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“Which hairstyles are linked to the perception of “Kawaii”?

The relationship between hair and interpersonal impressions based on eye-tracking analysis”

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1. Introduction

In recent years, Japan's kawaii culture — widely promoted through manga and anime — has attracted broad international attention. Although kawaii is often translated as cute, the word also conveys warmth and approachability and is grounded in positive emotion [1]. Because of these connotations, kawaii can not only enhance visual appeal but also engender favorable reactions from others and smoother communication. Researchers have also begun to study other interpersonal impressions, such as “cool” or “kind-looking,” in the wider field of human-attractiveness research. For example, earlier work shows that facial radiance increases positive impressions such as happiness and attractiveness [2], whereas light make-up can reduce the perceived intensity of negative emotions like anger and sadness [3].

Since most studies on interpersonal impressions have focused on facial shape and make-up, the influence of hairstyle remains underexplored. Our previous work found that styled hair can create impressions such as cleanliness and attractiveness as effectively as make-up [4], indicating that hair is an important factor in the perception of an individual.

To examine this issue, we conducted two experiments. Experiment 1 used eye-tracking and statistical analysis to determine which parts of the hair people frequently fixate on when forming impressions. Experiment 2 systematically varied the overall hairstyle shape and asked participants to rate several impression words—including kawaii—to clarify how different hair designs affect interpersonal impressions.

2. Materials and Methods

Experiment 1 – Eye-tracking study

2-1. Preparation of stimulus images

Sixteen female volunteers aged 30–49 years, all reporting a high interest in hair care and make-up, served as models. Each model used the front-facing camera of her own smartphone to take photographs under standardized clothing, background, and lighting conditions (Fig. 1a). Two images were obtained per person:

- Styled – hair arranged as for an elegant dinner date at an upscale restaurant;
- Unstyled – appearance shortly after waking up.

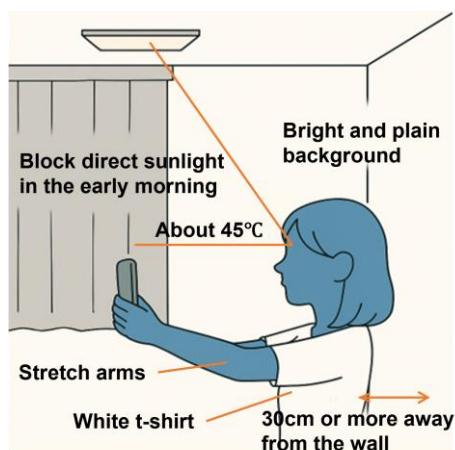
Before the photo session, we explained the study purpose and data-handling procedures, and every model provided written informed consent.

2-2. Selection of impression words (rating adjectives)

Each image was rated on four impression words: clean, attractive, well-groomed hair, and hair aging. The first two words were selected from our previous work [4], and the latter two words were selected as words that evaluate the hair.

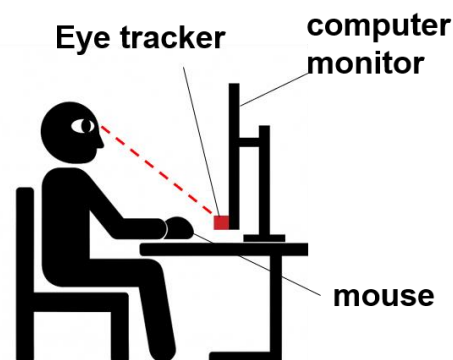
2-3. Participants and procedure

A screening survey of 267 Japanese women aged 30–49 yielded 52 volunteers who met the inclusion criteria: normal vision and a self-reported strong interest in personal grooming. After receiving a full explanation of the study, all volunteers provided written informed consent. Eye movements were recorded with a Tobii X-120 eye tracker (120 Hz) mounted below the monitor (Fig. 1b). Following calibration and task instructions, each participant viewed 32 stimulus images in random order. For every image, she rated the four impression words on an 11-point scale (0 = “does not apply at all”, 10 = “applies completely”). Eye-tracking data were collected concurrently (Fig. 1c).



