Mechanisms Underlying the Effect of Passive Social Network Use (PSNU) on Subjective Well-being (SWB): The Mediating Role of Ruminative Thinking

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Abstract: It is worth noting that the widespread popularity of smartphones has not only brought convenience to people, but also the SWB problem that comes with the PSNU has become a growing concern. In a survey of smartphone user groups, it was found that university students are the main force behind smartphone usage. Aiming to explore how the PSNU affects the perception of SWB through reflective thinking as well as to further understand the underlying mechanisms, this study used a questionnaire to survey 321 university students. The results found that: (1) There were significant negative predictive effects of passively using social network sites on SWB. (2) The passive usage of social network sites negatively affects university students' SWB by increasing their personal ruminative thinking. (3) PSNU also predicted life satisfaction through two mediating chains between ruminative thinking and emotions. This is achieved through a mediating chain between ruminative thinking and positive emotions as well as through a mediating chain between ruminative thinking and negative emotions. This study offers more proof of the PSNU has on college students' SWB and offers a solid theoretical framework for future research in cyber-psychology and, consequently, for effective behavioral education.

Keywords: Passive social network use, Ruminative thinking, SWB of individual, Emotion, Life satisfaction

1. Introduction

1.1. Background

It is significant that there are already over 4 billion smartphone users worldwide and 854 million cell phone users in China, making cell phones an essential part of people's life. This is owing to the simplicity and affordability of smartphones. The majority of smartphone users in China are college students, who on average use their devices for a significant amount of each day. Many students use

their phones for academic and study purposes in addition to their daily lives. The phenomenon that college students can freely use the Internet to find information, socialize, and make payments while observing and maintaining low contact with other users in the process of using the Internet, i.e., passive use of the Internet, is starting to receive more and more public attention as a result of the widespread use and popularity of smartphones. It has been shown that this PSNU without commenting and connecting with others can have many negative consequences on the SWB of the user, leading to negative emotions including depression, jealousy and ruminative thinking on one hand, while on the other hand leading to lower levels of life satisfaction [1]. Furthermore, according to Chen et al., several factors are mediating the link between the PSNU and SWB, including known levels of jealousy and self-esteem [2]. Beyond this, however, there is still a lack of research on how PSNU affects SWB in more dimensions and the mechanisms underlying the relationship. Therefore, the present study aims to address this issue.

1.2. Rumination as a Mediator

Rumination is a way of responding to pain and refers to the passive engagement in a process of constant repetitive cycles of negative thinking and constant reflection on the causes of certain outcomes [3]. According to Nolen-Hoeksema, although rumination can be defined broadly as the insistence on what one thinks and feels, the maladaptive cognitive style it entails is still a significant outcome, including despair, pessimism, neuroticism, self-criticism and so on [3]. Moreover, based on the above-mentioned variety of negative emotions brought about by rumination, Harrington and Loffredo further confirmed a prediction that rumination would be the strongest negative predictor of SWB through the great neuroticism tendency reflected in the rumination scale [4]. Thus these research studies provide strong evidence that rumination negatively predicts SWB.

Rumination is associated with social media use. Tran and Joormann also stated that during the browsing of social networking sites for instance Facebook, individuals were at great risk of suffering negative effects from rumination [5]. This is for reasons of the fact that social networking sites tend to bring positive bias information, and the contrast effect from this can cause passive users who initially do not comment to further reduce their level of self-evaluation, causing them to continuously think about the symptoms and causes of distress. Thus, Davila et al. concluded that individuals who use social networking sites more, have more negative and less positive interactions score higher on rumination [6].

Therefore, it was hypothesized that PSNU would lead to more individual rumination, which in turn leads to reduced SWB. That is to say, rumination may mediate the relation of passive use of social networks to SWB.

1.3. Mechanisms Underlying PSNU and SWB

It is important that emotions and life satisfaction reflect the emotional and cognitive elements of an individual's SWB, respectively [1]. Being two components of SWB, the two are closely linked. It has been shown that emotion is an important indicator of life satisfaction and that life satisfaction does not in turn influence emotion, with negative emotions negatively predicting life satisfaction and positive emotions positively predicting life satisfaction [1]. Selby et al. also noted that in the emotional cascade, the tendency to mull over negative thoughts increases the level of negative emotions and lowers the level of positive emotions, meaning that ruminating negatively predicts the level of positive emotions and actively predicts the level of negative emotions [7]. Tran and Joormann also showed that PSNU has an impact on emotion, with people who rely on Facebook and use it in a passive setting more likely to experience a decline in a positive mood, negatively predicting life satisfaction [5]. Rumination and passive usage of Facebook were used by the study to illustrate the

relationship between the two in section 1.2, while Felsman et al. looked into the association between rumination and life satisfaction, finding that there was a negative correlation between the two [8]. Therefore, based on the development of the relation between variables, it is clearly that emotions are likely to play a mediating role in rumination about life satisfaction. Considering the relationships between PSNU, rumination, emotions and life satisfaction together, ruminations and emotions can play a chain mediation role between passive use of the social networking site and life satisfaction.

