Age Differences in the Online Integration of Sticker-Based Emotional Context in Digital Communication

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Background: Understanding language in digital social contexts increasingly requires integrating verbal content with nonverbal visual cues such as stickers, commonly called KakaoTalk "emoticons" in Korea. According to Socioemotional Selectivity Theory (SST), older adults prioritize emotionally meaningful information and show a positivity bias in attention [1, 2]. The present study therefore examined whether sticker valence and arousal evaluations differ between adults in their 20s and 50+, and whether these evaluations are reflected in real-time eye movements during intergenerational chat.

Material and Procedure: In Experiment 1, 88 participants (45 in their 20s and 43 aged 50+) rated the valence and arousal of 60 positive and negative stickers on 9-point scales. Stickers were categorized as KakaoTalk defaults (“basic”) or as 20s- or 50+-preferred based on age-group purchase data. In Experiment 2, a subset of 44 Experiment 1 participants formed 22 intergenerational pairs and completed a role-play chat task across family and workplace scenarios. In each turn, the partner's message and sticker appeared in spatially separate regions of the chat interface. Turn-level fixation measures were extracted for the partner’s message, sticker regions, and combined regions, along with latency to first entry into the sticker region. Linear mixed-effects models (LMMs) examined whether individual ratings from Experiment 1 predicted these eye-movement measures in Experiment 2.

Results: In Experiment 1, valence ratings showed a significant age group × sticker category × polarity interaction ($F(2, 5130.4)=10.40$, $p<.001$): the 50+ group rated basic and 20s-preferred negative stickers more negatively, but rated 50+-preferred positive stickers more positively than the 20s group ($\beta=-0.939$, $p<.001$; Figure 2). For arousal, only 50+-preferred stickers elicited higher arousal in the 50+ group ($F(2, 5131.5)=8.93$, $p<.001$). In Experiment 2 (Table 1), higher valence for positive stickers predicted reduced fixation on the partner's message and sticker regions in the 50+ group — most robustly for basic stickers — whereas arousal effects were specific to 50+-preferred negative stickers. In the 20s group, higher valence for 50+-preferred negative stickers predicted faster entry into the sticker region.

Conclusion: Subjective sticker evaluations shaped real-time processing differently by age. In the 50+ group, higher valence facilitated processing of partner messages and stickers, consistent with SST's positivity effect. Arousal effects, in turn, were specific to stickers preferred by their own generation. In contrast, the 20s group showed earlier valence-driven attention to sticker regions. These findings show that age, sticker category, and affective evaluation are associated with differences in multimodal digital communication.

References

[1] Laura L. Carstensen, Derek M. Isaacowitz, and Susan T. Charles. Taking time seriously: A theory of socioemotional selectivity, *American Psychologist*, *54*(3), 165–181, 1999.

[2] Mara Mather and Laura L. Carstensen. Aging and motivated cognition: The positivity effect in attention and memory, *Trends in Cognitive Sciences*, *9*(10), 496–502, 2005.

Figures and Tables

Figure 1. Example sticker stimuli by category and polarity

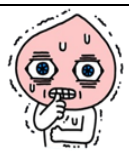
Sticker category	Basic		20s-pref		50+-pref	
Polarity	Positive	Negative	Positive	Negative	Positive	Negative
Example						

Figure 2. Mean valence (left) and arousal (right) ratings by sticker category and age group.

