



# A Study on the Differences in the Expressions of Emotional Cognition Between Bloggers and Users Based on the “Cloud Pet Keeping” Phenomenon

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**Abstract.** “Cloud Pet Keeping” is a phenomenon rising in Chinese UGC background that social media users keep eyes on certain pets’ growth by viewing the pictures and vocabularies released by pet bloggers. In the “cloud pet keeping” phenomenon, users can get emotional resonance through browsing the amusing pet photos shared by bloggers and are willing to contribute the consuming behavior. However, in the actual process of photos searching, users often fail to find the accurate content, as the users’ tags are different from the tags input by bloggers, leading to the bad user experience. It shows that the differences may exist in the expressions of emotional cognition between bloggers and the users. This paper focuses on whether there are differences or not, and the detailed information may exist. For the analysis methods, first stimulus was chosen and associated emotional expression vocabularies were found through brainstorming. Then final emotional expression vocabularies were organized and extracted by SPSS cluster analysis and multidimensional scaling analysis. By calculating Euclidean distance with data from matching experiments of Emotional expression vocabularies and stimulus, the differences are obtained. The result indicated that there are differences existed between the bloggers and the users’ expressions and it is apparent. The reason may be that bloggers do not systematically study the information contained in the photo when uploading. Also, users’ individual differences and other factors impact the results of this study. Following research will focus on how to provide a tag selection mechanism on photo-sharing social media, to provide a better user experience.

**Keywords:** “Cloud Pet Keeping” · Expressions of emotional cognition  
Stimulus experiment · User experience

## 1 Introduction

User-Generated Content (UGC) is an emerging mode for creating and organizing online information resources [1]. With the blooming of Web2.0, UGC provides endless possibilities for the content creation on the Internet. Users have become important part of the system [2]. “Cloud Pet Keeping” is a phenomenon rising in Chinese UGC

background that social media users keep eyes on certain pets' growth by viewing the pictures and texts released by pet bloggers. The main reasons for the rise of "Cloud Pet Keeping" phenomenon are as follows.

**Needs of Accompanying.** As far away from hometown and relatives, urbanites are often living alone, lack of emotional sustenance and have no family life. Therefore, the accompanying needs of pets are getting more and more stronger [3].

**Limited Conditions.** Due to busy work and living in rented houses, urbanites do not have the time and space to keep pets. They also know little about the knowledge needed to keep pets.

**Diverse Choices.** In the social media, users can raise several different temperament pets according to their own multiple preferences at the same time.

In "Cloud Pet Keeping" phenomenon, users are willing to contribute the consuming behavior, which promote a series of industry chain. Users will often buy peripheral products, send cat food to the bloggers who is raising the cats they like. In additional, there are also pets' smart hardware, pets' household items, pets' foster hotels and adoption etc. The unlimited potential and huge profit of the pet industry highlights the value of improving the user experience [4]. Emotion means the subjective feelings or experiences of the individual [5]. Emotional experience is about the individual subjective experience of emotion [6]. In the "cloud pet keeping" phenomenon, users get emotional resonance from browsing these photos. However, in the actual process of photos searching the pets they would like to keep online, users often fail to find the accurate content, which lead to the bad user experience. This situation shows that the differences may exist in the expressions of emotional cognition between bloggers and the users. This paper focuses on whether there are differences or not. Research methods of emotional experience based on photos are feature analysis [7], user knowledge architecture [8, 11], quantitative study [9, 10]. While, there are few research to study the difference between the expressions of emotional cognition between bloggers and users.

The main contents conclude following parts:

- Collect vocabularies and photos which is about the object of "Cloud Pet Keeping" Phenomenon from bloggers and users as many as possible from social medias. Then professional researchers brainstormed, analyzed, summarized and correlated all the emotional expression vocabularies, and the correlation score matrix of these related vocabularies was obtained; The representative vocabularies were extracted through the multi-dimensional scale and cluster analysis by SPSS.
- The filtered representative vocabularies are used as the photo grouping category. The typical photos selected by the professional researchers, which match the representative vocabularies, were stimulus.
- By calculating Euclidean distance and statistical methods with data from multi matching experiments of emotional expression vocabularies and stimulus, the differences in the expressions of emotional cognition between bloggers and users are obtained.

