http://www.jsebs.org
ISSN: 2288-3908

The Journal of Society for e-Business Studies
Vol.24, No.2, May 2019, pp.179-197
https://doi.org/10.7838/jsebs.2019.24.2.179

온라인 상의 적대적 행동에 정보과부하가 미치는 영향

Effects of Information Overload on Hostile Behaviors Online

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초 록

온라인 상에서의 사용자 행동에 대한 많은 연구가 있었지만 어떤 메커니즘에 의해 사용자들이 적대적인 행동을 하는지에 대해서는 밝혀진 바가 많지 않다. 이러한 점에서, 이 연구는 무엇이 사용자의 적대적인 행동을 야기하는지를 밝혀내고자 한다. 더 구체적으로는, 악성 댓글 같은 플레이밍(Flaming)과 지각된 위험, 익명성, 기대 감정 반응(Expected Emotional Reaction) 등의 인지와의 관계를 규명하고자 했다. 이러한 관계 여부를 확인하기 위해 설문조사가 이루어 졌고, 모든 변수들이 플레이밍과 유의한 관계가 있음을 확인했다. 또한 정보 과부하(Information Overload)가 지각된 위험과 플레이밍 사이에서 조절효과를 가진다는 것을 확인했다. 이러한 결과를 미루어 볼 때, 사용자들이 경험하는 정보 과부하를 줄이는 것은 온라인 커뮤니티를 건전하게 유지하는 방법일 것이라 할 수 있을 것이다.

ABSTRACT

Although there have been lots of studies about users' behaviors online, few have explored the mechanism of hostile behaviors. In this sense, this study aims at discovering what may elevate users' hostile behaviors. More specifically, we tried to find the relationship between flaming behavior and perception factors such as perceived risk, anonymity and expected emotional reaction.

A survey was conducted to investigate the relationship of the above variables. As a result, all these variables show significant effects on flaming, and information overload are found to act as a moderator. We carefully conclude that flaming in online community can be reduced by preventing information overload each user perceives.

키워드 : 악성댓글, 정보과부하, 공적 자기인식, 인지된 식별가능성, 정서적 사회적 실재감
Flaming, Information Overload, Public Self-Awareness, Perceived Identifiability, Affective Social Presence

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Received: 2019-04-11, Review completed: 2019-05-16, Accepted: 2019-05-27

1. Introduction

Unlike offline environment, online communities are characterized by distinctive characteristic, anonymity. This characteristic arose from the way individuals are identified in online environment. Nicknames or avatars instead of real identities are used to represent users in the online communities. Meaningless auto-generated codes are also used as an identifier. Such substitution of user's identity with virtual ones changes their self-concept and their identity perceived by others; they feel like being no one; users become unidentifiable and intractable in the environment. In other words, they become anonymous [33, 41]. Empirical evidence shows that people's online behavior changes in ananonymous environment. People are less restrained to their social norms and demonstrate uninhibited behaviors in an anonymous computer-mediated environment [33]. Online hostile behaviors such as extreme criticism and aggressive comments are the typical manifestation of the uninhibited behaviors [41].

It has been known that online hostile behaviors pose threat to online community by evoking anger, distrust and negative emotions among users [1]. In order to reduce such pests, it would be of value to explore motivations and factors influencing online hostile behavior.

Online hostile behavior has been studied so far in two-folded: one for personality and gender [41] and the other for the reasons of the hostile behaviors [1, 25, 26]. However, few studies have investigated the manageable factors in online environment to control hostile behavior.

This paper explores relationships between online hostile behaviors and perceptual factors such as perceived risk and anonymity. Then, from these relationships, we identify controllable factors of hostile behavior. Identifying controllable factors, we believe, can provide managerial insights to practitioners.

2. Literature Review

2.1 Flaming as a Hostile Behavior

Flaming is an expression of strong opinion in the form of extreme profanity, insults and hostile comments [10, 38]. Flaming is also known as the consequence of toxic online disinhibition, an uninhibited behavior which conflict harm on oneself and others [41]. As a manifestation of online toxic disinhibition, flaming can also be defined as an offensive mode of expression in online environment [1, 10].

Flaming has been studied in the way of exploring antecedents and motives of flaming. Most importantly, two main reasons were largely studied as an antecedent of flaming behaviors; Reduced social cues and Anonymity [1, 3, 16, 18, 20, 21, 25, 26, 41, 42]. Absence of identity and social cues such as social position indicators, non-verbal cues make people to participate in antinormative behaviors in online

environment [20, 21]. Moreover, according to previous research, social cues and anonymity have a stronger impact on preventing flaming behaviors than the accountability of punishment [7].

