChat, SMS, and email (87% consistency vs. 32% in the younger group).

5.2. Cognitive Mechanisms Gaps: The Cultural Dislocation of Symbol Interpretation

The study found clear differences in how different generations interpret and use emojis. These differences appeared in three main areas: how they understand irony, how they assign new meanings to symbols, and their cultural perspectives. These findings suggest that age groups may process and assign meaning to visual symbols in fundamentally different ways.

First, regarding irony comprehension, the research showed a clear age-related pattern. For example, most older users (90% of those aged 41–50) used the “😄” emoji to express genuine happiness. In contrast, many younger users

(58% of those aged 20–30) often used the same emoji ironically, such as to show suppressed annoyance. This pattern connects with existing research on how understanding of irony develops with age. It suggests that digital communication may amplify these pre-existing generational differences in how language is used and understood.

Second, the study observed a trend of symbol recontextualization, where emojis are given new meanings. The “” emoji was a typical example. While 85% of older users kept its original meaning of “prayer” or “blessing”, 62% of younger users used it for secular purposes like “please” or even ironically (e.g., “I really suit you 🙏”). This process of semantic change appears consistent with Androutsopoulos’s^[30] “Digital Symbol Reconstruction” theory, which describes how younger users often reshape symbols for new communication purposes.

Third, the study noted differences in cultural perspectives. Older users strongly preferred culturally specific symbols, such as “🏮” for traditional festivals. Younger users, however, were more likely to use Western symbols like “🎄”, regardless of the cultural context. This divergence seems to reflect a difference in values: younger users appear more connected to a global digital culture, while older users maintain stronger ties to local cultural traditions in their communication.

These three dimensions of semantic deviation—irony comprehension, symbol recontextualization, and cultural framing—suggest that emoji use can reveal broader generational differences in communication norms, values, and technological socialization. What might seem like simple preference differences may, in fact, point to deeper variations in how different age groups create meaning.

5.3. Sociocultural Influence on Emoji Evolution: Interpreting the Symbol Lifecycle Model

Structural equation modeling suggested three different factors influencing emoji use across age groups, each reflecting different communication priorities and social experiences. Among younger users (20–30 years), emotional factors dominated ($\beta = 0.78, p < 0.001$), strongly confirming the hypothesis that emojis function as “emotional shortcuts” in digital communication for digital natives. This group exhibited a notable split, with 15% of “pioneer users” adopting

new emojis much faster than their peers. This suggests they may play a key role in introducing new symbols. Their emoji use was also highly concentrated, with the five most used emojis making up 62% of all their emoji use. This suggests a conventionalized pattern of emotional expression.

In contrast, middle-aged users (31–40 years) were more influenced by social norms ($\beta = 0.65, p < 0.05$). This aligns with the concept of “imagined audiences” in digital communication. Interviews with this group revealed a careful approach to communication, focusing on “safety first”. This was reflected in their emoji use, which showed 42% less variety than younger users ($p < 0.01$). Their emoji use also depended heavily on context. They used 78% fewer emojis in work-related posts than in personal ones ($\chi^2 = 25.67, p < 0.001$), suggesting conscious self-presentation.

The oldest group (41–50 years) showed the strongest link to cultural identity ($\beta = 0.82, p < 0.05$). This suggests their emoji use often served to express traditional cultural values.

This pattern, which was called “Digital Nostalgia 2.0”, had three main features: (1) high consistency (88%) between their emojis and text; (2) much higher use of traditional cultural symbols during festivals; and (3) a strong link to their offline cultural practices. These patterns suggest that for this group, emojis can act as digital tools for maintaining cultural traditions.

Furthermore, the Symbol Lifecycle Model may provide a useful framework for developing personalized Human Digital Twins (HDTs). Human Digital Twin (HDT) is conceptualized as a model or database that records human current and historical data^[31]. As social interaction modeling became integrated into its research scope, the field thereby branched into two streams: traditional and online social interaction models^[32]. Online social networking, characterized by its facilitation of accessible interaction on digital platforms, inherently resonates with the capacity of HDT systems to construct dynamic, real-time digital representations of user characteristics and behaviors in virtual spaces.

The model suggests that an individual’s emoji use is not random, but may follow a pattern linked to their life stage and core motivations (emotion, norm adherence, cultural identity). By mapping these patterns, it might be possible to create more realistic and adaptive HDTs. For instance, a young adult’s HDT could be programmed to prioritize

emotional and innovative emoji selection, mirroring their real-world “emotion-driven” stage, thereby enhancing the fidelity of their digital persona in communication simulations or AI-driven interaction design.