## 2 Exploratory Research

In the “Cloud Pet Keeping” phenomenon, most common animals are cats, dogs, pandas and so on. Among them, cats get far more attention than the other. Several important reasons are as follows.

**Quiet & Easy to Feed.** For bloggers, cats are quieter than the other animals. They do not interfere too much the owner’s life, and are easy to feed.

**More Independent.** Cats and dogs are the most popular pets in the family. Compared with dogs, cats are more independent or even cool. In daily life, urbanites lack specific channels to express their true emotions. Facing the cat on the other side of the screen, they can just imagine their emotions projected onto the cat and get spiritual support [12].

For these reasons, in this paper, cats’ photos chosen from social networks are stimulus for experiments.

### 2.1 Emotional Expression Vocabularies Collection

The photos in this paper are mainly collected from Weibo and Lofter. The key word for searching is *cat*. According to the ranking from high to low, more than 700 photos were collected. Professional researchers brainstormed with these pictures to come up with as many Emotional expression vocabularies as possible. At the same time, the Emotional expression tags assigned by the blogger were obtained as supplementary reference.

The supplementary emotional expression vocabularies collected have several different sources (see Fig. 1).

- Tags input by the bloggers when they upload photos.
- Emotional expression vocabularies extracted from topic input by the bloggers when they upload photos.
- Emotional expression vocabularies extracted from text input by the bloggers when they upload photos.
- Emotional expression vocabularies extracted from sticker which made by the bloggers with the pet photos.

Combined with the results of brainstorming and various tags from bloggers, the final number of vocabularies to be analyzed is 46. They are *Serious, Sad, Tsundere, Adorkable, Puzzled, Angry, Dazed, Happy, Ignorant, Innocent, Horrified, Curious, Lazy, Adorable, Dignified, Shocked, Well-behaved, Overbearing, Tired, Annoyed, Sorrowful, Naughty, Dolorous, Mad, Afeared, Disgusted, Indifferent, Shy, Persistent, Despising, Leisurely, Cozy, Pitiful, Calm, Excited, Melancholic, Helpless, Chill, Astonished, Pleasant, Aggrieved, Focused, Depressive, Guilty, Fortunate, Anxious.*

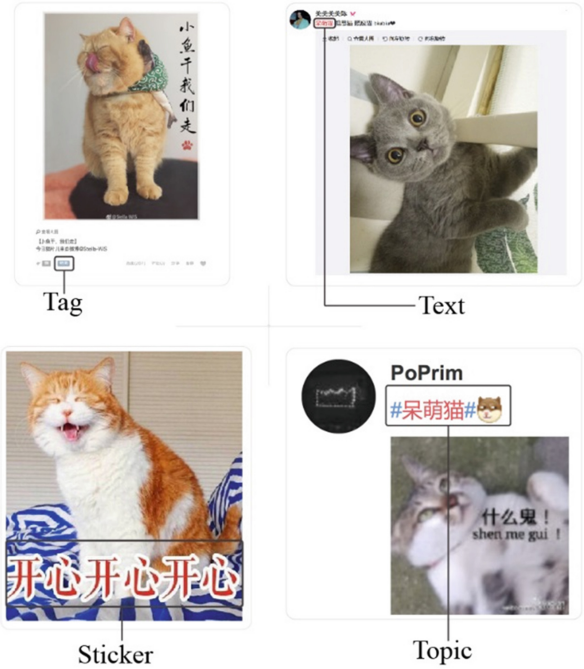


Fig. 1. Four different sources of the emotional expression vocabularies

## 2.2 Emotional Expression Vocabularies Correlation Analysis

For taking the 46 vocabularies as emotional expression vocabularies for the matching experiments will bring a huge experimental work, and the degree of relevance between these emotional expression vocabularies is quite different. Therefore, these 46 keywords need to be reprocessed. Professional researchers will grade vocabularies by their correlation to get the correlation matrix between them. Then results will be analyzed by SPSS tool. After SPSS analysis, more representative keywords will be extracted as the final emotional expression vocabularies.