Another main concern was the demographics of flaming users. Gender [39, 40] or personal characteristics such as risk-taking propensity, sensation-seeking scale [2, 27] were found to affect flaming.

Lastly, others focused on the motivation of flaming behaviors. Alonzo and Aiken suggest-that people practice in flaming behaviors to gratify their needs or personal objectives in online environment [1]. Based on 'uses and gratifications theory', the study explored the relationship s between psychological variables and flaming motives.

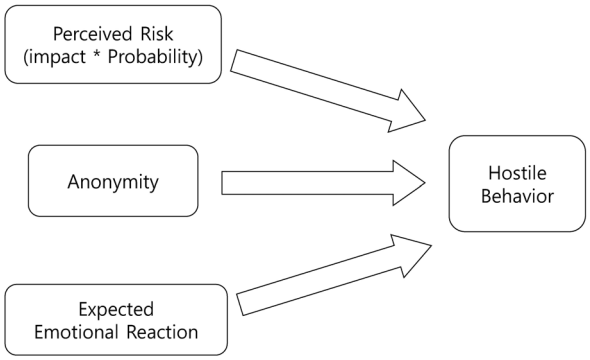
2.2 Model of Flaming

This study proposes a conceptual framework of hostile behavior with three overarching concepts perceived risk, anonymity, expected emotional reaction <Figure 1>. Perceived risk refers to the risk of hostile behavior perceived by the subject. To avoid risk, individuals may restrain their hostile behaviors.

Anonymity has been largely used as an important environmental factor of hostile behavior. Although anonymity can be viewed in various perspective, this study takes a perspective of perceived anonymity by individuals. Expected emotional reaction refers to a personal perception of how others will react to the persons' behavior. One reason why people demonstrate hostile behaviors could be enjoyment attained through watching others reaction. Thus, this factor may stimulate hostile behavior.

2.2.1 Perceived Risk

It is known that people are more sensitive to loss than to the same amount of gain. For this reason, people tend to avoid loss. This tendency is known as "loss aversion" [23]. Loss aversion will be more likely to occur when



〈Figure 1〉 Conceptual Framework

people can clearly identify the risk of their decision. Considering the loss may occur, people tend to control risk for the means of avoiding loss. By the same token, in online communication, people will make conscious decisions about their hostile behavior when it entails risk.

In our study, we have considered various possible risks existing when users demonstrate hostile behaviors, which is to be blamed or receiving severe penalties. Among those possibilities, in this study, risk is operationally defined as "damaged online social reputation."

In the general theory of risk management, risk is assessed in two dimensions; risk impact and risk probability. Risk impactis the amount of loss that the risk may cause, and Risk probability refers to the chance of loss may occur [15]. As the risk is defined as damaged online social reputation in this study, the risk impact would be the degree to which individuals consider their social status in the online community. Likewise, risk probability would be the likelihood of being identified. In the relationship between perceived risk and risk impact, risk probability seems to have moderation effect.

2.2.2 Anonymity

Anonymity has been believed to influence hostile behaviors by creating online disinhibition effect [1, 3, 18, 25, 26, 41, 42]. Online disinhibition effect refers to the phenomenon that people tend to demonstrate uninhibited behaviors in online environment [41]. Empirical evidence shows that anonymity plays a critical role in this phenomenon [38]. As users' behavior changes dramatically with this effect, online disinhibition effect is known to be one of the main characteristics of communication in online environment [24, 26].

Users engage in hostile behaviors when online disinhibition affect users in negative direction [41]. It can be inferred that anonymity also relates on hostile behaviors in online environment. Users tend to be more critical when they are not identifiable [17]. Moreover, users think their hostile behaviors are unaccountable in an anonymous environment. This may be followed by a high level of toxic disinhibition causing offensive and abusive behaviors [8, 9]. As a typical consequence of negative online disinhibition effect, flaming can be affected by anonymity.

2.2.3 Expected Emotional Reaction

According to a previous study, users participate in flaming behavior for fun or entertainment [1]. This motivation of flaming is triggered by watching others' reaction. Thus, expected emotional reaction is used as a major factor of flaming.

