

A Mechanism to Control Aggressive Comments in Pseudonym Type Computer Mediated Communications

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Abstract. We propose a mechanism to alleviate the aggression on Computer Mediated Communications. A title reflecting the aggressivity of comments posted by the user is displayed on screen. The effects of the proposed mechanism are verified with laboratory experiment, where participants post comments after reading the topics of discussion and other participants' comments. The results indicate the validity of the proposed mechanism.

1 Introduction

With recent widespreading of smartphones and PDAs, computer-mediated communication (CMC) has been increasingly popular. For example, online chat services enable sending messages back and forth among people on the Internet, and social networking service (SNS) enables building virtual community based on real community [1]. Compared to face to face (FTF) communications, CMC is characterized by the lack of Social Cue (e.g. voice, face, emotion, etc.) compared to FTF communication. It has been proposed that character based communications enhance public self-consciousness (public SC) and reduce private self-consciousness (private SC) [2]. Public SC means the externally directed consciousness, such as face and behavior, which can be seen by others. On the other hand, private SC denotes the internally directed consciousness, such as feeling, emotion and thinking, which can not be seen by others. There is a hypothesis of tendency to change self consciousness in order to increase anonymity, in direction to hide social cues [3].

The side effect of anonymity is the encouragement to deviate from the standard values and rules. For example, criminal accusations exist on 2-channel¹ and Twitter². In response to this situation, the necessity of information literacy is increasingly recognized, and many educational institutions teach how to use SNS [4].

¹ <http://www.2ch.net/>.

² <https://twitter.com/>.

On the other hand, the advantage of anonymity is to encourage people to accuse, report crimes, and self-disclose. Encouraged self-disclosure means the abolishment of prejudice and even an opportunity to express opinion by disconnecting the discussion topic from personality. In addition, it prevents people from having a bias toward opinions driven by appearance or social status. Moreover, it facilitates shy people, who hesitate to express their opinions in public, to state their opinions.

The identity of a user on Internet can be classified based on attainability and linkability [5]. The attainability is defined as the possibility of identifying personal information, and the linkability is defined as possibility of distinguishing whether an online action is executed by the same person or not. Table 1 shows the explanation of autonym, pseudonym, and cryptonym based on attainability and linkability. For example, Facebook has attainability and linkability because it forces its users to disclose their real name. Hence it is an autonym service. On the other hand, 2-channel is a complex CMC service, because it has a huge number of threads and they belong to different classes. In 66 % of all forums users present their IDs, so that their comments can be linked to the user, however they are not forced to open their real name. In other 34 % forums, users are not forced open real name, without attached user IDs. Therefore, the former belongs to Pseudonym type, and the latter to Cryptonym type.

Table 1. Definitions of anonymity

	Attainability	Linkability
Autonym	Yes	Yes
Pseudonym	No	Yes
Cryptonym	No	No

CMC users can conceal their social cues, so individuality is easily lost [3]. In other words, they are difficult to realize the difference among each other. It is likely that such circumstances make them aggressive, besides the accusations cyber cascade, risky shifts and flaming. For example, according to an early CMC study, when the participants discussed on FTF and CMC to reach a consensus, the CMC group showed more aggressive and insulting comments compared to FTF communication groups [6]. However, the result is heavily criticized [7].

On the other hand, FTF communication curbs the outcome of group decision making because group members are afraid of criticism and poor evaluation of their idea. There is a possibility that CMC with assured anonymity reduces the user's feeling of pressure from other users [8]. In addition, it has been reported that the group decision support system (GDSS) alleviates effectively the social anxiety [9]. Thus GDSS facilitates group decision making on CMC. Moreover, it has been reported that the CMC group's motivation and degree of contribution are bigger than FTF communication group's [10]. Furthermore, the group

decision by FTF communication often result in a small number of members contributing to the discussion, whereas CMC evens the contributions of all group members [11]. Thus, electronic brain storming (EBS) has been designed, and EBS seems to improve productivity of idea generation than normal brain storming on FTF communication [12].

In all above mentioned CMC services, there is a problem of aggressive comments by the users, sometimes resulting in flaming.

Mechanisms proposed to directly alleviate aggressions on CMC services are as follows.

1. When a user makes a comment and clicks “post button” on a CMC service, the service jumps to a page which recommend the user to have second thoughts about the context of comment before receiving and reflecting on the communication page.
2. When a user makes a comment and clicks “post button” on a CMC service, the service checks the comment by natural language processing, and if it contains aggressive words, it prohibits the user from posting.