### Emotional Expression Vocabularies Correlation Score

Three professionals are invited to grade the correlation between any two of these 46 vocabularies. The professionals scored on a 9-point scale ranging from 'significant negative correlation' to 'significant positive correlation'. The point 1 means 'significant positive correlation' and the point 9 means 'significant negative correlation'. The relevant portion of the score result is shown in Fig. 2.

	<i>Serious</i>	<i>Sad</i>	<i>Tsundere</i>	<i>Adorkable</i>	<i>Puzzled</i>	<i>Angry</i>	<i>Dazed</i>	<i>Happy</i>
<i>Serious</i>	1	3	5	8	6	7	8	9
<i>Sad</i>	3	1	8	8	6	8	4	9
<i>Tsundere</i>	5	8	1	9	7	8	6	8
<i>Adorkable</i>	8	8	9	1	5	9	5	4
<i>Puzzled</i>	6	6	7	5	1	6	3	8
<i>Angry</i>	7	8	8	9	6	1	5	9
<i>Dazed</i>	8	4	6	5	3	5	1	9
<i>Happy</i>	9	9	8	4	8	9	9	1
<i>Ignorant</i>	8	7	8	3	4	7	2	6
<i>Innocent</i>	8	7	2	2	7	8	4	4
<i>Horrificed</i>	9	3	7	7	3	5	5	8
<i>Curious</i>	8	7	7	4	4	8	4	7
<i>Lazy</i>	9	5	8	4	8	8	5	6

**Fig. 2.** Part of emotional expression vocabularies correlation score

**Emotional Expression Vocabularies Correlation Matrix Analysis**

Using the SPSS tool, the vocabularies correlation matrix is analyzed through multi-dimensional scale analysis and cluster analysis.

Of all three professionals’ results, the highest reliability analysis results is as follows (see Fig. 3).

**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.706	.749	46

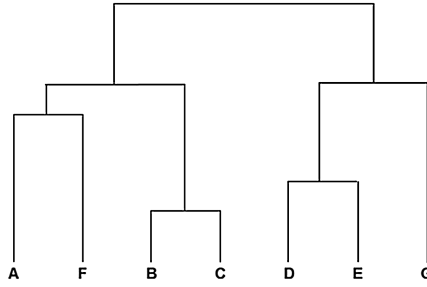
**Fig. 3.** Reliability statistics result

**Cluster Analysis**

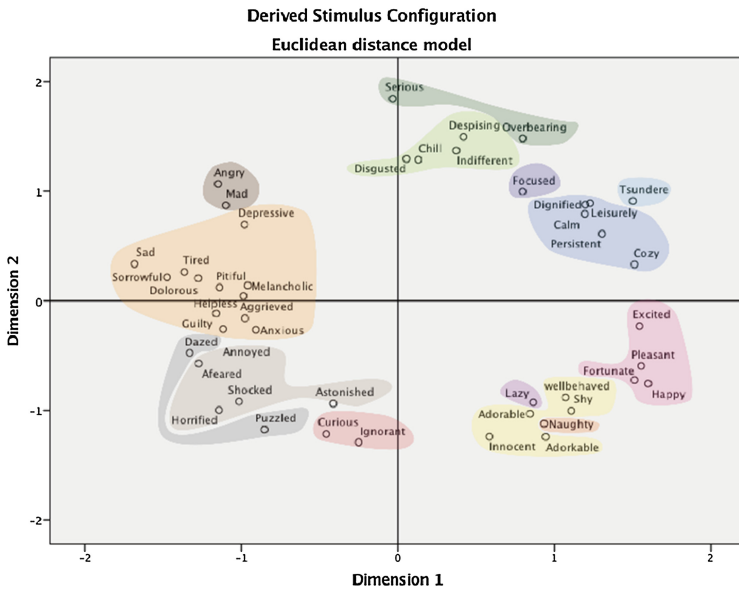
Cluster analysis calculates the distance between variables in a multidimensional space. The method classifies by following the closest distance principle (see Fig. 4) [12].