To assess the behavioral response of others, the emotional reaction can be used as an information input [31]. For the same reason, the expected emotional reaction can be referred to as the perception that the users in this online community would be easily affected by others' postings or replies. That is, low level of expected emotional reaction would mean the person

thinks that user's emotions in this online community are not affected easily by other's comments or postings. This may reduce people's motivation to address flaming behaviors.

As user's emotional reaction is related to the motivation of flaming, this study posits the expected emotional reaction as the main factor of flaming.

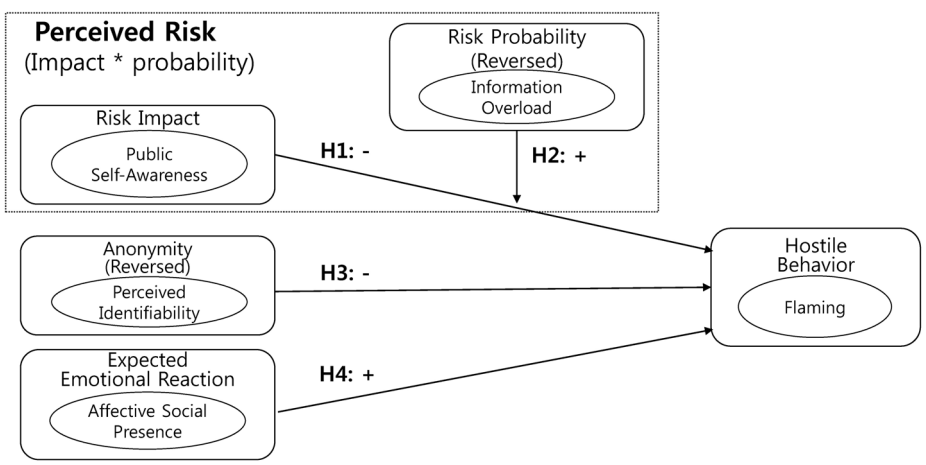
3. Research Methods

3.1 Research Model and Hypotheses

The research model of this study is presented in <Figure 2>. It is based on the conceptual framework. To construct a model of flaming, perceived risk, anonymity, and expected emotional reaction are used. As these variables are the conceptual construct, this study proposes the model containing measurable variables for three conceptual constructs and hypotheses of their relationship <Figure 2>.

Risk can be estimated by the product of risk impact and risk probability [15]. Risk impact is measured by using Public self-awareness and risk probability is measured by information overload. Information overload is commonly defined as the situation that the amount of information received exceeds the capacity of mental resource to process information [11, 36]. This phenomenon is mainly based on the limitations of processing capacity. Thus, too much information, even worse when it is complicated, leads to information overload. In the context of flaming, Information overload can be interpreted as a reversed proxy variable of risk probability.

Public self-awareness refers to the attention to oneself as a social being. This concept reflects the concern over being judged and evaluated by others in social situations [13]. The user



〈Figure 2〉 Research Model

with a lower level of public self-awareness would care less about their social standards and social evaluation. Conversely, users with a higher level of public self-awareness are more likely to control risk of damaged online social reputation when they are about to practice hostile behaviors. Once they assess the risk impact as high, they may not decide to practice in flaming behaviors due to loss aversion [23].

H1: Public self-awareness influences negatively on flaming.

This study employs information overload for measuring the probability of risk. More specifically, information overload as a conversational overload in computer-mediated communication is used in this study. Conversational overload occurs when too many messages are delivered so that the receiver cannot process and respond properly [19, 42]. In online communication, a person can receive multiple messages simultaneously. This may cause users to have communication load and may result in conversational overload [28]. By the same token, users may experience conversational overload when confronted with too many postings or replies.

Because information overload makes users incapable to process information properly, users can't find specific information easily under information overload. For the same reason, users may think that their flaming behavior, just like other behaviors in online communities, is hard to be revealed. In other words, under a high level of information overload, users may feel that their behaviors would not be discovered. This corresponds to the concept of risk probability. The higher users experience information overload, the lower they feel the risk of their behaviors will be discovered. For this reason, information overload can be used as a reversed proxy variable of risk probability.

The perceived risk can be assessed by multiplying risk impact and risk probability [15]. That is, perceived risk is an expected outcome of risk impact on the condition of risk probability. This relationship of variables can be interpreted as a moderating relationship, and this could be applied to the assessing process as well [4]. For those reasons, information overload would have a moderating effect on the relationship between risk impact and flaming behavior as a reversed variable of risk probability.