Moreover, general parental control system can also detect the action that a user posts an aggressive comment. However, if a user is familiar to these methods, the user clicks automatically the button in the first method, or avoid using unprintable and bad words that are detected by the natural language processing. These methods are not effective in alleviating aggressive comments.

On the other hand, there are systems with moderation system, such as “Slashdot”, “textream” and “Youtube”, in which users moderate each other’s comments, and every user can see the assessments of their comments. In “Slashdot”, a title based on other users’ assessments are assigned to each user. The title is a reminder to users that their comments are observed by other users, which may enhance public SC, and reduce private SC, and may alleviate user’s aggressivity. A problem of these CMC services is that the titles are assigned to user accounts, which automatically requires the disclosure of users, and anonymous user cannot be used.

The present study focuses on anonymous CMC services, and proposes a mechanism to incorporate title assignment into pseudonym CMC services.

2 Methods

2.1 Hypotheses

Based on the relation between anonymity and self-consciousness, the following hypotheses are tested.

Hypothesis H1: In pseudonym CMC, the aggressivity of the user with attached title is lower than those without title.

Hypothesis H2: In pseudonym CMC, users with attached title take longer time to decide (formulate) the comments than users without title.

The second hypothesis H2 is tested because displaying the attached title to the users might affect their self-consciousness to remind that their comments are assessed by other people, thus requiring longer time to decide or formulate the comments to post.

2.2 Experiment System

An experimental CMC system (Figs. 1, 2 and 3) was built to verify the validity of the proposed mechanism and to test the hypotheses H1 and H2.

It is necessary that the discussion topics used in the experiment include extreme opinions in order to generate aggressive comments. Twenty topics that actually resulted in active discussions and extreme opinions including some kind or rivalry in existing CMC services were extracted.

Prospected to clarify the subject's opinion and enhance rivalry mind from some CMC services. Figure 4 shows examples of discussion topics.