**Multidimensional Scaling Analysis**

Multidimensional scaling analysis is also referred to as “Similarity structure analysis”. The method reduces research objects (samples or variables) in multi-dimensional space to the low-dimensional space to locate, analyze and classify. At the same time, original relationship between objects is preserved (see Fig. 5).



**Fig. 4.** Hierarchical clustering



**Fig. 5.** Multidimensional scaling analysis

Combining these two kinds of analysis results, researchers conclude and extract emotional expression vocabularies in a more scientific way (see Fig. 6).

Finally, 14 vocabularies are extracted from 46 vocabularies as indicators for later experiment. The vocabularies are *Happy*, *Naughty*, *Adorable*, *Disgusted*, *Serious*, *Tsendere*, *Calm*, *Focused*, *Lazy*, *Curious*, *Shocked*, *Angry*, *Dazed*, *Sad*.

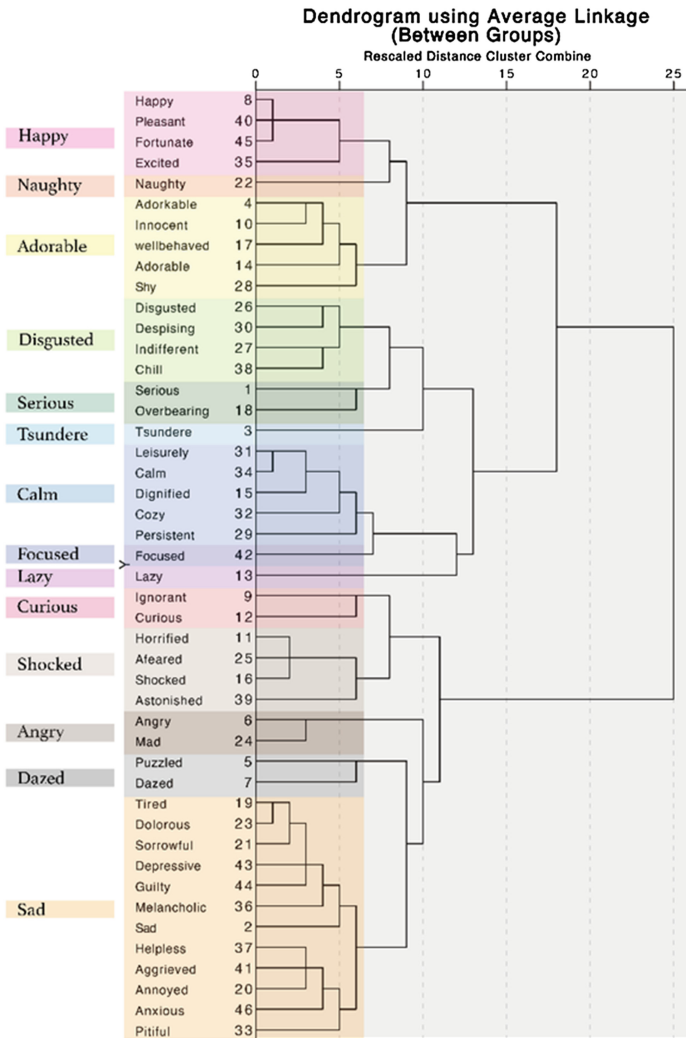


Fig. 6. Dendrogram and word extraction

### 3 Stimulus Experiment

#### 3.1 Stimulus Experimental Design

##### Stimulus Images Preparation

Based on the 14 emotion expression vocabularies obtained previously and the tags assigned by bloggers, the researchers categorized more than 700 images collected from social platforms. The photos that have similar tags are divided into the same one category. Then, the researchers carefully selected 5 typical pictures in each category as