1.4. This Research

There has not yet been much research on the mechanisms underlying the effects of PSNU on SWB. In order to close this gap, this study's goal is to introduce ruminative thinking as a mediating variable to gain a better understanding of inherent mechanisms in the influence among independent and dependent variables. The issue at hand is: What are the precise underpinning mechanisms of PSNU's impacts and how does ruminative thinking mediate their effects on SWB? There are three main hypotheses in this study. The first is that passive social networking site use is a poor predictor of SWB. According to the second theory, correlations between the use of passive social networks and SWB are mediated through ruminative thinking. The third theory holds that PSNU can influence both ruminative thinking and emotions via two chains of mediating effects.

2. Method

2.1. Participants

The research collected data online through "Questionnaire Star" and a whole of 321 feedback forms were returned. After sorting and eliminating invalid data copies, 303 valid data were acquired, yielding a 94.39% effective rate. There were 143 males (47.2%) and 160 females (52.8%); 42 freshmen (13.9%), 88 sophomores (29.0%), 75 juniors (24.8%); 50 seniors (16.5%), 42 postgraduates (13.8%); and 6 doctoral students (1.9%). The subjects ranged in age from 16 to 27 years old. (M = 21.38; SD = 2.04).

2.2. Materials

2.2.1. PSNU

The passive use component of the subjective and Ding-developed questionnaire on social network use (SNU) was chosen to have four items [9]. A 5-point scale was used to score the survey, with 1 representing "never" and 5 representing "frequently" (always). In this study, the Cronbach's alpha coefficient for the questionnaire was 0.81.

2.2.2. Rumination Scale

Levels of rumination were assessed using the Rumination Scale, as modified by Treynor et al. (2003) [10]. The scale has 10 items total, 10 items in each of the two dimensions of contemplation and introspective rumination, and 5 items in each dimension. The scale is rated on a scale of 1 (never) to 4, with 4 being the highest score possible (always). The final score is the average score of all items. The level of ruminating increases as the score rises. The scale's alpha coefficient in this study is 0.82.

2.2.3. Subjective Well-being (SWB)

SWB consists of two scales: the Satisfaction with Life and Positive Negative Affect. The perceived elements of SWB were assessed using the five-item Satisfaction with Life Scale (SWLS) [11]. For

instance, on a scale of 1 (strongly disagree) to 7 (mostly agree), rate the statement "My life is near to my ideal in most areas" (strongly agree). The Cronbach alpha coefficient for this scale was 0.84 in this study, and a higher total score suggests a better level of overall life satisfaction.

The authors used the Affective Balance Scale (which was revised by Chen and Zhang from Bradburn) to measure Positive and negative affect [12]. This 14-question questionnaire consists of two dimensions: positive affect (PA) which has 8 questions and negative emotions (NA) which has 6 questions. The participant rates his or her own mood over the previous month on a 4-point scale, with 1 representing "not present" and 4 representing "frequently present.". Scores that are higher reflect recent happy or negative affect. The happy and negative mood subscales have Cronbach's alpha coefficients of 0.79 and 0.85, respectively. The calculation method of SWB is: add standardized life satisfaction and positive emotion scores, and then subtract standardized negative scores, according to previous research [13].

2.3. Data Processing

Firstly, the data were subjected to descriptive statistics and correlation studies using SPSS 23.0. Second, the Hayes SPSS macro program PROCESS and the bias-corrected percentile Bootstrap methodology were used to assess the mediation hypothesis. To estimate the 95% confidence intervals for the mediation effect, 5000 Bootstrap samples were used. The effect was significant if the confidence interval did not contain zero.

2.4. Common Method Biases

The authors used Harman one-way test to test common method bias [14]. On each of the four study variables' question items, an exploratory factor analysis was done. According to the findings, six factors with characteristic roots bigger than one were examined, and the first factor's variance explanation was found to be 30.39%, which was below the 40% critical level. Therefore, it can be said that this study is not subject to significant common method bias.

3. Results

3.1. Descriptive Analysis

As shown in Table 1, Rumination and PSNU had a significant and beneficial relationship (r = .33, p< .01). SWB was significantly and negatively associated with both rumination and passive social networking site use (r = - .53, p< .01; r = - .56, p< .01).

Table1: Descriptive Analysis and Correlation Analysis Outcomes.