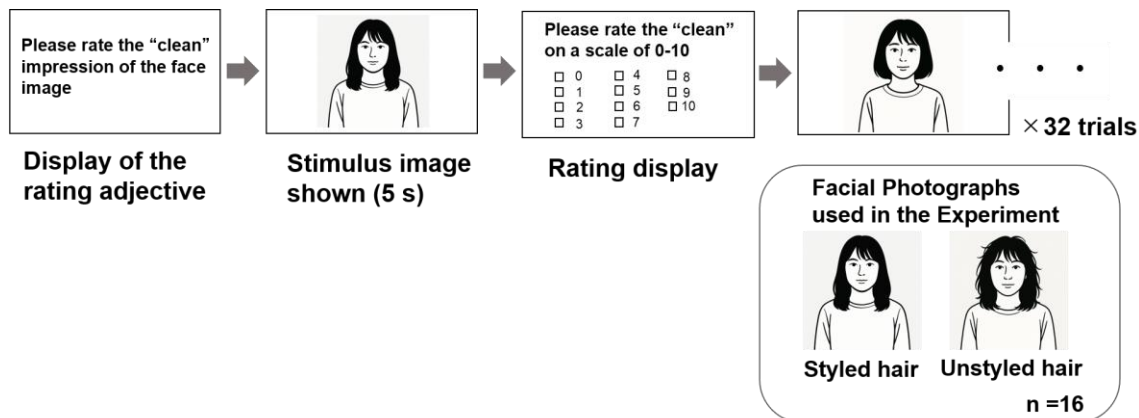
(a) Model photography procedure

Each model took her own photographs in line with the protocol described above.



(b) Eye-tracker set-up

A Tobii eye-tracker was fixed to the lower bezel of the monitor (see illustration). Participants selected their ratings with a mouse.



(c) Sequence of the monitor displays

First, an explanation of the experiment and the rating words to be evaluated were displayed. Next, a face image was displayed for 5 seconds, followed by the rating display. When a participant responded, the next face image was displayed for 5 seconds. This was done for 32 pictures x 4 impression words. Actual photographs were used for the test.

Figure 1 Illustration of the experimental procedure

(a) Method for photographing the models; (b) Eye-tracker setup; (c) Sequence of monitor displays

Experiment 2 – Impression ratings for bangs and hair ends

2-4. Preparation of stimulus images

Guided by a professional hair stylist, we created 12 hairstyle variations on a medium-length female wig. Using standard styling products, we varied the bangs and the hair ends independently and photographed each style under identical lighting and background conditions. To prepare a neutral face, photographs of 32 Japanese women (30–49 years) were averaged with Abrosoft FantaMorph 5. Each hairstyle photograph was then overlaid on the average face, resulting in 12 stimulus images (Fig. 2).

2-5. Selection of impression words (rating adjectives)

From Japanese beauty magazines published in a year, we extracted about 600 words related to interpersonal impressions. After merging synonyms and removing redundancies, the list was reduced to 49 words.

These 49 impression words were presented in an online questionnaire to 600 Japanese women (30–49 years), who indicated on seven-point scales how well each word matched their ideal personal image. Factor analysis of these responses yielded four factors. Drawing on these factors and our previous studies, we chose 14 final impression words (Table 1). We also asked participants to give a numerical estimate of the model's age for every stimulus image.

2-6. Participants and rating procedure

An online screening recruited 517 Japanese women aged 30–49 who reported a strong interest in hair styling and make-up. All participants received written information about the study and its data-use policy and provided informed consent.