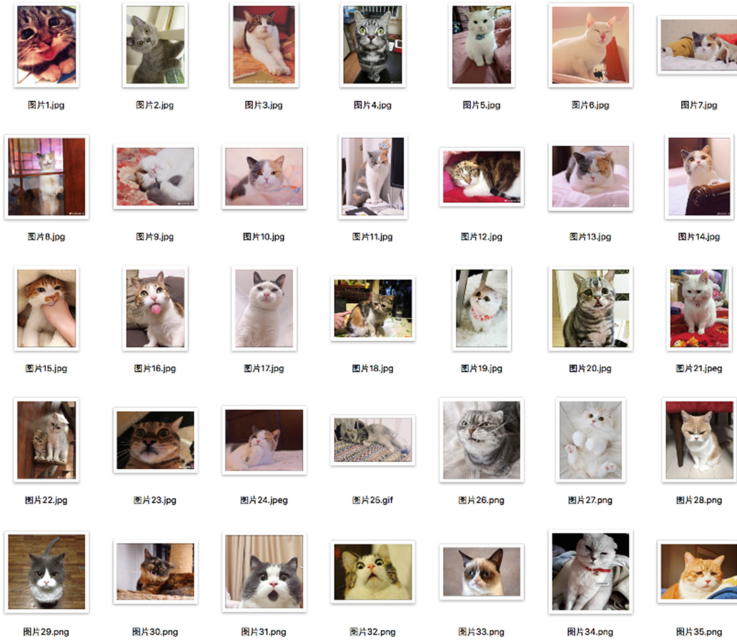


Fig. 7. Part of photos for experiment

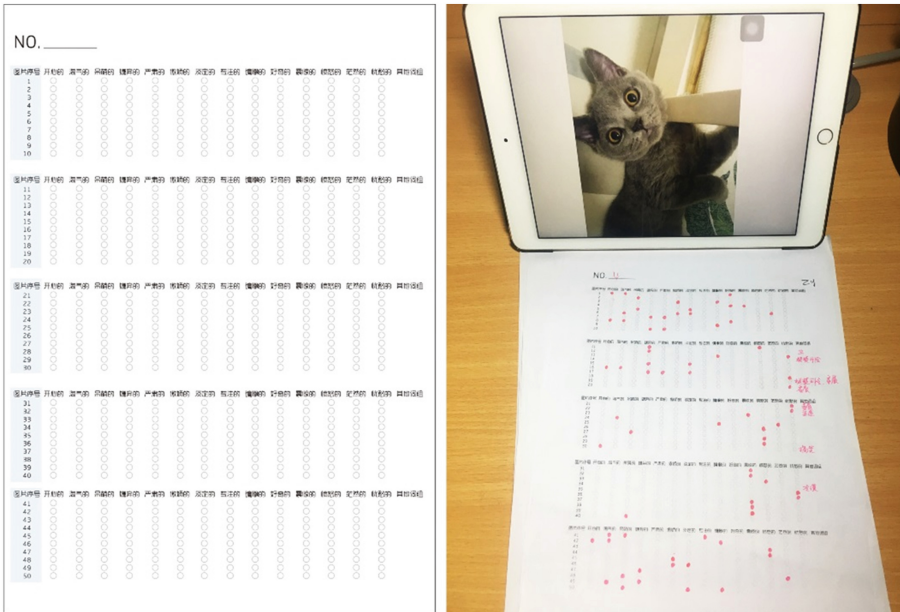


Fig. 8. Card designed for this experiment and the actual use



stimuli. Finally, 70 stimuli photos are obtained. Selected experimental photos do not contain any text, the decoration such as the expression effect given by apps, and the cat itself does not have any dress. The 70 photos are randomly disrupted and labeled with number from 1 to 70. Experiment photos are shown in Fig. 7.