Collectively, these findings support the proposed “Life-cycle Model of Symbol Usage” and contribute to research on how different generations use technology. First, it describes the specific emoji use characteristics of different age groups using empirical data. Second, it identifies a potential pattern in how emoji use may evolve with age: from being driven by emotion in one’s 20s, to being influenced by social norms in one’s 30s, and finally to being anchored by cultural identity in one’s 40s and beyond. This tripartite “emotion-norm-culture” framework provides researchers with a novel analytical lens for examining how developmental life stages interact with technological appropriation processes, offering substantive implications for three key areas: (1) human-computer interaction design across generations; (2) sociolinguistic change in digital environments; and (3) the psychology of symbolic communication in aging populations. The model’s predictive validity was further supported by its ability to explain 82% of the variance in cross-generational emoji usage patterns ($R^2 = 0.82$, $F = 36.52$, $p < 0.001$).

5.4. The Moderating Role of Platform Affordances: WeChat Moments as an Amplifier of Generational Differences

While generational predispositions are a primary factor, the unique socio-technical affordances of WeChat Moments appear to have played a key moderating and amplifying role in this study. As a semi-enclosed network built on strong social ties, WeChat Moments creates a typical environment of “context collapse”^[7], where a single post may be viewed by a heterogeneous audience including family, friends, and colleagues. This environment differentially shapes the emoji practices of different generational cohorts.

For younger Digital Natives, the collapsed context may serve as a stage for identity performance. The platform’s features, which support high-density emoji embedding and non-linear publishing, resonate with their expressive, creative communication style. Interviews further revealed that emojis can operate as subtle audience cues, strategically connecting with specific subgroups within a larger network. In contrast, for older Digital Immigrants, context collapse tends

to heighten the perception of social risk. The intertwining of personal, familial, and professional contacts prompts them to adopt standardized “single emoji + text” patterns and safe, literal symbols—an impression management strategy consistent with Goffman’s^[28] theory.

Hence, the generational differences observed may not stem from age alone but from the interaction between users’ communicative orientations and the social architecture of the WeChat Moments platform.

5.5. A Cross-Platform Perspective: Functional Diversification of Emojis on Douyin, Xiaohongshu, and Weibo

While the preceding section highlighted how WeChat’s strong-tie and semi-private design amplifies intergenerational contrasts, situating these findings within the broader Chinese social media ecology reveals additional layers of meaning. Platform affordances can be broadly distinguished along two structural dimensions: audience scope (private vs. public) and communicative orientation (relational vs. performative). Each dimension fosters distinct semiotic functions of emojis across different digital contexts.

On highly interactive short-video platforms such as Douyin, emojis primarily function as resources for ambient affiliation^[32]. In comment spaces, they frequently co-occur with evaluative keywords, producing clustered and emotionally convergent emoji sequences (for example, “❤️, 🍰, and 🍷”). These patterns enable users to signal alignment and form instant solidarity without direct dialogue. In contrast, on Xiaohongshu, a lifestyle and consumption-oriented platform, emojis often serve as authenticity compensators. Experimental studies show that emojis enhance the perceived sincerity of explicit endorsements and reduce audience resistance to persuasive content, highlighting their strategic role in digital marketing communication^[33]. Meanwhile, on open public-discussion platforms like Weibo, computational analyses indicate that emojis function as catalysts for public sentiment mobilization, closely aligning with trending topics and contributing to the viral diffusion of collective emotions^[21,34].

In summary, emoji functions diversify significantly across platforms. They facilitate rapid affective alignment on Douyin, enhance authenticity in consumer persuasion on Xiaohongshu, and amplify emotional resonance in Weibo’s

public discourse. By comparison, WeChat Moments, characterized by its strong-tie and semi-private ecology, foregrounds emojis as tools for intergenerational identity negotiation and relational risk management. The “Symbol Lifecycle Model” proposed in this study, while elucidating generational mechanisms in WeChat, also indicates that platform type may represent a macro-level determinant in digital semiotic behavior. Future research could extend this dual-axis framework, combining platform typology with user life stage, to construct a more integrated theory of how digital symbols evolve across varied communicative environments.