H2: Information overload positively moderates the relationship between public self-awareness and flaming.

Anonymity is employed as another conceptual construct of flaming behavior in this study. To operationally define and measure anonymity, this study uses perceived identifiability as a reversed variable. Perceived identifiability refers to the degree to which a person believes their behavior can be identified by others [33]. This also indicates the 'knowledge

of other group members', which comprises another dimension of anonymity [29, 33].

Perceived identifiability indicates the perceived chance to cause risk, not the actual probability. Thus, this variable does not directly relate to anonymity. When writing a post or reply on an anonymous bulletin board, for instance, most users would believe it is impossible to identify their behaviors. However, others may consider that some distinguishable habits or characteristics shown in their behaviors could make them identifiable. For those reasons, measuring anonymity by using perceived identifiability suits better than the real possibility to be identified.

Perceiving low level of identifiability is identical with perceiving low high of anonymity, which may intrigue users to behave flaming [3, 18, 41, 42].

H3: Perceived identifiability influences on flaming in a negative way.

Expected emotional reaction is another conceptual construct in this study. In order to operationalize and measure this construct, affective social presence is employed [31].

Affective social presence is defined as the extent to which an individual's emotional connection is affected by social interaction with the others in a virtual environment [5, 31]. Regarding that emotional response is related to the sensitivity of social presence, affective social presence could be used as an operational definition of social presence [37].

Empirical evidence suggests affective social presence has a positive effect on intrinsic motivations such as joy and fun in online community [31]. By the same token, affective social presence may positively affect flaming. For instance, people with high level of affective social presence would think other users in the online community will be affected easily by their flaming behaviors. Thus, this would foster flaming motivation [1].

H4: Affective social presence has a positive effect on flaming.

3.2 Measurement

Online survey was conducted to collect data. The survey consists of demographic information questionnaire and main questionnaire. The main questionnaire is composed of 16 items; two of that measured public self-awareness [33], four items measured perceived identifiability [33], five measured flaming [30], three measured affective social presence [5, 31], and two measured information overload. All the questions are answered in seven-point Likert scale.

The questionnaire used in this study is shown in <Table 1>. Participants are asked to imagine and answer about the online community site ABC that they visit most.

From the multiple attributes of information overload, this study measures information

overload in terms of perception. For instance, indicator IO1 is measured by the question, “In my online community ABC, because new postings appear frequently, my new posting tends to be got behind next page soon.” And indicator IO2 is measured by the question, “In my online

〈Table 1〉 Item Wordings

Variable	Definition	Item	Reference
Public Self-Awareness (PSA)	Attention to oneself as a social object	1. I usually was worried about making a good impression	Pinsonneault and Heppel [33], Ning Shen and Khalifa [31]
		2. I was concerned about what other people thought of me	
Affective Social Presence (ASP)	The extent to which a user's emotional connection aroused by virtual social interaction with the others.	1. The other individuals are influenced by my moods.	
		2. I am influenced by others' moods.	
		3. I think people in this forum affect each other's mood /emotional state.	
Perceived Identifiability (PI)	Degree to which people believe they can be identifiable in virtual community	1. I believed others could identify my comments	Pinsonneault and Heppel [33]
		2. I believed that group members did not know each other well enough to identify the authors of comments	
		3. I believed I had a distinguishing characteristic that allowed other group members to identify my comments	
		4. I believed it was possible to identify the origin of the comments based on the author's personal characteristics	
Information Overload (IO)	Perception that the extent to which amount of entered information exceeds one's process capability.	1. In my online community ABC, because new postings appear frequently, my new posting tends to be got behind next page soon	
		2. In my online community ABC, new replies tend to appear frequently and fast as like as even no one is attracted to my replies	
Flaming (FLA)	Flaming experiences	1. have flamed one or more times in comments on others' postings or replies	Moor et al. [30]
		2. flame regularly in comments on others' postings or replies	
		3. think flaming is just an honest way of expressing disagreement	
		4. think flaming is usually meant to be funny	
	Attitude toward flaming	5. I see flaming in comments, I find it amusing	

Note: after reliability and validity tests, FLA4, PI2 and ASP3 are removed.

community ABC, new replies tend to appear frequently and fast as like as even no one is attracted to my replies."

