

ORIGINAL ARTICLE

## Elucidation of Factors Predicting the Impression of “*Yuru-sa*” in Japanese Yuru-kyara Mascot Characters

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**Abstract:** In recent years, “Yuru-kyara” mascots, a class of mascot characters popularized by their characteristic of “*yuru-sa*”, have played important roles in the promotions of regional events and products. Although previous studies implicated the importance of structural and emotional factors for *yuru-sa* in Yuru-kyara mascots, it is unclear what factors affect or predict the impression of *yuru-sa* in these mascots. Here we examined structural and emotional factors that predict the *yuru-sa* impression in Yuru-kyara mascots. The independent *t*-tests and multiple regression analyses revealed that the factors of “childlikeness” and “friendliness” may correlate with a stronger impression of *yuru-sa*. Furthermore, we found that altering the ratio or size of structural factors showed different levels of the *yuru-sa* impression on the perceivers. We propose that our results may facilitate the design of Yuru-kyara mascots to be more appealing and effective in promoting brand images of local communities.

**Keywords:** *Yuru-kyara, Mascot character design, Semantic differential method*

### 1. INTRODUCTION

In recent years, the concept of the Japanese adjective “*yurui*” has been popularized and used in many situations in Japanese popular culture. Translated literally as “loose” or “relaxed”, this term can have several other connotations, such as gentle, weak, light, unfinished, unsophisticated or laid-back, depending on the context in which it is used [1]. For example, “*yuruku ganbaru*” refers to the act of a light or casual attempt at something, while “*yuru-kawa*” is an adjective term used to describe something cute (or *kawaii* in Japanese) with a particularly relaxing attitude. The most popular use of this term is “Yuru-kyara”, which translates literally to “loose mascot character”, made by its combination with the word “character” to describe a class of mascot characters [2]. Yuru-kyara mascots play significant roles in the promotion of regional events and local products. Jun Miura, an illustrator and cultural critic, has defined Yuru-kyara mascots as “a class of costumed or cuddly characters (*kigurumi* in Japanese) created for the purpose of promoting local products or events by local institutions all over Japan” [3]. Miura also gave three characteristics that identify with Yuru-kyara mascots [4]; 1) The character delivers a strong message of love for its hometown or local region. 2) The character’s movements and behaviors should be unstable and unique. 3) The character should be unsophisticated or laid-back (*yurui*) and lovable.

The use of Yuru-kyara mascots as a promotional tool to boost a local economy cannot be underestimated. The Bank of Japan estimated that Kumamon, a popular Yuru-kyara mascot from Kumamoto Prefecture, and its related merchandises had brought in 123.2 billion yen (\$1.2 billion) in economic impact within two years after its conception [5]. Designing Yuru-kyaras that do not only look good but radiate “*yuru-sa*” could become an important process through which local institutions and communities can promote their identities and generate more income.

A previous study has revealed that the characters’ eyes in popular Japanese Manga (comics) series represent a significantly larger proportion of the face compared with that of real human beings [6]. Furthermore, Atsushi Muta reported that many of these characters’ ratio of height-to-width were  $1 : \sqrt{2}$  [7], suggesting that there may be a relation between characters’ impressions and their structures or proportions. In addition, Takayoshi Yamamura enumerated several notable elements of Yuru-kyara mascots: a child-like figure as a structural element and impressions of self-depreciation, relatability, and reassurance as emotional elements [8]. Thus, these previous studies implied that particular structural and emotional factors may affect the impression of the *yuru-sa* in Yuru-kyara mascots. However, it is not clear how these factors are combined to show the impression of *yuru-sa* in the design of these Yuru-kyara mascots.

The aim of this present research was to explore factors that affect or predict the impression of *yuru-sa* in Yuru-kyara mascots. In this research, we sought to understand these factors through three experiments; the first was to classify a sample of Yuru-kyaras and to observe the trend within each cluster. The second was to compare and contrast the impressions of mascots classified as Yuru-kyara or of those that were not through independent *t*-tests and multiple regression analyses. The third was to investigate the hypothesis that the impression of *yuru-sa* is dependent on the relative proportions of each mascot’s eye size and head-to-body ratio. By these three experiments, we aimed at identifying the structural and emotional factors that affect or predict the impression of *yuru-sa* in Yuru-kyara mascots.