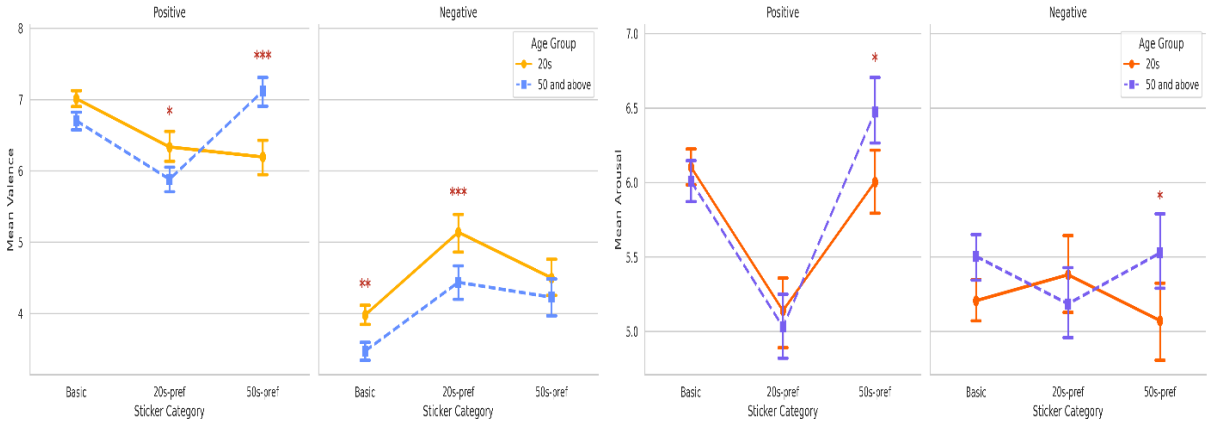


Table 1. Summary of significant eye-tracking effects predicted by individual sticker evaluations

Age	Affective Measure	Sticker Category	Polarity	Utter FT	Emo FT	UttEmo FT	Entry Time
50+	Valence	basic	Positive	-611.0 (.014*)	-313.0 (.018*)	-726.0 (.028*)	—
		20s-pref	Positive	−591.0 (.045*)	—	—	—
		50+-pref	Positive	−512.0 (.034*)	—	—	—
	Arousal	50+-pref	Negative	-534.0 (.041*)	—	—	—
20s	Valence	50+-pref	Negative	—	—	—	-898.0 (.013*)

Note. Utter FT = total fixation time within the partner utterance AOI; Emo FT = total fixation time within the sticker AOI; UttEmo FT = combined fixation time across utterance and sticker AOIs; Entry Time = latency to first fixation entry into the sticker region during sticker selection.

Optional Supplemental Information

Figure S1. Chat interface and AOI definitions in Experiment 2

Table S1. Example role-play scenario used in the real-time chat task

- Family Situation

	Parent role	Third-child role
Scenario context	You live with your spouse and three children. Your third child is a 22-year-old advertising and public relations major who is less tidy than your eldest child. Recently, your third child has been busy preparing for several competitions, won second place, and has not had dinner with the family for some time.	You are a 22-year-old student living with your parents and two older siblings. You are majoring in advertising and public relations while preparing for employment. Recently, you won the silver prize in an advertising competition after many late nights, left your room messy, and now have dinner plans with friends.
Neutral tasks	Ask about your child's day, return time, and dinner plans for tonight.	Ask about the parent's workday, mention your dinner plans, and suggest a weekend family meal.
Positive task	Congratulate the child on winning second place in the competition.	Thank the parent for understanding your late returns during the competition period.
Negative task	Complain about the child's messy room and ask them to clean it.	Apologize for making the room messy while preparing for the competition.

- Workplace Situation

	Team leader role	Staff member role
Scenario context	You are Team Leader Choi in a five-member marketing team at a company. With Assistant Manager Kim on parental leave, you assigned Lee tasks for next week's client meeting before your business trip. Lee will attend next week's client meeting with you and travel there by taxi, after coordinating the meeting and preparing the presentation materials for your review.	You are Lee, a junior employee in a five-member marketing team. With Assistant Manager Kim on parental leave, Team Leader Choi assigned you tasks for next week's client meeting before leaving for a business trip. You scheduled the meeting for next Wednesday at 3 p.m. in the client's meeting room and prepared the presentation materials using Choi's reference materials.
Neutral tasks	Ask about the meeting time and venue and ask to review the presentation materials.	Ask about the team leader's business trip and confirm who will attend the meeting and how to get there.
Positive task	Compliment the organization and visual quality of the presentation materials.	Thank the team leader for the helpful reference materials.
Negative task	Mention the typos in the presentation materials and ask Lee to revise them carefully.	Explain that extra work during Kim's parental leave left you with less time to prepare.