Each participant viewed every stimulus image together with the 14 impression words on the same computer screen and rated, on an 11-point scale (0 = “does not apply at all”, 10 = “applies completely”), how well each adjective described the image. To ensure sufficient monitor resolution, responses were accepted only from desktop or laptop computers; smartphones and

tablets were not allowed. The 12 images were shown in random order. After rating the impression words, participants also entered a numerical estimate of the model's age for each image.

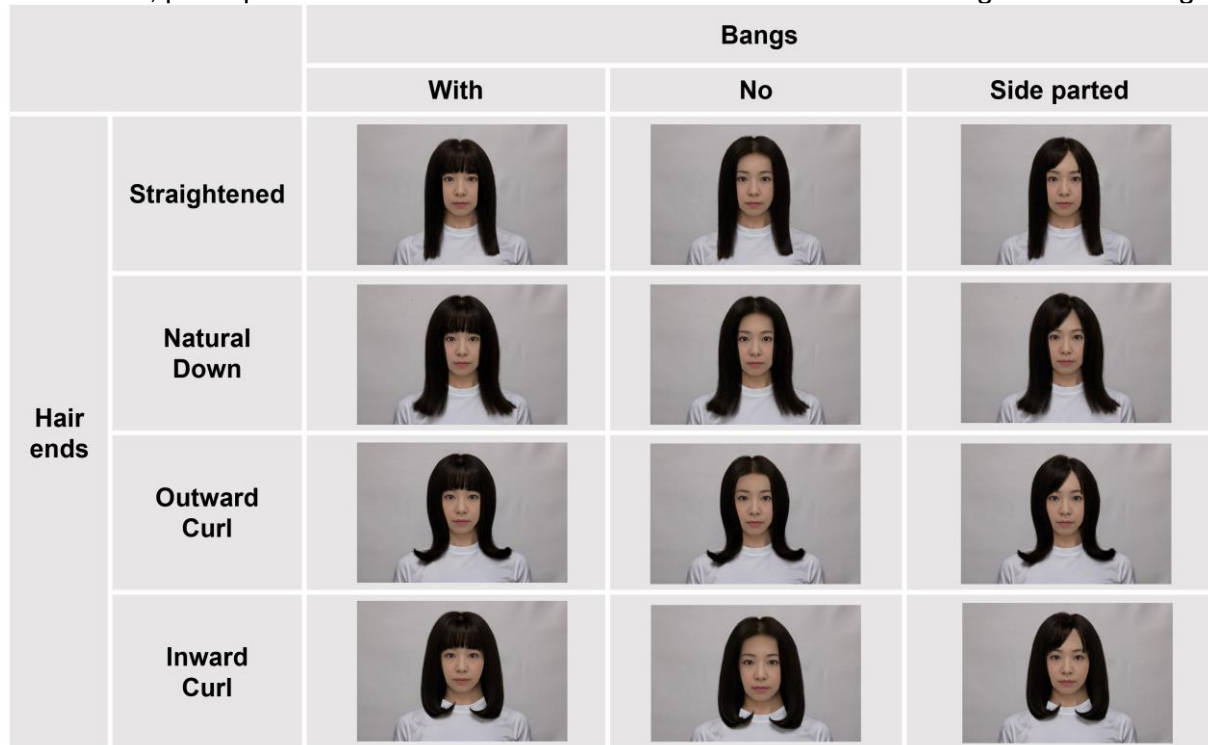


Figure 2 Stimulus images used in experiment 2

Twelve images were prepared by combining three bang styles with four hair-end styles; these images were presented to participants during the evaluation task.

Table 1 Fourteen impression adjectives used in the experiment 2

Calm	Approachable	Kawaii	Likable
Romantic appeal	Beautiful	Cool	Flamboyant
Energetic	Fresh	Clean	Happy
Competent	Attractive		

3. Results

Experiment 1 – Eye-tracking study

3-1. AOI analysis of gaze during impression ratings

Following a professional hair-stylist's guidelines, each stimulus image was divided into five areas of interest (AOIs): crown, sides, hair ends, bangs, and face (Fig. 3). We conducted a two-way analysis of variance (ANOVA) and post hoc tests, using the presence or absence of hair styling and facial regions as independent variables, and dwell time as the dependent variable, to analyze whether hair styling affected dwell time on each region.