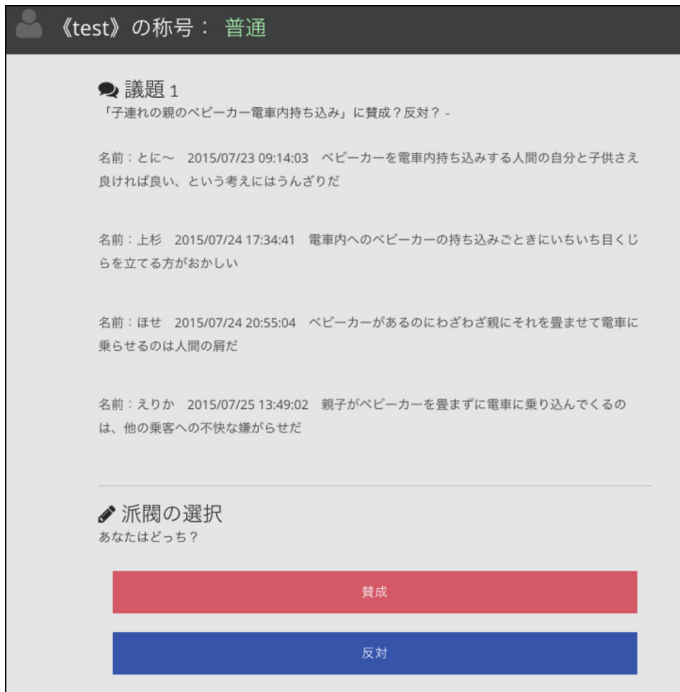


Fig. 1. Screenshot of experimental system at Step 1

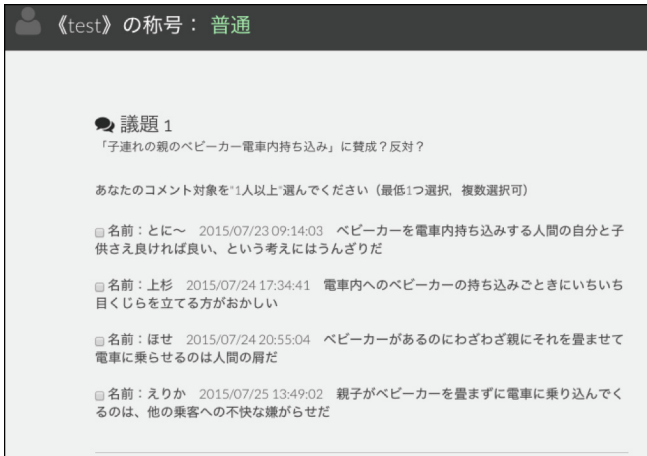


Fig. 2. Screenshot of experimental system at Step 2

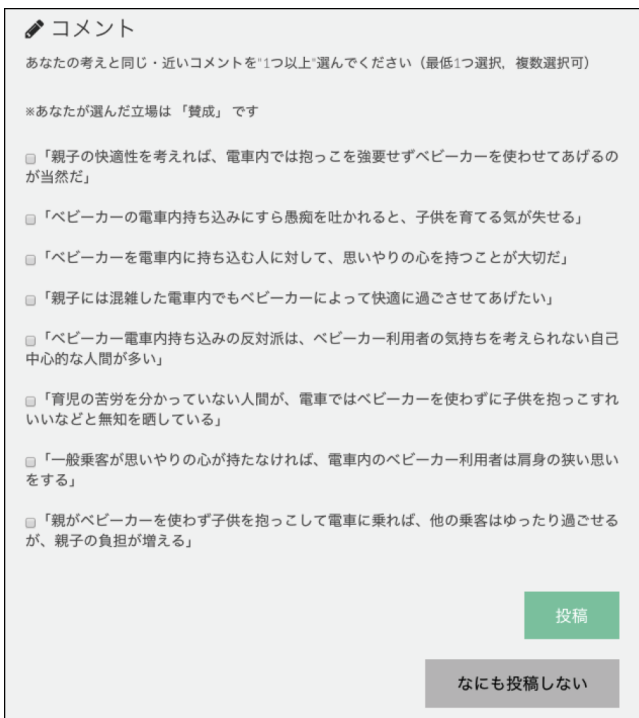


Fig. 3. Screenshot of experimental system at Step 3

Do you agree or disagree with the juvenile's act?
Do you agree or disagree with the nuclear power plant?
Do you agree or disagree with the education of second language from childhood?

Fig. 4. Examples of discussion topics

The experiment is conducted as follows.

1. Enter the account name.
2. Repeat twenty times the following steps.
 - Step 1.** Read a topic and comments from other four users about the topic, where two are agreeing opinions, and the other two are disagreeing opinions. Then choose (i) agree or (ii) disagree.
 - Step 2.** Read the four candidate comments, then select one comment that the participant wants to use as the replying comment to the forum. If there are no suitable comments, the participant does not have to select any comments.
 - Step 3.** Read the eight candidate comments, then select one comment that the participant wants to use as the replying comment to the forum. If there are no suitable comments, the participant does not have to select any comments.
3. Answer a questionnaire.

The participants select one comment for each topic from candidate comments which are prewritten sentences whose aggression levels (minimum: 1–maximum: 5) are predetermined in a pre-analysis. The aggression levels of comments are hidden to the subjects.

The number of topics is twenty, so that participants repeat twenty times the steps 1–3. The experiment consists of four sets, where each set consists of five topics. The duration of one experiment is about 60 min. Experimental room is laid silent. There are a desk and a laptop computer to access the experimental forum system. Only one person participates in one experiment session.

At the Step 1, four comments posted by four “virtual” users are presented to the participant, in order to simulate an on-going discussion. The four comments consists of two agreeing opinions to the presented topic, and two disagreeing opinions. At the Steps 2 and 3, sixteen candidate comments, consisting of eight agreeing and eight disagreeing opinions, are presented to the subject.

Twenty topics are provided in an experiment sessions, thus the total number of comments is 400. These comments consist of comments extracted from existing CMC services and originally created comments.

Only half (eight) of provided comments are presented to the subjects at Step 3, based on the agreeing or disagreeing opinion selected by the subject at Step 2. Furthermore, the presented comments can be divided into two classes (four comments based on reason-X, and four comments based on reason-Y). For example, if a participant selects disagree regarding the topic “Do you agree

or disagree with the juvenile act?” at Step 2. In eight disagreeing candidate comments presented at Step 3, where four candidate comments are based on reason-X (“We must inflict a severe punishment on juvenile delinquency for regeneration”), and other four are based on reason-Y (“Victims or bereaved family can’t be convinced of the reason for commutation of sentence which a criminal is youth”). In addition, the comments based on a reason consists of different aggression levels A, B, C and D (the weakest is A, the strongest is D).