## 2. EXPERIMENT

### 2.1 Experiment 1

The aim of the first experiment (Experiment 1) was to classify a sample of 20 Yuru-kyara mascots randomly selected from Yuru-Kyara Grand Prix 2013 (Table 1; <http://www.yurugp.jp/>). As it was deemed essential that the mascots being evaluated should be as unknown to the participants as much as possible, the mascots were selected from a pool of 150 with the rank of 50<sup>th</sup> place to 200<sup>th</sup> place in the competition. Eighty-four participants (students of the University of Tsukuba, age range; 19-26 years) were asked to evaluate each mascot according to 14 semantic adjectives (see Fig. 2) using 5-point Likert scale. The 14 adjectives were selected using KJ method from a pool of character-related words supplemented by our preliminary workshops.

The obtained results were evaluated using principal component analysis and cluster analysis methods.





















### 2.2 Experiment 2

In the second experiment (Experiment 2), 76 participants (students of the University of Tsukuba, age range: 19-26 years) completed a questionnaire in which they were asked to think about Yuru-kyara mascots in general and evaluate them according to 15 semantic adjectives (“*yurui*” and the same 14 adjectives used in Experiment 1) using 5-point Likert scale. They were then asked to think of non-Yuru-kyara mascots and do the same. One of the adjectives *yurui* was used as a measurement of level of *yuru-sa*. The 14 adjectives were analyzed using the principal component analysis. The item scores from both Yuru-kyaras’ and non-Yuru-kyaras’ evaluations were analyzed together for overall dimension reduction. The component scores were used in the independent *t*-test to compare Yuru-kyaras’ evaluation scores with non-Yuru-kyaras’ ones, as well as in the multiple regression analysis with *yurui* as a dependent variable.

### 2.3 Experiment 3

The third experiment (Experiment 3) investigated the effect of two visual aspects of Yuru-kyara mascots on the level of *yuru-sa*: eye size and head-to-body ratio. These two elements were chosen based on past researches on cartoon or manga characters ([6-8], as outlined in Introduction), indicating that the enlargement of the eyes and alteration of the body ratio like a child (e.g., larger head and smaller body) are popular techniques employed by mascot designers.

**Table 1:** Profiles of 20 Yuru-kyara mascots selected for Experiment 1. Each ranking of Yuru-Kyara Grand Prix 2013 is shown as “Ranking”

										
No.	1	2	3	4	5	6	7	8	9	10
Name	Yamaton	Dashimaru-kun	Udatsumaru	Miyatan	Osaruno-kuu	Kitahiro-maiji-i	I-wakun	Takibou	Muzumuzu	Kasamano-inakichi
Prefecture	Kanagawa	Aichi	Tokushima	Hyogo	Gifu	Hokkaido	Aichi	Tokyo	Toyama	Ibaraki
Ranking	50	61	70	77	104	194	84	103	72	124
										
No.	11	12	13	14	15	16	17	18	19	20
Name	Appi-i	Ozumin	Paipuru-kun	Hassuru-koumon	Yuumiiman	Kanibon	Hasupii	Haginyan.	Suwatton	Morinoyousei-morion
Prefecture	Saitama	Osaka	Saitama	Ibaraki	Kagoshima	Osaka	Saitama	Yamaguchi	Hokkaido	Kanagawa
Ranking	119	129	134	136	167	172	107	111	190	182

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Unlike those in Experiment 1, the 10 mascots were not randomly selected from the 50<sup>th</sup> to 200<sup>th</sup> place of Yuru-Kyara Grand Prix 2013, but were selected based on whether it was feasible for their visual graphics to be altered for the purpose of the experiment (Table 2). Three selection criteria were taken into account; 1) It had to be possible to obtain a high-resolution image of the mascot. 2) The posture of the mascot image had to be front-facing. 3) The posture and visual components of the mascot, especially those related to eyes and head, had to be manipulable in order to alter their sizes. In 5 of the 10 mascots, their eyes’ sizes were altered to 4 different levels: 60%, 80%, 120%, and 140% of the original size (Fig. 1). In the other 5 mascots, their head sizes were altered in

the same manner, with the height of each altered mascot being adjusted to be equal to that of the original (Fig. 1). The 5 levels (4 alterations plus original) multiplied by 10 mascots equaled 50 images, with 25 belonging to 5 mascots with their eyes’ sizes altered and the other 25 belonging to 5 mascots with their head-to-body ratios altered. Sixteen individuals (students of the University of Tsukuba, age range; 19-26 years) agreed to participate in this experiment, in which they were asked to evaluate the *yuru-sa* level (7-point Likert scale) of the 50 images. Observations were made from calculating the average of the *yuru-sa* score of each mascot at each level.