**Experimental Method**

Each time, the expert user browses one photo, and decided whether the emotional vocabulary can be the photo’s tag, describing the photo. If it can, record 1. If not, record 0. If expert users think that there are other vocabularies that differ greatly from those provided, they can also write the vocabulary down separately. In order to let the expert user record more conveniently, card designed for this experiment and the actual use is shown in Fig. 8. Data recording is shown in Fig. 9.

NO.	Happy	Naughty	Adorable	Disgusted	Serious	Tsundere	Calm	Focused	Lazy	Curious	Shocked	Angry	Dazed	Sad
1	1	1	0	0	0	0	0	0	0	1	0	0	0	0
2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	1	0	0	1	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	1	1	0	0	0
5	0	0	1	0	0	0	1	0	0	0	0	0	0	0
6	0	1	0	0	0	1	1	0	0	0	0	0	1	0
7	0	0	0	1	1	0	0	0	0	0	0	0	0	0
8	1	1	0	0	0	0	0	0	1	0	0	0	0	0
9	0	0	0	0	0	0	0	0	1	0	0	0	0	0
10	0	0	0	1	1	0	0	0	0	0	0	0	0	0
NO.	Happy	Naughty	Adorable	Disgusted	Serious	Tsundere	Calm	Focused	Lazy	Curious	Shocked	Angry	Dazed	Sad
11	0	0	0	1	0	0	0	0	0	0	0	1	0	0
12	0	0	0	1	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	1	0	0	0	0	1
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	1	0	0	0	1	0	0	0	0	0	0	0
16	1	1	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	1	1	0	1	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	1
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	1
NO.	Happy	Naughty	Adorable	Disgusted	Serious	Tsundere	Calm	Focused	Lazy	Curious	Shocked	Angry	Dazed	Sad
21	0	0	0	0	0	0	0	0	0	0	0	0	0	1
22	0	0	0	0	0	0	0	0	0	0	0	0	0	1
23	0	0	0	0	0	0	0	0	0	0	1	0	0	0
24	0	1	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	1	0	0	0	1	0
26	0	0	0	0	0	0	0	0	0	0	0	1	0	0
27	0	0	1	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	1	0	0
29	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Fig. 9. Data recording of cards

**3.2 Stimulus Experiment of Expert Users**

This experiment invites 35 participants on behalf of the experts. There are 16 males and 19 females. They all using weibo over years, browsing cats’ photo every day and some of them keep several different cats online. Before the experiment, researchers explain in detail about the experiment process and rules.

**4 Data Analysis**

The schematic diagram of data of each photo is shown in Fig. 10.

For each experiment photo, the blogger’s tag was obtained when downloading it. Therefore, this dimension was counted as 1. In the remaining dimensions, all counted as 0 points.

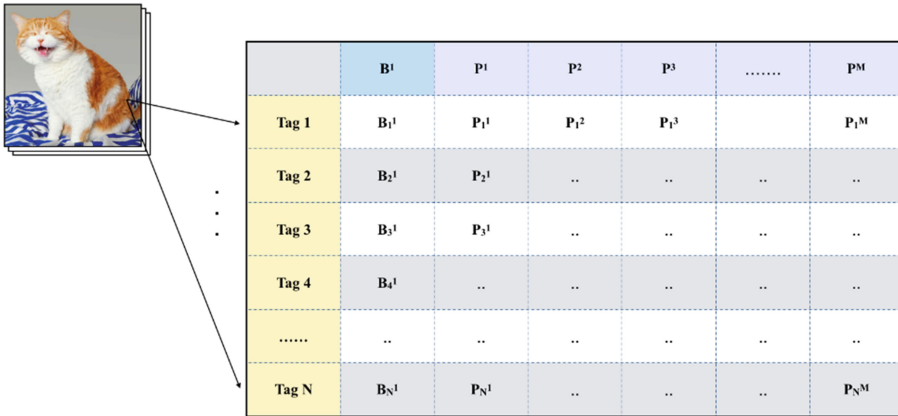


Fig. 10. Schematic diagram of data of each photo

The 14 emotional expression vocabularies represented 14 separate dimensions. If the expert user writes down a new word, the researcher would consider whether it was appropriate and if it was, then the vocabulary will be added as a new dimension to calculate.