Styling significantly increased dwell time on the bangs and the face ($p < .05$; Table 2). In contrast, dwell time on the sides and hair ends decreased ($p < .05$), suggesting that styled hair directs observers' gaze toward the bang region.

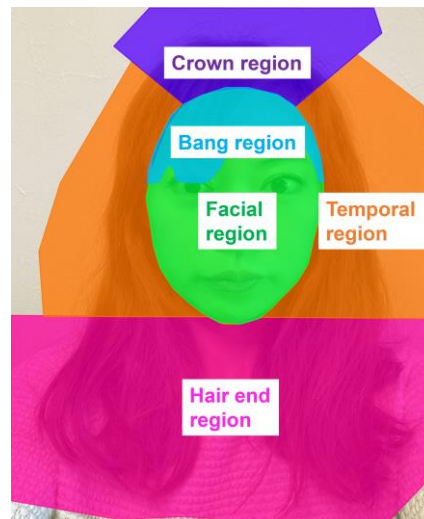


Figure 3 Example of dividing a hairstyle image into five areas of interest (AOIs)

Under a professional hair-stylist, each stimulus was segmented into the Crown region, Temporal region, Bang region, Facial region and Hair end region. These AOIs were used in the eye-movement analysis to examine participants' gaze distribution and impression formation.