3. RESULTS

3.1 Results of Experiment 1

In Experiment 1, the principal component analysis yielded 3 components (Fig. 2). In this experiment, items with a factor loading greater than the absolute value of 0.8 are taken into consideration.

For Component 1, the items with a factor loading greater than the absolute value of 0.8 were “familiar”, “reassuring”, “cute”, “approachable (negative of “unapproachable”)” and “pleasant (negative of “gross”)”; it was interpreted as “affectionate”, meaning the mascots looked friendly and familiar (Fig. 2). For Component 2, the items with a factor loading greater than the absolute value of 0.8 were “conspicuous (negative word of “inconspicuous”)” and “impactful”; it was interpreted as “striking”, meaning the mascots were eye-catching and impacted the viewer’s mind (Fig. 2).

Table 2: Profiles of 10 Yuru-kyara mascots selected for Experiment 3. Each ranking of Yuru-Kyara Grand Prix 2014 is shown as “Ranking”

					
No.	A	B	C	D	E
Name	Chihaya-hime	Fujimin	Tochimaru-kun	Bokkurin	Kabukki
Prefecture	Kyoto	Saitama	Tochigi	Hyogo	Ishikawa
Ranking	-	-	44	63	15
					
No.	F	G	H	I	J
Name	Tokoron	Konyudo-kun	Hanitan	Ayukoro-chan	Takinomichi-yuzuru
Prefecture	Saitama	Mie	Osaka	Kanagawa	Osaka
Ranking	39	-	23	9	13

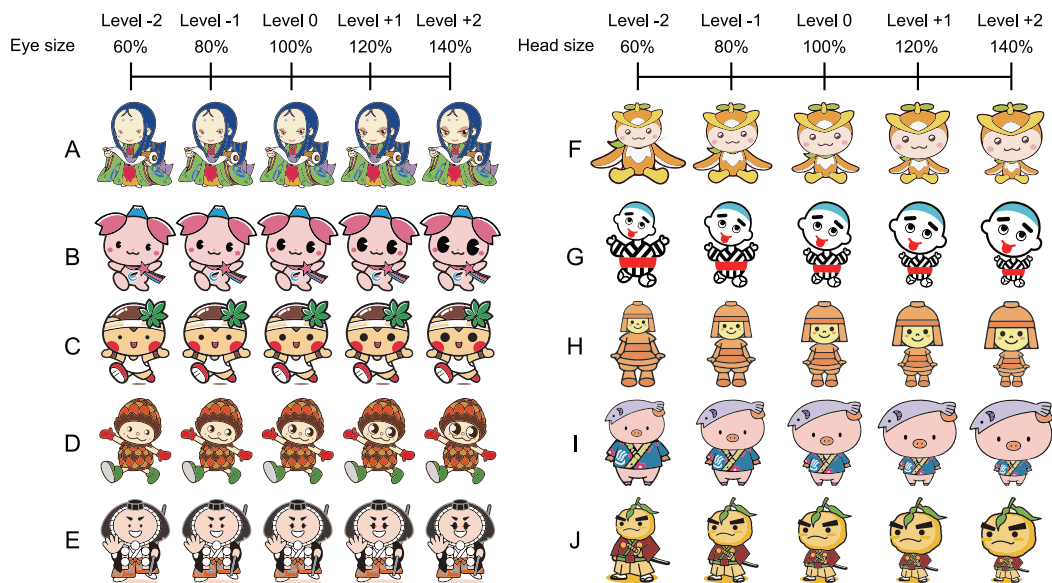
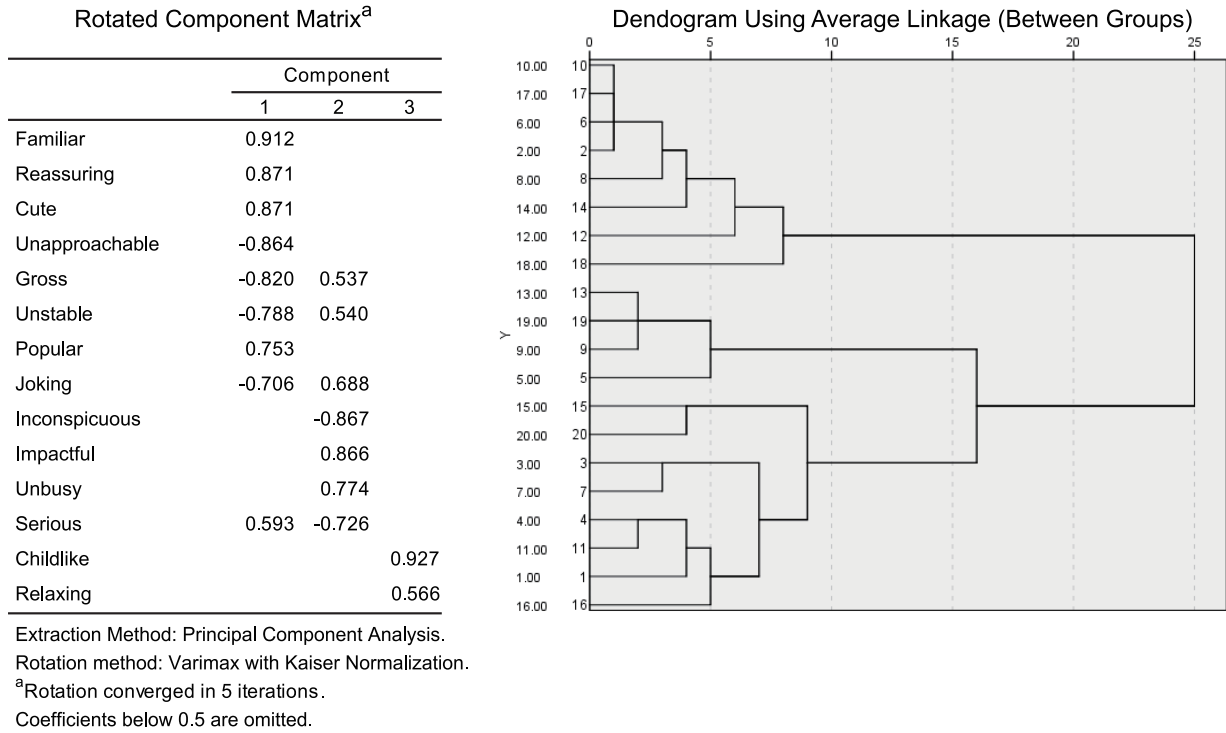