Risk impact and risk probability are multiplied to assess perceived risk. This exactly corresponds to the verifying process of moderating effect [4]. The multiplication of standardized variables (public self-awareness and information overload) will be the moderated variable.

3.3 Data Collection

Before collecting the data, a pilot test was conducted with 20 online community users. After receiving feedbacks about survey items, the data was collected through online. To represent the population better, samples were selected from an online panel service and data was collected from online community users in South Korea for 4 days. Users were instructed before participating in the survey. All users were asked for the screening question to check they have enough experience about posting and replying. After that question, users responded to the main questionnaire as thinking about their best online community. The collected data were analyzed with SPSS statistics software.

Through the online survey, 406 replies were collected and only 270 responses were completed. Among those 270 responses, three abnormal responses were removed, and the rest were used to test hypotheses. <Table 2> shows the demographic information of 267 records. The samples seem to be representable enough for the population of interest.

4. Results

4.1 Reliability and Validity Analysis

In this study, reliability was tested using Cronbach's alpha value. As shown in <Table 3>, all Cronbach's alpha value was greater than

〈Table 2〉 Demographics of Participants (N=267)

Demographics		Frequency	Percent (%)
Gender	Male	130	48.69
	Female	137	51.31
Age	Younger than 20	90	33.71
	20~29	77	28.84
	30~39	100	37.45
Education	Middle school or lower	21	7.87
	High school graduate	95	35.58
	Undergraduate	140	52.43
	Postgraduate or higher	11	4.12

〈Table 3〉 Reliability and Validity Analysis

Variable	Cronbach's Alpha	Rotated Component Matrix					
		Indicator	Component				
			1	2	3	4	5
Flaming	0.901	FLA1	0.869	-0.193	0.055	-0.03	-0.07
		FLA2	0.897	-0.264	0.05	0.009	0.009
		FLA3	0.804	-0.054	0.085	0.126	0.066
		FLA5	0.871	-0.139	0.104	-0.027	0.031
Perceived Identifiability	0.842	PI1	-0.142	0.851	0.043	-0.057	-0.199
		PI3	-0.203	0.837	-0.141	-0.02	-0.078
		PI4	-0.228	0.805	-0.231	-0.042	-0.119
Affective Social Presence	0.817	ASP1	0.08	-0.183	0.902	0.099	0.063
		ASP2	0.156	-0.071	0.839	0.194	0.285
Information Overload	0.772	IO2	0.084	-0.003	0.157	0.889	0.043
		IO1	-0.03	-0.086	0.087	0.886	0.123
Public Self-Awareness	0.743	PSA1	-0.099	-0.203	0.094	0.085	0.863
		PSA2	0.112	-0.125	0.198	0.09	0.85

the recommended threshold value of 0.7 [32]. This demonstrates the construct reliability was acceptable.

Validity was also tested through the exploratory factor analysis. Principal component analysis was used to extract factors and varimax was employed for rotation method. Five factors were extracted explaining 80.313% of the total variance. The factor loadings of indicators for each intended construct was greater than the recommended value of 0.5. This indicates strong convergent validity [14]. As each indicator showed the highest factor loading on its intended construct, the discriminant validity was also verified. However, some indicators (FLA4, PI2, ASP3) had been removed through reliability and validity test.

The mean and standard deviation of each variable is shown in <Table 4>. As the responses were collected through an online survey and questions about flaming behavior are negative questions, social desirability bias

〈Table 4〉 Descriptive Statistics

Variable	Mean	Std. Deviation	N
Flaming	2.486	1.504	267
Affective Social Presence	4.226	1.238	267
Perceived Identifiability	4.297	1.342	267
Public Self-Awareness	4.698	1.246	267
Information Overload	4.797	1.292	267

could occur for these questions. Flaming variable showed the mean of 2.487 and skewness of 0.966 <Table 4>. With these statistics, the null hypothesis of Shapiro-Wilk test was not able to be rejected. That is, responses regarding flaming was skewed.

However, the measurement items about flaming include not only opinion about flaming but also experiences about flaming <Table 1>. Because negative behavior occurs less frequently than neutral or positive behaviors, hostile behavior tends to occur less.

4.2 Hypothesis Tests

Multiple regression analysis is used to analyze data for testing hypotheses. Before conducting the analysis, multicollinearity must be concerned. Correlation of each variable waw calculated to detect multicollinearity <Table 5>. All correlation between independent variables were less than 0.5 indicating no correlation between independent variables. In addition, variance inflation factor (VIF) was calculated to find multicollinearity. As seen the <Table 6>, the highest VIF value is 1.300, which is much less than the recommended threshold 10. Thus, there seems to be no multicollinearity.