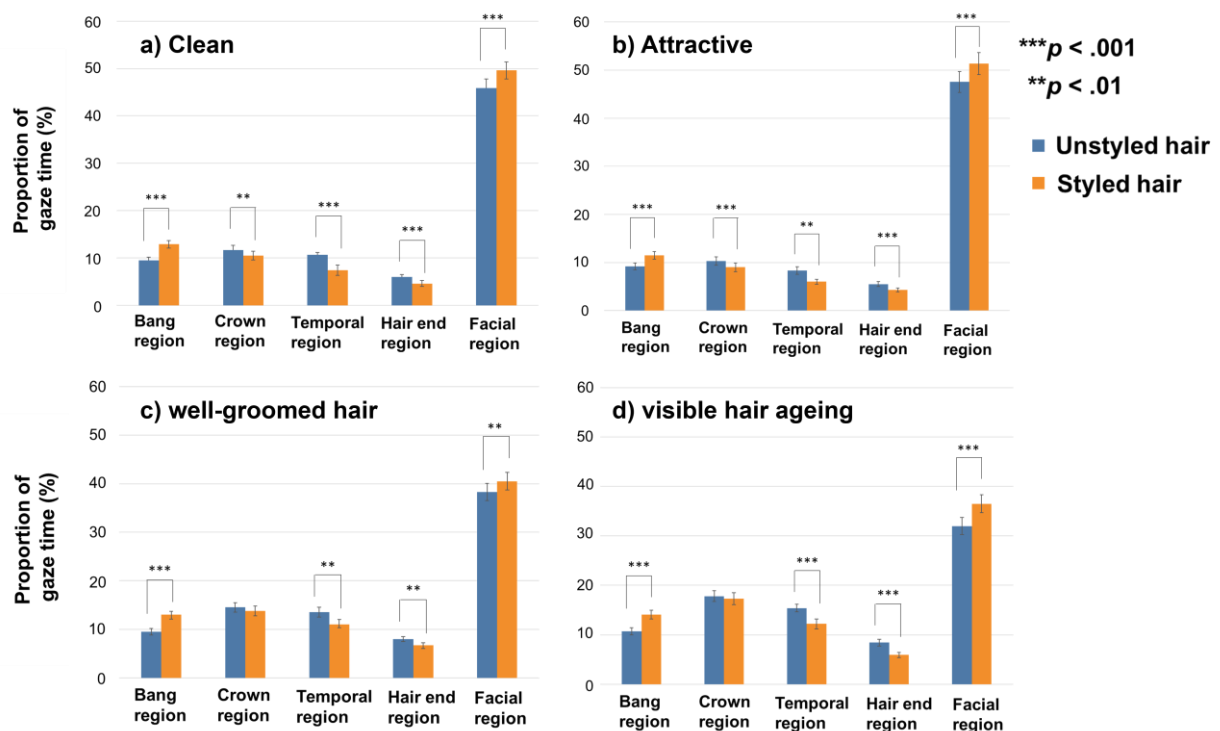


Figure 4. Proportion of gaze time (%) assigned to each area of interest (AOI)

Statistical comparisons between the unstyled-hair condition (blue) and the styled-hair condition (orange). Error bars show ± 1 SE. Asterisks above a pair of bars denote a significant main effect of hair styling in the two-way ANOVA (** $p < .01$; *** $p < .001$).

Experiment 2 – Impression Ratings for Bangs and Hair Ends

3-2. Influence of Bangs and Hair Ends on Impression Ratings

Experiment 1 showed that styling the hair increased gaze time on the bangs while reducing gaze time on the hair ends. We therefore predicted that the bangs would strongly affect impressions, whereas hair ends would play a smaller role. To examine this, we created 12 hair-styles that combined three bang styles — with bangs, side-parted bangs, and no bangs — with four hair end styles — straightened, natural down, outward-curl, and inward-curl. Each impression word served as a dependent variable in a two-way ANOVA with bang style and hair end style as independent factors.

Table 3 presents the two-way ANOVA results and post hoc tests. Bang style showed a significant main effect for every impression word; contrary to our prediction, hair end style also showed a significant main effect for all words. In addition, every word revealed significant bangs \times hair ends interaction.

Post-hoc comparisons clarified these effects.

Bang styles

- “With bangs” made the models appear significantly younger than both parted and no-bang styles ($p < .001$).
- “Side-parted bangs” scored higher on positive attributes such as calm, friendly, romantic appeal, fresh, and likable than the other bang styles ($p < .05$).
- “No bangs” received higher ratings for cool and competent impressions ($p < .001$).

Hair end styles

- “Natural down” showed no outstanding ratings.
- “Straightened” increased competent and cool ratings ($p < .05$).
- “Inward-curly” enhanced feminine and gentle impressions (approachable, cute, romantic appeal, attractive; $p < .05$).
- “Outward-curly” raised ratings for dynamic impressions such as Flamboyant and energetic ($p < .05$).

Interaction analysis showed distinct amplification patterns. The side-parted bangs \times inward-curly hair ends combination significantly raised approachable and likable ratings, whereas no bangs \times straightened hair ends boosted competent and cool ratings.

For beautiful and clean, the two highest-scoring styles were no bangs \times straightened hair ends and side-parted bangs \times inward-curl hair ends; their means did not differ ($p < .05$; Fig. 5). The side-parted/inward-curl style outperformed the other ten styles on these two impression words ($p < .05$). In contrast, the no-bangs/straightened style did not differ from a few designs (e.g., side-parted \times straightened) but still obtained significantly higher scores than the remaining styles ($p < .05$).

Table 3 Two-Way ANOVA results and post-hoc tests for impression words

Words	Hair parts	Main effect			post hoc tests	Interaction (bangs \times hair ends)		
		<i>F</i>	η^2_p	<i>p</i>		<i>F</i>	η^2_p	<i>p</i>
Calm	Bangs	12.523	0.031	***	$B^W=B^N<B^S$	8.615	0.022	***