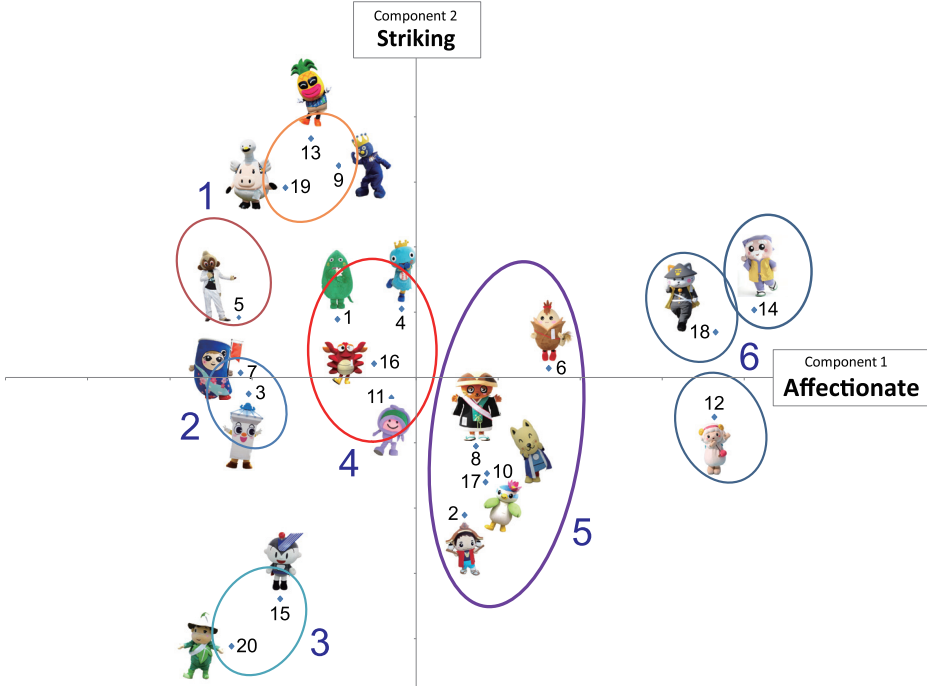
Figure 1: Samples used in Experiment 3. A-E mascots with their eyes altered at 4 levels, and F-J mascots with their head-to-body