For each picture, Euclidean distance *Dis* is calculated to obtain the distance between the blogger and each expert user in all dimensions.

- $B_i^x$ : the blogger's cognition  $P_i^x$ : the expert user's cognition  
 Supermark: the serial number of the participants  
 Subscript: the serial number of TAG
- $Dis_i^2$   
 Subscript: the serial number of photo

For the convenience of calculation, using  $Dis_i^2$  represent the  $Dis_i$  for they have the same value. It is calculated by(taking photo1 as an example):

$$Dis_1^2 = (B_1^1 - P_1^1)^2 + (B_2^1 - P_2^1)^2 + (B_3^1 - P_3^1)^2 + \dots + (B_N^1 - P_N^1)^2 \tag{1}$$

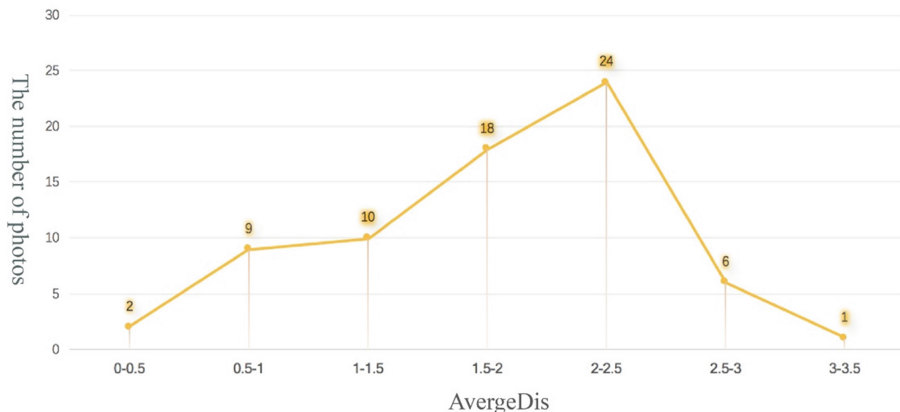
Divide the sum of the square of *Dis* by the number of participants N to get the average difference between bloggers and users. By calculating the experimental results of 70 pictures, the picture of the emotional cognitive distribution between users and bloggers of the 70 photos *AverageDis* is finally obtained.

$$AverageDis = \sum (Dis_1^2 + Dis_2^2 + Dis_3^2 + \dots + Dis_{70}^2) / N \tag{2}$$

The analysis tools used is EXCEL.

### The Experimental Results

After obtaining all 35 expert users' data, the analysis is calculated. The Fig. 11 shows the distribution of emotional cognitive differences between bloggers and users. The abscissa



**Fig. 11.** Distribution of emotional cognitive differences between bloggers and users.

of the graph Fig. 11 is the average difference between the blogger and the users on each photo. According to the calculation results, *AverageDis* are divided into 0–0.5, 0.5–1, 1–1.5, 1.5–2, 2–2.5, 2.5–3, total of 7 groups. The vertical axis represents the number of photos. In 0–0.5 range, there are 2 photos; in 0.5–1 range, there are 9 photos, in 1–1.5 range, there are 10 photos; in 1.5–2 range, there are 18 photos; in 2–2.5 range, there are 24 photos; in 2.5–3 range, there are 6 photos; in 3–3.5 range, there are 1 photos. The differences more than 1 have a total of  $10 + 18 + 24 + 6 + 1 = 59$  photos (see Fig. 11).