Considering the moderation effect test (H2), a hierarchical regression analysis was conducted. The result of hypothesis tests was shown in <Table 6> and <Figure 3>. Model 1 shows the direct effect size of independent variables and moderated variable, which shows significant model fit ($F = 15.123$, $p < 0.000$). It demonstrates that H1, H3, and H4 are supported by our data. In Model 2, the moderated variable was added to test the moderating effect. Model 2 also showed significant model fit ($F = 14.209$, $p < 0.000$) and significant explanation of dependent variable (adj. r square = 0.199).

The moderated variable was calculated by the product of public self-awareness and information overload. The result shows that the moderated variable significantly affects flaming [4]. Moreover, the change of R square between Model 1 and Model 2 was significant indicating the moderating effect size is also significant. Thus, H2 was supported. However, information overload (moderator variable) has

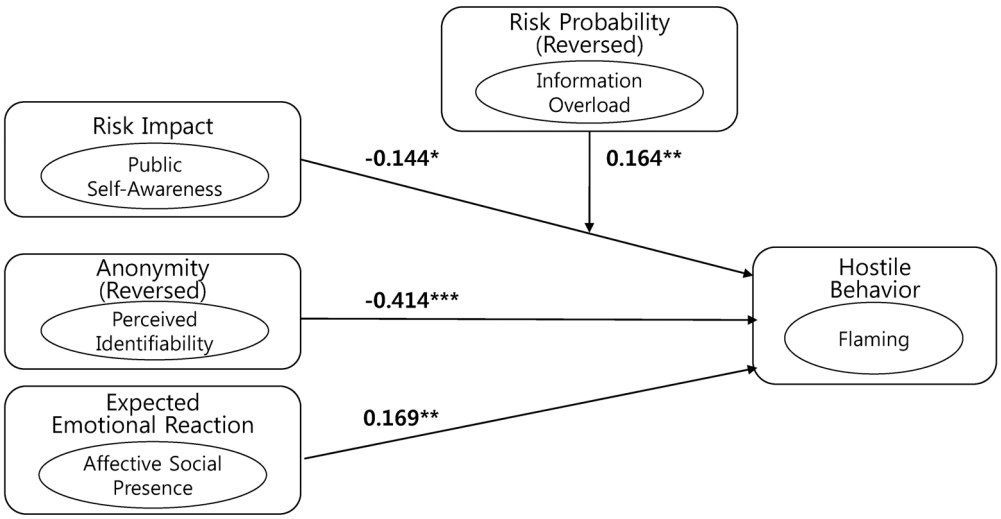
〈Table 5〉 Correlation Matrix (2-tailed)

	FLA	ASP	PI	PSA	IO	PSAxIO
Flaming	1					
Affective Social Presence	0.238***	1				
Perceived Identifiability	-0.400***	-0.310***	1			
Public Self-Awareness	0.068	0.378***	-0.346***	1		
Information Overload	0.072	0.313***	-0.127*	0.219***	1	
PSAxIO	0.104	-0.055	0.117	0.012	-0.084	1

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

no significant effect on flaming in Model 2. This indicates that information overload fully moderates the relationship between public self-awareness and flaming.

<Figure 4> graphically shows the interaction effect of information overload. The direction of the relationship between public self-awareness and flaming (H1) is reversed when users perceive the information overload as high.



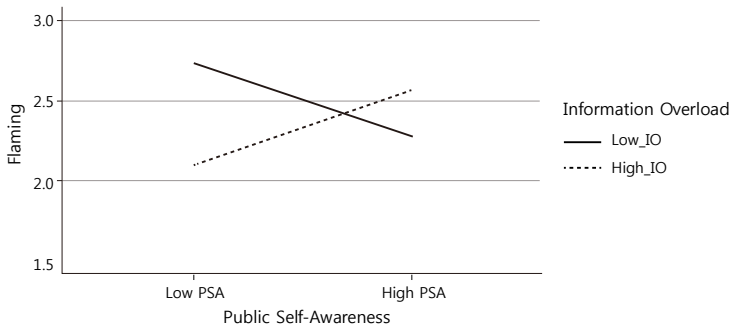
Note: $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