**Figure 2:** Rotated component matrix of the principal component analyses and cluster analyses of the 20 mascots in Experiment 1

Using component scores from Components 1 and 2, we plotted an image map of the selected 20 Yuru-kyaras by the results of cluster analyses in Experiment 1 (Clusters 1-6; Fig. 3). In Figure 3, the mascots in Cluster 1 scored high on the “striking” component. However, they were slightly lower regarding the “affectionate” component. Looking at the communality

of these mascots, they had rather memorable features or combinations of features, for example, large lips and eyes on an enlarged pineapple head (mascot 13) or a combination of cow and bird features of mascot 19. Although these mascots were striking, they were rated lower in terms of affection, possibly due to the “stranger” impression of their features.



**Figure 3:** Image map of 20 selected Yuru-kyara mascots for two principal components, clustered from the results of cluster analyses in Experiment 1

On the opposite end of the “striking” component, Cluster 3’s mascots were rated lower on both “affectionate” and “striking” components. Perhaps this was due to their similarly strange and uncommon combination of clothing and features. For example, the conical hat and the sweat suit of leaves (mascot 20) and hero-like, white-skinned boyish looks with a blue logo mark on its head (mascot 15), they were rated low as to being affectionate. However, unlike Cluster 1, these features and their combination were generic objects that did not attract much attention and were not memorable.

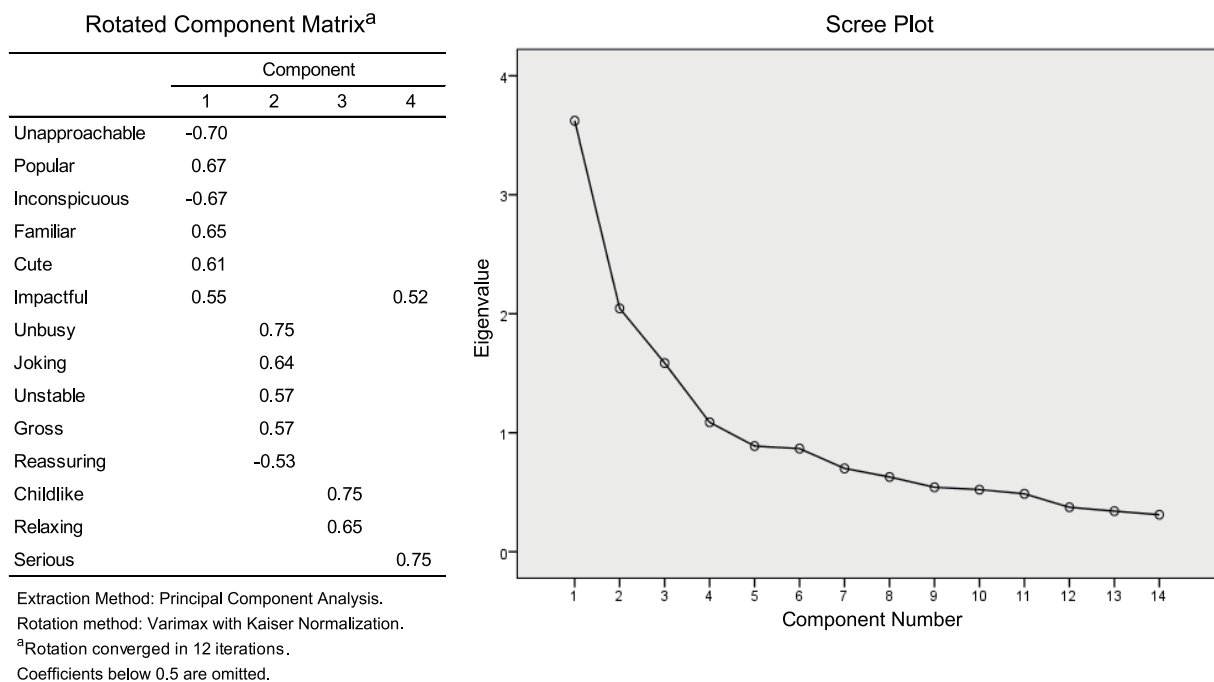
In comparison to those in Clusters 2 and 4, the mascots in Cluster 6 on the high end of the “affectionate” component had visual proportion of common cartoon mascots—that is, a slightly overblown head with an exaggerated human body frame. Whereas, the mascots in Clusters 2 and 4, rated low on the “affectionate” component, had a less human-like frame. For example, mascots 7 and 3 (Cluster 2) were can-like, and mascots 1 and 11 (Cluster 4) had no abdomen. Mascot 5 was a rare case that had real human proportions but a strange-looking monkey’s head. It was rated rather low as in terms of affection. It is also worth noting that mascots with animal imagery (e.g., mascots 8, 10, 16, 17) were generally rated in the mid-range of the “striking” component, that is, not exceptionally high or low. Also, animals commonly seen as mascots, such as a sheep and a cat (mascots 12 and 18), were rated higher on the level of affectionateness, whereas those that were less common, such as monkey and crab (mascots 5 and 16), scored lower on affectionateness.