	Hair ends	23.372	0.056	***	$H^O < H^N < H^S = H^I$			
Ap-proachable	Bangs	38.802	0.09	***	$B^N < B^W < B^S$			
	Hair ends	12.143	0.03	***	$H^N = H^O = H^S < H^I$	10.079	0.025	***
Kawaii	Bangs	73.461	0.158	***	$B^N < B^W = B^S$			
	Hair ends	49.081	0.111	***	$H^S = H^N < H^O < H^I$	13.477	0.033	***
Romantic appeal	Bangs	42.024	0.097	***	$B^N < B^W < B^S$			
	Hair ends	26.216	0.063	***	$H^S = H^N = H^O < H^I$	19.97	0.048	***
Beautiful	Bangs	31.009	0.073	***	$B^W < B^N < B^S$			
	Hair ends	23.372	0.035	***	$H^O = H^N < H^S = H^I$	12.941	0.032	***
Cool	Bangs	102.86	0.208	***	$B^W < B^S < B^N$			
	Hair ends	23.372	0.056	***	$H^O = H^I < H^N < H^S$	10.147	0.025	***
Energetic	Bangs	19.147	19.147	***	$B^W < B^N < B^S$			
	Hair ends	19.5	0.047	***	$H^S = H^N < H^I < H^O$	9.561	0.024	***
Fresh	Bangs	50.834	0.115	***	$B^W < B^N < B^S$			
	Hair ends	19.694	0.048	***	$H^N = H^O < H^S = H^I$	11.633	0.029	***
Clean	Bangs	32.652	0.077	***	$B^W < B^N < B^S$			
	Hair ends	28.944	0.069	***	$H^N = H^O < H^S = H^I$	12.941	0.032	***
Likable	Bangs	24.431	24.431	***	$B^W = B^N < B^S$			
	Hair ends	23.313	0.056	***	$H^N = H^O < H^S < H^I$	12.557	0.031	***
Flamboyant	Bangs	3.115	0.008	*	$B^W = B^N < B^S$			
	Hair ends	39.307	0.091	***	$H^S = H^N < H^I < H^O$	2.699	0.007	*
Happy	Bangs	30.325	0.072	***	$B^N < B^W < B^S$			
	Hair ends	34.043	0.08	***	$H^N = H^S < H^O < H^I$	10.941	0.027	***
Competent	Bangs	98.228	98.228	***	$B^W < B^S < B^N$			
	Hair ends	40.477	0.094	***	$H^O < H^N < H^I < H^S$	8.677	0.022	***
Attractive	Bangs	17.756	0.043	***	$B^W = B^N < B^S$			
	Hair ends	16.619	0.041	***	$H^S = H^N = H^O < H^I$	14.446	0.036	***
Age	Bangs	184.85	0.32	***	$B^W < B^S < B^N$			
	Hair ends	11.622	0.029	***	$H^O < H^S = H^N = H^I$	2.325	0.006	*

Note. Common dfs: Bang F(2, 784); Hair end F(3, 1176); Bang \times Hair end F(6, 2352).

η^2_p = partial eta-squared. Significance: *** $p < .001$, ** $p < .01$, * $p < .05$.

Bangs codes— B^W = with bangs, B^N = no bangs, B^S = right-parted bangs;

Hair ends codes— H^O = outward curl, H^N = natural down, H^S = straightened, H^I = inward curl. In the post hoc strings, means are listed from low to high; "<" indicates a significant difference and "=" indicates no significant difference.