We arranged the aggression level of comments by combining four content elements “Slanderous”, “Critical”, “Declarative”, “Affirmative”. “Slanderous” is when the context and its words make others uncomfortable. “Critical” indicates the words and context are contradictory. They can be used as the broad index of aggression. “Declarative” indicates the words and context do not include any softer expression, which is defined as the ending of sentences to make them mild, such as “in my humble opinion” or “for what it’s worth” [13]. “Affirmative” indicates the words and context not belonging to the previous three content elements. In addition, the aggression level of the four example comments from other users (two agreeing and two disagreeing opinions) presented at Step 1 are level D, designed to cause subjects to select aggressive comments from the eight candidate comments at Steps 2 and 3. Table 2 shows the structure of the candidate comments.

Table 2. Structure of supposed comments

Faction	Basis of arguments	Aggression level (Ideal value)
Agree or disagree	X	A (1.5)
		B (2.5)
		C (3.5)
		D (4.5)
	Y	A (1.5)
		B (2.5)
		C (3.5)
		D (4.5)

The titles assigned and displayed to the participants are (1) “Rabid”, (2) “Normal”, and (3) “Clement”. The initial title is “Normal” at set₁. The title changes three times at an interval (one min) between the sets. Note that the title does not change during one set.

The average aggression levels of selected comments at the set S_n determines the title at the next set S_{n+1} . The candidate comments include some comments who have gaps between the ideal value of aggression and measured value. In addition, the candidate comments presented at Step 2 depend on the faction selected at the last step, so that, we can not use uniformity criterion to decide the title. The following criteria are used.

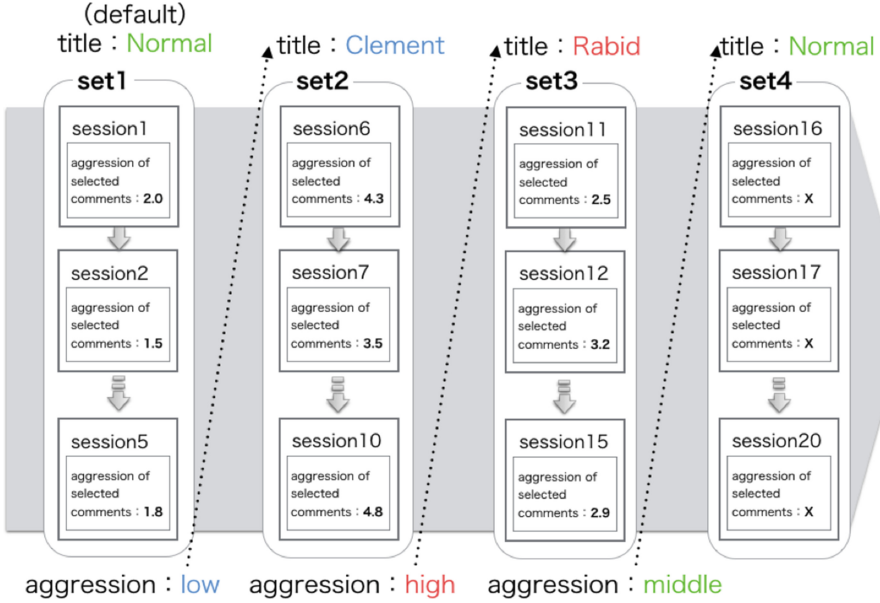


Fig. 5. Mechanism of title assignment

Rabid: The average aggression in set_n is higher than the maximum value of quartile deviation of the candidate comments presented in set S_n .

Normal: The average aggression in set S_n is within the quartile deviation of the candidate comments presented in set S_n .

Clement: The average aggression in set S_n is lower than the minimum value of quartile deviation the candidate comments presented in set S_n .

Figure 5 shows the title changing mechanism.

3 Results and Discussions

The number of participants was 46 (age: 18–27 yr), and Table 3 shows the ratio of male to female of this experiment. They were divided into the experimental group ($n = 23$, the title was presented) and control group ($n = 23$, title was hidden).

We compared the experimental group with the control group from the viewpoint of “average aggression of selected comments” and “average duration of selecting comments”. The former corresponds to hypothesis H1, the latter corresponds to hypothesis H2. Shapiro-Wilk analysis indicated that both parameters are non-normal distribution, thus we used the Mann-Whitney U test to assess the statistical significance of mean differences between the groups.