### 3.2 Results of Experiment 2

The principal component analysis yielded 4 components (Fig. 4). In this experiment, items with a factor loading greater than the absolute value of 0.6 are taken into consideration.

For Component 1, the items with a factor loading greater than the absolute value of 0.6 were “approachable (negative of “unapproachable”), “popular”, “conspicuous (negative of “inconspicuous”), “familiar” and “cute”, which were interpreted as “friendly”, meaning the mascots had popular and easily approachable characteristics. For Component 2, “unbusy” and “joking” items were the two items with a factor loading greater than the absolute value of 0.6. This component was interpreted as “amusing”. For Component 3, “childlike” and “relaxing” were considered and the component was interpreted as “childlike”. For Component 4, “serious” was the only item with a factor loading greater than 0.6 and the component was taken as representing “serious”.

Next, we compared the component scores of Yuru-kyaras with those of non-Yuru-kyaras by independent *t*-tests. Statistical analyses showed that there are significant differences in scores for all of the components (Table 3). For Component 1, “friendly”, the scores of Yuru-kyaras were evaluated significantly higher than those of non-Yurukyaras, with a mean difference of 0.638 ( $p < 0.001$ ). Yuru-kyaras also scored significantly higher with regard to Component 2 “amusing”, with a mean difference of 0.495 ( $p = 0.003$ ) and Component 3 “childlike”, with a mean difference of 0.881 ( $p < 0.0001$ ).



**Figure 4:** Rotated component matrix of the principal component analyses and the scree plot from 14 items in Experiment 2



**Table 3:** Independent *t*-tests between Yuru-kyara and non-Yuru-kyara mascots' scores for 4 Components in Experiment 2

	Yuru-kyaras	Non-Yuru-kyaras	<i>p</i> -value
	Mean ± SEM		
1	0.330 ± 0.108	-0.307 ± 0.119	< 0.001
2	0.256 ± 0.129	-0.239 ± 0.105	0.003
3	0.456 ± 0.114	-0.425 ± 0.102	< 0.0001
4	-0.210 ± 0.122	0.196 ± 0.114	0.016

- Component 1: Friendly
- Component 2: Amusing
- Component 3: Childlike
- Component 4: Serious

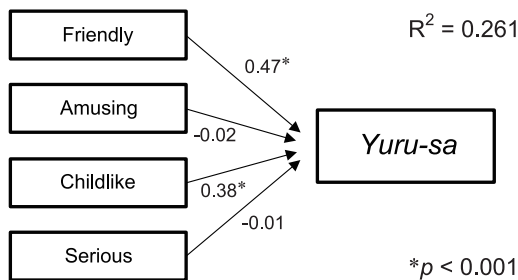
Yuru-kyaras were however rated less “serious” in Component 4 with a mean difference of 0.406 (*p*=0.016).

Together, the results of principal component analyses and independent *t*-tests revealed that participants regarded Yuru-kyara mascots as being more “friendly”, “amusing”, “childlike” and less “serious” when they were asked to think about Yuru-kyara and non-Yuru-kyara mascots.

Furthermore, we examined the relationships between *yuru-sa* and the 4 components through multiple regression analyses with the level of *yuru-sa* as dependent variables and the 4 components as independent variables. The results of these analyses also revealed that “friendly” and “childlike” components predicted the *yuru-sa* level at a statistically significant level (Fig. 5).