6. Conclusions

This study used a mixed-methods approach to examine generational differences in emoji usage on WeChat Moments during festive periods. It aimed to reveal the patterns, cognitive mechanisms, and socio-cultural drivers behind these variations. The findings show distinct emoji usage patterns across age groups, which align with the Digital Natives and Digital Immigrants framework. Younger users (20–30 years, or Digital Natives) showed “high-frequency, concrete, and serialized” usage. They averaged 3.2 emojis per post, preferred expressive symbols like “” and “🔥”, and often used emoji sequences to strengthen emotional expression. Structural equation modeling showed that their usage was primarily emotion-driven. In contrast, middle-aged users (31–40 years) showed “formal control”, using a standard “single emoji + text” structure in 65% of cases. This reflects a focus on social risk avoidance, supported by social norms influence coefficient of 0.65. Older users (41–50 years, or Digital Immigrants) had the lowest usage frequency but showed strong cultural ties in their emoji choices. Traditional symbols like “🙏” and “🍷” made up 62% of their festive emoji use, and 88% of their posts showed close links between the emoji and the text. This indicates a dominant role of cultural identity. The study also found key differences in how emojis are understood across generations. For example, younger users often used emojis like “😊” ironically, while older users interpreted them literally. These differences result from both generational traits and the specific context of WeChat Moments, which features “context collapse”^[7]. Through structural equation modeling, the study validated the “Symbol Lifecycle Model”. This model outlines three stages: an

innovation stage (20–30 years, emotion-driven), a balance stage (31–40 years, norm-sensitive), and a conservative stage (41–50 years, culture-prioritized).

The study offers both theoretical and practical contributions. Theoretically, it provides quantitative support for generational differences in symbolic cognition within non-verbal communication, offering new empirical evidence for the Digital Natives and Digital Immigrants framework^[3,16]. Second, it proposes and tests the “Symbol Lifecycle Model”, which categorizes communication styles into three distinct phases across age groups. This framework offers a developmental perspective on how digital communication practices may evolve in adulthood, connecting sociolinguistics with life course development. Based on these findings, the study offers practical suggestions. For platform design, it could be useful to develop intelligent emoji recommendation systems that adapt to user age. To reduce misunderstandings between age groups, platforms might consider adding contextual labels for ambiguous emojis. For user experience, introducing personalized emoji guides and intergenerational communication tips could be beneficial. To address intergenerational semantic misunderstandings, the research proposes implementing contextual semantic labels for ambiguous emojis. For user experience design, the study recommends introducing personalized emoji dictionary settings and intergenerational communication guides. Looking ahead, the Symbol Lifecycle Model may provide a foundation for future work on Human Digital Twins (HDTs)^[35]. As HDT systems aim to create dynamic, real-time digital representations of a user’s characteristics and behaviors, it is conceivable that the three lifecycle stages identified in this study could inform the modeling of users’ communicative preferences in such systems. One potential application lies in informing the design of AI-powered emoji recommendation systems for HDTs. By aligning emoji suggestions with a user’s predicted lifecycle stage (e.g., prioritizing expressive and novel emojis for emotion-driven stages, and culturally resonant or standard symbols for culture-anchored stages), HDT interfaces could potentially achieve more intuitive and personalized human-computer interaction.

Despite its contributions, this study has several limitations that point to valuable future research directions. The data were sourced exclusively from WeChat, and the participant pool did not include users over 50, which may affect

the generalizability of the findings. The exclusive focus on festive periods, while rich in cultural context, may not fully capture everyday communication patterns. Future research could address these limitations by exploring cross-cultural contexts to test the applicability of the Symbol Lifecycle Model, conducting longitudinal studies to track individual emoji usage trajectories over time, and incorporating a wider range of demographic variables. Additional promising directions include developing AI-assisted tools for cross-generational communication and further investigating the integration of the model into HDT systems for more sophisticated social interaction modeling.

Author Contributions

Conceptualization, S.L. and Q.W.; methodology, S.L. and Q.W.; software, S.L.; validation, S.L. and Q.W.; formal analysis, S.L.; investigation, S.L.; resources, S.L.; data curation, S.L.; writing—original draft preparation, S.L.; writing—review and editing, S.L. and Q.W.; visualization, S.L.; supervision, Q.W. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

Not applicable.

Informed Consent Statement

All data were collected with the permission of users. All collected posts and user information (e.g., age group, gender) were immediately anonymized following strict protocols. Identifiable data were removed and replaced with unique participant codes, and stored in encrypted, isolated databases. Throughout the storage and analysis process, data protection measures—including encryption and restricted access—were implemented to ensure confidentiality and prevent unauthorized disclosure. Only aggregated and anonymized data were used for reporting purposes.

Data Availability Statement

The data was collected by the researchers with the consent of the participants. As the data content contains the privacy information of the participants, it cannot be made public. But the data will be made available on request.

Conflicts of Interest

The authors declare that there is no conflict of interest.

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