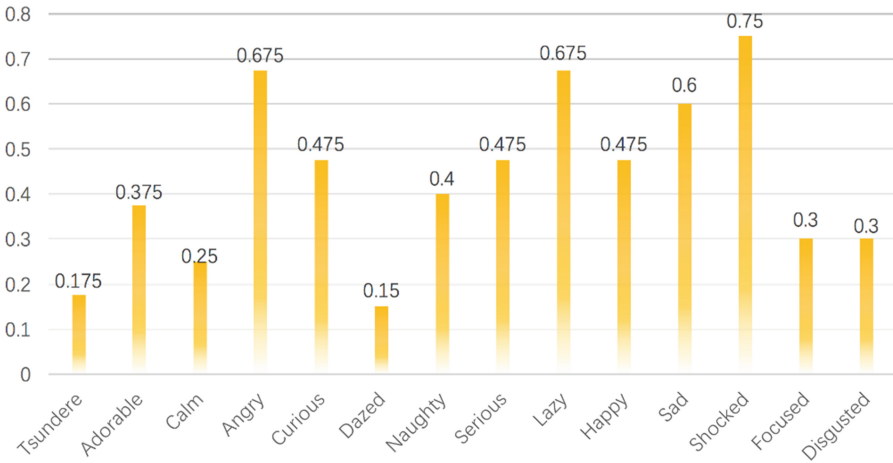
For the correlation between each two vocabularies is far and the selected images are very typical, the difference between the selected vocabularies is still very large, there are 70% of the pictures, bloggers and users of the difference vocabulary reached 1.5 and above. It shows that there are actually differences existed between the bloggers and the users' in the expressions of emotional cognition and it is significant.

For each emotional expression vocabulary category, the consistency between bloggers and users' choosing *Con* are calculated by: ( $X$  is the serial number of the tag chosen by the blogger)

$$Con = \left( \sum (P_X^1 + P_X^2 + P_X^3 + \dots + P_X^N) \right) / N \quad (3)$$

Vocabularies with high difference existed between the bloggers and the users' in the expressions of emotional cognition are *Dazed*, *Tsundere*, *Adorable*, *Calm*, *Focused* and *Disgusted* (see Fig. 12). Their *Con*'s value is lower than 0.3.

Photos having a quite high level of consistent with bloggers emotional cognition vocabulary: *Shocked*, *Angry*, *Lazy*. It can be speculated that users have a clearer cognition and expression of these emotions of cats.



**Fig. 12.** Consistency between bloggers and users' scoring of each emotional kind

## 5 Conclusion

This paper explores the differences in the expressions of emotional cognition between bloggers and users based on the “Cloud Pet Keeping” phenomenon. The main study method includes three parts: Firstly, collecting vocabularies and photos about the object of “Cloud Pet Keeping” Phenomenon as many as possible. Then professional researchers brainstormed, summarized and correlated all the emotional expression vocabularies. The representative vocabularies were extracted through the multi-dimensional scale and cluster analysis. Secondly, the filtered representative vocabularies are used as the photo grouping category. The typical pictures selected by the professional researchers, which match the representative vocabularies, were stimulus. Thirdly, by calculating Euclidean distance and statistical methods with data from multi matching experiments of Emotional expression vocabularies and stimulus, the differences are obtained.

The result indicated that there are actually differences existed between the bloggers and the users' expressions and it is apparent. Vocabularies such as *Dazed*, *Tsundere*, *Adorable* etc. are hard for users to unify their expression of recognition. On this basis, researchers can find more differences between the bloggers and users and the reasons.

The reasons for the difference in this experiment may be that the bloggers do not systematically study the information contained in the photo when uploading. The bloggers may use the photo in a funny way on purpose to attract users. Users may not know the story happened between the blogger and the cat. Also, the expert users' individual differences and other factors have the impact on the results of this study. Following research will focus on how to provide a tag selection mechanism on photo-sharing social media, to provide a better user experience for the users.

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