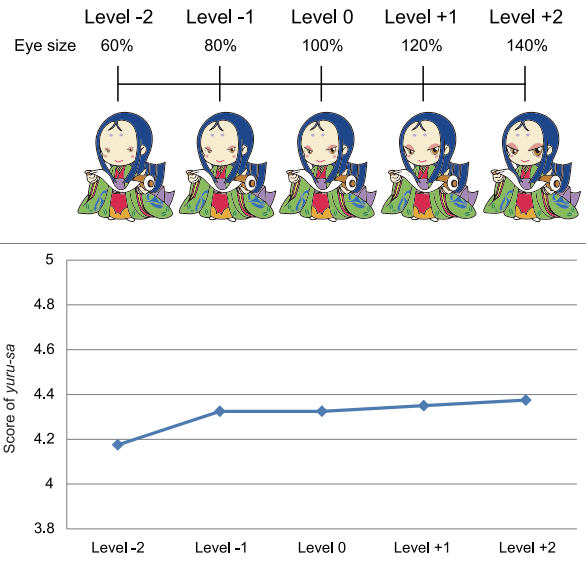
**3.3 Results of Experiment 3**

Figure 6 shows the average score from the *yuru-sa* evaluation of 5 mascots at 5 different eye sizes (the accompanying example image is one of the 5 mascots evaluated, see also Fig. 1). From the average score, there seemed to be a slight positive correlation between the size of the mascot’s eyes and the level of *yuru-sa*. That is, while keeping every other body parts at the same size, increasing the eye size of the mascots seemed to increase the feeling of *yuru-sa*.



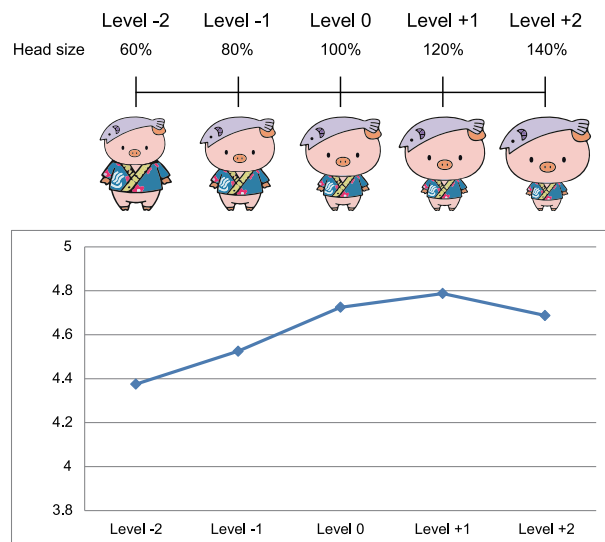
**Figure 5:** Multiple regression analyses of the level of *yuru-sa* and 4 Components of Yuru-kyara mascots in Experiment 2

Figure 7 shows the average score from the *yuru-sa* evaluation of 5 mascots at 5 different head-to-body ratios (see also Fig. 1). From the average score, decreasing the head-to-body ratio (Levels -1 and -2) appeared to drastically reduce the impression of *yuru-sa* from the mascots (in comparison to the original design). On the other hand, increasing the ratio (bigger head) showed a slight increase at Level +1 and a drop in the *yuru-sa* level at Level +2. This observation indicates that as head-



**Figure 6:** Example images shown above are one of the 5 mascots evaluated used in Experiment 3.

The mean score of *yuru-sa* rating from 5 mascots with their eye size altered at 4 levels (60%, 80%, 120%, and 140%). from the original eye (Level 0).



**Figure 7:** Example images shown above are one of the 5 mascots evaluated in Experiment 3.

The mean score of *yuru-sa* rating from 5 mascots with their head-to-body ratio altered at 4 levels (head-to-body ratios are 60%, 80%, 120%, and 140% while keeping total height the same). 100% indicates the original head-to-body size (Level 0).

to-body ratio became smaller—or in other words, as the ratio came closer to the actual human ratio, the *yuru-sa* impression decreased accordingly. Nonetheless, increasing the size of the head exponentially did not increase the feeling of *yuru-sa*, as shown by the drop at Level +2.