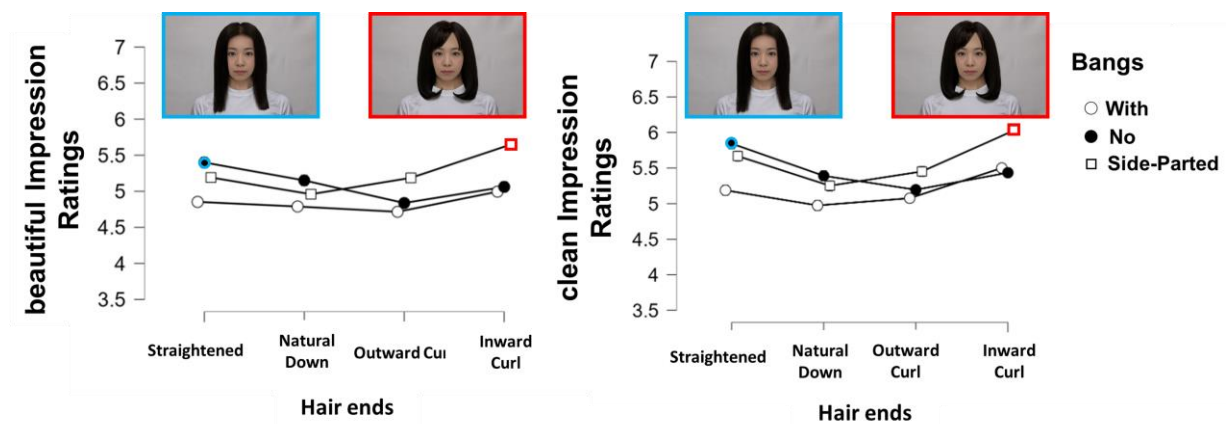


Figure 5 Mean ratings of “Beautiful” and “Clean.”

The blue circles show the scores for the no-bangs × straightened hair ends, while the red squares show the scores for the side-parted bangs × inward-curved hair ends. Error bars are not shown because the standard errors were very small.

3.3 Hairstyles that enhance the “kawaii” impression

A two-way ANOVA showed that the styles with bangs × inward-curved hair ends and side-parted bangs × inward-curved ends received significantly higher kawaii ratings than the other ten styles ($p < .05$); the two leading styles did not differ from each other (Fig. 6).

To clarify which co-impressions accompany kawaii, we conducted a multiple regression for the best-rated style (side-parted bangs × inward-curved hair ends). Kawaii served as the dependent variable, while the remaining impression words were predictors. The standardized beta coefficients were: calm ($\beta = .22$), approachable ($\beta = .26$), romantic appeal ($\beta = .16$), attractive ($\beta = .25$), cool ($\beta = -.09$), and perceived age ($\beta = -.02$). Thus, higher feelings of calmness, approachableness, romantically appealing, and attractiveness were positively associated with kawaii, whereas cooler or older impressions showed small negative associations.

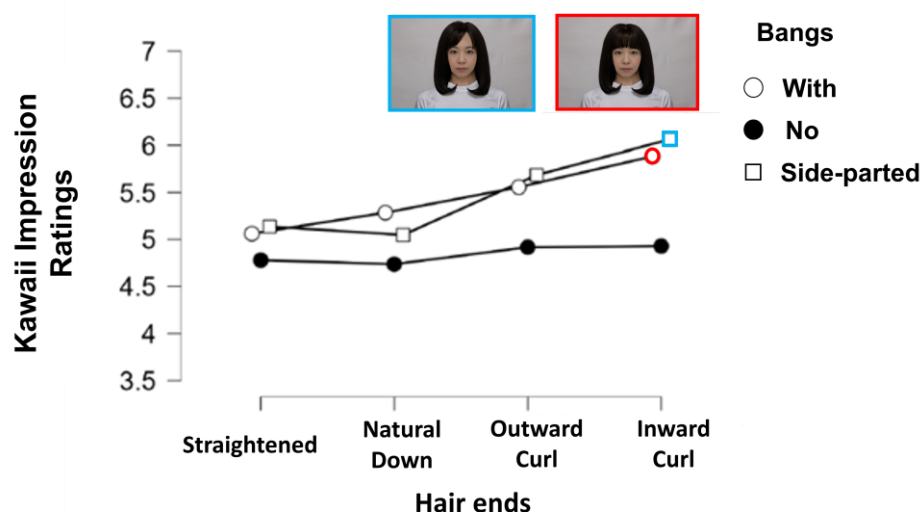


Figure 6 Mean ratings of “KAWAII.”