〈Figure 3〉 Result

〈Table 6〉 Result of Hypothesis Tests

	Model1				Model2			
	Std Error	Beta	t-value	VIF	Std Error	Beta	t-value	VIF
(Constant)	0.62	-	6.892	-	0.612	-	7.058	-
ASP	0.077	0.165**	2.607	1.299	0.076	0.169**	2.702	1.3
PI	0.068	0.393***	-6.485	1.187	0.067	0.414***	-6.884	1.203
PSA	0.076	-0.13*	-2.079	1.267	0.075	-0.144*	-2.321	1.273
IO	0.069	-0.001	-0.02	1.123	0.068	0.012	0.203	1.13
PSAxIO	-	-	-	-	0.088	0.164**	2.96	1.024
R^2	0.188				0.214			
Adj.R^2	0.175				0.199			
ΔR^2	-				0.026			
F	15.123***				8.762**			

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$, Dependent variable: Flaming.



〈Figure 4〉 Moderating Effect

Since the data were gathered through an online survey only, the possibility of common method bias exists. Just like all other self-reported data, consistency or social desirability might distort the responses [34]. To consider this problem, Harman's single factor test was conducted. The result shows that a single factor explained 33.847% of the total variance, which was less than the recommended threshold, 50% [34]. This means that common method bias has not significantly influenced the collected data.

5. Conclusion and Limitation

This study aims to find a manageable variable about flaming behaviors. Three conceptual constructs (perceived risk, anonymity, and expected emotional reaction) were studied and used to explain the mechanism of flaming behaviors.

The result shows several findings. With regards to the perceived risk factors, public self-awareness (as a risk impact) has a negative effect on flaming. In addition, information overload (as a reversed risk probability) fully moderates the relationship between public self-awareness and flaming. This implies that an individual's perceived risk and their hostile behavior can be moderated by controlling the level of information overload. This demonstrates the importance of managing information overload in online community.

To conclude, since the public self-awareness and information overload have a strong impact on flaming behavior and they are controllable, designer and administrator of online community should take account of this issue. First, revealing users' online social status such as peer evaluations of their posts, previous IDs or etc. would be effective for users to increase the risk impact of their flaming behaviors. These functions could be easily added to the design of a community site or the current system. Second, designing the interface of online community site to prevent information overload would decrease the flaming behaviors.

The method of designing interface to avoid information overload is still to be studied, but the key is not to provide too many information at a time.

Regarding anonymity, perceived identifiability has a significant negative effect on flaming. This result corresponds to the previous studies showing anonymity is a key factor of flaming. However, this study focuses on the personal perception of anonymity. This seems to be more valid since users may perceive a different level of anonymity in the same situation. For this reason, this study claims that personal perception of anonymity will explain better than objective anonymity.

As for the expected emotional reaction factors, affective social presence is found to significantly influence on flaming. Like some former studies, this study also investigates what motivates flaming. Reviewed previous studies, fun is revealed as a significant motivation of flaming and some psychological variables are found which affect that motivation. But, instead of using those variables, this study tried affective social presence as another psychological variable, and it is verified.

This study raises several implications. First, this study employs three conceptual constructs to explore flaming mechanism by using measurable variables which only a few studies used before. Especially, perceived risk is used as a key factor of this study. Moreover, unlike the previous studies, this study measured perceived risk based on the risk assessment process. As the method of assessing risk is similar to the moderating effect, this study could bring these concepts to research model properly.

Moreover, this study reveals the importance of information overload and its moderating role to prevent the online community from flaming. According to the result of this study, a high level of information overload decreases the perceived risk and its suppression effect on flaming. In other words, if online community site manager did not control information overload properly, then users in that site might feel free from risk and flame more than before. Therefore, preventing information overload environment is required for reducing flaming behaviors.

Although all the hypotheses were statistically supported, the study showed several limitations. One of the limitations would be that the study has been conducted by only self-report data. Especially, information overload was measured based on an individual's experience. This could cause several problems and limitations. And social desirability biases have caused the skewness of data about flaming. Another limitation of this study is that the data of users above 40 years old was not collected. Although they are not most users in online communities, this might bring another bias.

In future research, it could have better and more interesting results with data collected from various information sources such as user logs or secondary data. And by gathering addi-

tional data from online community sites which have more flamers would help the data skewness problem. Lastly, focusing on the special domain of online communities may help to discover the better explanation of online hostile behaviors.

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