#### 4. DISCUSSION

This research explored factors predicting the impression of *yuru-sa* in Yuru-kyara mascots. Three studies were conducted to investigate different aspects of *yuru-sa* impression. Experiment 1 comprised classification of Yuru-kyara mascots and observed trends within each cluster. In Experiment 2, we compared the general impressions of Yuru-kyaras with those of non-Yuru-kyaras through dimension reduction by using principal component analyses and mean score comparison by using independent *t*-tests. In addition, we examined the relationships between *yuru-sa* and the 4 components through multiple regression analyses. In Experiment 3, we examined whether the impression of *yuru-sa* might have been dependent on the relative proportions of each mascot’s eye size and head-to-body ratio. Consequently, we have elucidated various characteristic factors that affect or predict the impression of *yuru-sa* in Yuru-kyara mascots.

##### 4.1 Factors predicting the *yuru-sa* impression in Yuru-kyara mascots

Experiment 1 was carried out in combination with principal component analyses and cluster analyses. The observations in Experiment 1 implied that the combination of visual components and mascot features might have an important effect on the “striking” or “affectionate” impression of Yuru-kyara mascots. Unusual combinations, such as unexpected combination of animals—a cow and a bird, or a pineapple head with gothic facial features—may create attention-grabbing and memorable mascots. However, our results also suggested that these unusual combinations might make the mascots unfamiliar, leading the viewer to dissociate from the mascot in the end.

The results of Experiment 2 suggested that the 14 items can be reduced to 4 components: “friendly”, “amusing”, “childlike” and “serious” (see Fig. 4). Our results also indicated that general impressions of Yuru-kyara mascots are more “friendly”, “amusing” and “childlike”, and less “serious” than those of non-Yuru-kyara mascots. In addition, we have shown that both “friendly” and “childlike” components were predictors of the level of *yuru-sa* in Yuru-kyara mascots. This observation also complements the results of principal component analyses

and the classification of mascots in Experiment 1. The “affectionate” component of Experiment 1 and the “friendly” component of Experiment 2 are certainly close not only in their factors but in their meanings. In fact, the “approachable”, “popular”, “familiar” and “cute” factors in the “affectionate” component of Experiment 1 are included in the “friendly” component of Experiment 2.

The results of Experiment 1 also revealed that the proportions of Yuru-kyara mascots as a whole seemed to influence their “striking” and “affectionate” levels of impression. For example, when one mascot took on a less human-like frame (e.g., can-shaped body), it became less “affectionate” on the image map. Those that scored high on both “striking” and “affectionate” components seemed to resemble the human form but with a slightly overblown head or other prominent features. The results of Experiment 3 showed a similar trend of a change in the *yuru-sa* level with a change in eye size or head-to-body ratio. This result displays some similarity to the baby schema effect proposed by Glocker et al. [9]. Their study showed that infants’ faces with high baby schema features induced more positive emotional responses from potential caretakers [9]. The cuteness and resulting attractiveness of the infant induced by its structural features may be similar to the impression of *yuru-sa* and its interestingness found in our research. Further research in this area might reveal how big or small each feature of Yuru-kyara mascots should be.

##### 4.2 Application of this study to Yuru-kyara mascot design

In relation to the application of the results of this study, it is worth noting that the impression of “friendliness” and “childlikeness” may predict the *yuru-sa* level of Yuru-kyaras at a statistically significant level. Observation of Yuru-kyara grouping in Experiment 1 suggested that the combination and allocation of visual contents or elements seem to be an important aspect in crafting “friendly” and “childlike” characteristics. In the design process, incorporation of these elements can be distinguished into 2 steps: selecting the appropriate element for the character and implanting the content visually into the design. For example, Kumamon, a popular Yuru-kyara mascot in Kumamoto Prefecture, who has red cheeks and “own 2 feet” human-like posture, has “childlike” and “friendly” characteristics to increase the *yuru-sa* impression.

In addition, Lin et al. also suggested that the “design style” (complexity of visual elements) and “motion alignment” (if the character is seemingly in motion or still) are important dimensions affecting how the consumers perceive the mascot characters [10]. Although our present

study could not examine the factor by “motion alignment”, the dimension of motion alignment may increase the “childlike” impression in the characters.

In summary, the examination of Yuru-kyara mascots and comparison of general impressions of Yuru-kyara versus non-Yuru-kyara mascots suggested that designers of Yuru-kyara mascots should aim to first craft an image or feel of “childlikeness” (childlike and relaxing) and incorporate visual factors that generate higher level of “friendliness” by carefully selecting and combining visual elements. The insights from this research could help designers better grasp the meaning of *yuru-sa* and create Yuru-kyara mascots that are appealing and effective in promoting the brand image of local communities.

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