The blue square shows the right-parted bangs × inward-curved hair ends style; the red circle shows the full bangs × inward-curved hair ends style. Error bars are not shown because the standard errors were very small.

4. Discussion

Experiment 1 revealed that hair styling influenced observers' gaze: dwell time on the bangs and the face increased, whereas time on the sides and hair ends decreased. Smoothing down stray strands appears to draw attention toward the center of the face. Although our study did not isolate the effect of make-up, the data suggest that, without appropriate styling, viewers may look at the face less and the intended impact of cosmetics could be reduced. Consequently, arranging the hair may be a prerequisite for conveying favorable facial impressions. The longer fixation on the bangs in the styled condition further indicates that observers used this region as an important factor when forming their judgements.

Based on these results, we hypothesized that the bangs would strongly shape impressions, whereas the hair ends would play only a minor role. Experiment 2 tested this by combining three bang styles (with, side-parted, none) with four hair ends styles (natural down, straightened, inward-curl, outward-curl) to create 12 photographs, which were then rated on multiple impression words. Contrary to our expectation, both the bangs and the hair ends produced significant main effects, and their interaction influenced every impression words. These findings indicate that, even though the hair ends receive little direct fixation, they are processed in peripheral vision as part of the overall silhouette and make a meaningful contribution to impression formation. In short, the bangs are inspected analytically within central vision, while the hair ends modulate impressions through their global shape in peripheral vision.

Significant interactions between bangs and hair ends were found for every impression word. This means that the two parts can amplify or weaken each other's effects. In particular, the combinations "side-parted bangs x inward-curved hair ends" and "no bangs x straightened hair ends" achieved equally high ratings on "beautiful" and "clean", even though their shapes differ greatly.

These findings suggest that a sense of visual unity between the bangs and the hair ends helps people judge a hairstyle as beautiful and clean. Similar principles appear in other fields: moderate color matching makes outfits look more fashionable [5] and building façades that achieve visual unity through the orderly placement of elements receive higher aesthetic ratings than façades with irregular layouts [6]. Thus, like clothing or architecture, hairstyles may be evaluated as design objects, with bangs and hair ends acting as key elements of the overall composition.

On the other hand, the styles "side-parted bangs x inward-curved hair ends" and "with bangs x inward-curved hair ends" received the highest mean kawaii scores ($p < .05$). Because all raters were Japanese, this result may reflect the post-war *burikko* culture, in which childlike innocence became a core element of Japanese kawaii [7]. Baby-schema research shows that infant cues—such as a covered forehead and rounded contours—evoke cuteness in adults [8]. A bang that hides the forehead, combined with inward curls, creates a soft, youthful outline and may therefore amplify the Japanese perception of kawaii.

Multiple-regression analysis, using kawaii as the dependent variable, supported this view: higher kawaii ratings were associated with higher scores for "calm" and "approachable" and with a lower perceived age, in line with earlier findings [1] [7].

Because the study used only Japanese participants, culture-specific preferences such as *kawaii* most likely shaped the results. By contrast, judgements of “beautiful” and “clean” appeared to depend on a sense of unity and balance between the bangs and the hair ends—an aspect that may operate across cultures. Replicating the experiment with other cultural groups could help the cosmetics industry design hair-care products that balance local tastes with global appeal.

5. Conclusion

This study is the first to analyze, in a systematic way, how bangs and hair ends jointly influence a wide range of interpersonal impressions, including the Japanese concept of *kawaii*. Our findings show that certain pairings of bangs and hair ends amplify several positive impressions; therefore, a hairstyle should be viewed as two separate yet integrated parts.

These results provide baseline data for developing hair-styling and hair-care products that aim to create specific social impressions. They may also offer practical guidance to individuals who wish to adjust their bangs and hair ends to match the image they want to convey.

6. References

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