Figure 6 shows the difference of average aggression of selected comments between the groups. The average aggressivity level of the experimental group was 6.9% lower than the control group. Furthermore, the difference is significant ($p < 0.01$), indicating that the hypothesis H1 is supported. No significant

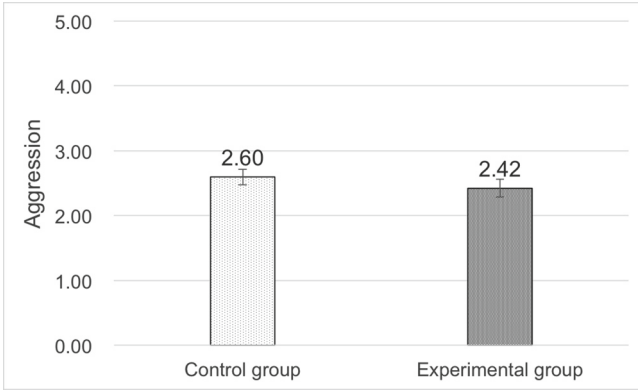


Fig. 6. Average aggression of selected comments

difference was found between the average duration of selecting comments of the experimental and control groups.

The number of sets attached with title “Rabid” was zero. The ratio of “Normal” and “Clement” were 42% and 58%. Furthermore, there were no difference on the two parameters (average duration of selecting comments and average aggression of selected comments) between “Normal” and “Clement” sessions.

Table 3. The ratio of male to female of this experiment

	Control group		Experimental group	
Male	15	65.2%	11	47.8%
Female	8	34.8%	12	52.2%
Total	23	100.0%	23	100.0%

In the experimental group, the ratio between male and female is approximately the same (Table 3). In the control group, however, male participants are approximately double of females. This is not a problem because gender difference seems to have no effect on cyber aggression [14]. Moreover, our experiment treats anonymous cases, so we assume that difference of gender ratio does not affect to the average aggression of selected comments.

Figure 7 shows the aggression histogram of selected comments. Figure 7 indicates that aggressive comments, those above 4.0, were hardly selected in both the experimental and control groups. It is possible that the participants do not tend to select highly aggressive comments, or the selection of aggressive comments was repressed by the experiment environment. To verify this point, the experimental design should be improved.

The following three methods are possible. (1) Use more aggressive candidate comments from CMC services to induce a more aggressive reaction.

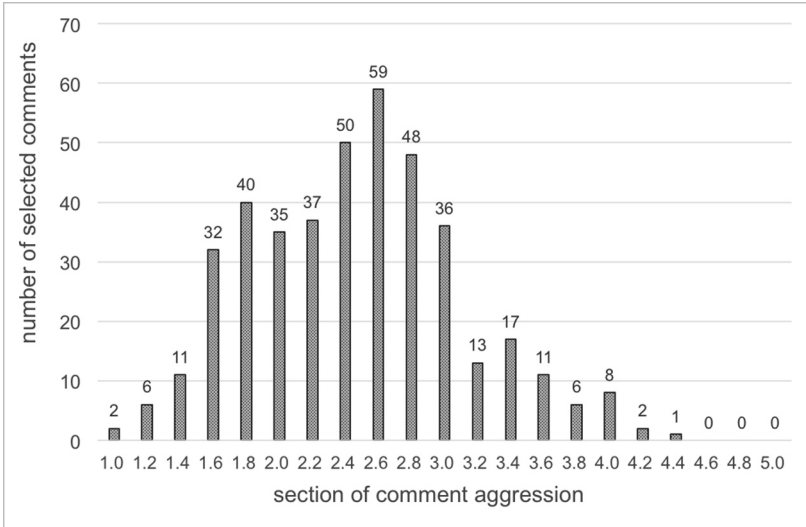


Fig. 7. Histogram of aggression levels of selected comments

(2) Experiment with younger participants, who are in early teens. (3) Incorporate more realistic settings to the experimental forum. The second method is based on the fact that the prefrontal cortex of adolescents is not fully developed yet, so teenagers have more difficulty in controlling their desires and behaviors [15]. The age of participants of the present study was between 18 to 27, University students, and they may have already known CMC manner and Internet literacy. The third method, to improve the experimental system, is to reduce the gap from the actual CMC services. In our study, the participants selected only one response from candidate comments. This might have caused the unrealistic feeling to the participants who use actual CMC services. Incorporating mechanism to allow participants to reply and obtain responses from other users, creating more interactive environment, and allowing submission of free texts instead of choosing prewritten texts, are possible improvements.

4 Conclusion

The purpose of this study is to alleviate the aggression on Computer Mediated Communication services by introducing the attachment of titles based on the comments written by the users. The results indicate that the aggressivity of comments can be reduced. However, it is interesting that the time duration to formulate comments was unaffected.

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