Variables	M	SD	1	2	3
1 PSNSU	2.72	.96	1		
2 Rumination	2.50	.57	.33**	2	
3 SWB	- .00	2.55	- .56**	- .53**	1

Note. N = 303.
*p < .05. **p < .01. ***p < .001

3.2. Testing for Mediation Effect

The authors expected that passive SNSU would indirectly affect individuals' SWB through rumination. The findings of the regression results are presented in Table 2. Passive SNSU negatively predicts SWB of individual (β = -1.13, p < .001), positively predicts rumination (β = .20, p < .001); Rumination negatively predicts SWB (β= -1.75, p < .001). The outcomes are presented in Figure 1 and Table 3. The mediating effect of rumination was significant, with an effect value of -1.75.

Table2: Analyzing the mediating role of PSNU and SWB.

Predictive variables	Model 1 (outcome variable：Rumination)			Model 2 (outcome variable： SWB)		
	β	t	95%CI	β	t	95%CI
PSNSU	.20	6.12***	[.13, .26]	-1.13	-9.38***	[-1.38, - .89]
Rumination				-1.75	-8.53***	[-2.19,-1.31]
R2		.11			.45	
F		37.50***			120.33***	

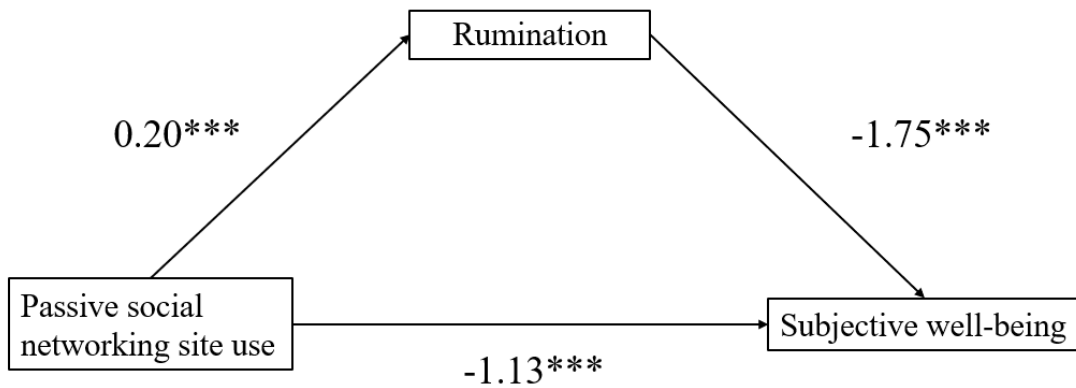Note. N = 303. * p <0 .05. **p < 0.01. ***p < 0.001

Figure1： Partial Mediation of Rumination in PSNU and SWB.

Table3: Decomposition of A Total, Direct and Mediated effects.

	Effect	Boot SE	Boot LLCI	Boot ULCI	Percentage of effect
Mediated effect	- .34	.02	- .19	- .09	23.13%
Direct effects	-1.13	.13	-1.38	- .90	76.87%
Total effect	-1.47	.13	-1.72	-1.23	

3.3. Testing for Chain Mediating Effect

The results of the descriptive statistics of satisfaction with life for the cognitive dimension of SWB are shown in Table 4. Positive affect (PA) and negative affect (NA)for the emotional dimension and the results of the correlation analysis with the independent variable passive SNSU and the mediating variable rumination are also shown in Table 4. Statistics showed a statistically significant positive correlation between PSNU and ruminant reaction (r = .33, p < .01), significantly negatively correlated with positive emotion and life satisfaction   (r = - .46, p < .01; r = - .36, p < .01), and positively correlated with negative emotion (r = .60, p < .01); positive emotions and life satisfaction were significantly inversely linked with meditation (r = - .29, p < .01; r = - .42, p < .01), and were significantly and negatively correlated with positive emotions (r = - .29, p < .01; r = - .42, p < .01) and negative emotions   (r = .65, p < .01); Life satisfaction is considerably and favorably connected with positive emotions (r = .62, p < .01); The results showed that the more negative emotions a person had, the less satisfied he was with his life (r = - .60, p < .01).

Table4: Results of Descriptive Statistics and Correlation analysis of Cognitive and Emotional Dimensions of SWB with Independent and Mediating Variables.

	M	SD	1	2	3	4	5
1PSNSU	2.72	.96	1				
2 Rumination	2.50	.57	.33**	1			
3 PA	3.17	.50	- .46**	- .29**	1		
4 NA	2.34	.73	.60**	.65**	- .55**	1	
5 SWL	4.48	1.28	- .36**	- .42**	.62**	- .60**	1

Note. N = 303. SWL = satisfaction with life. *p < .05. **p < .01. ***p < .001.

Table5: Bootstrap 95% Confidence Interval for Indirect Pathways of Rumination and Positive Affect.

Indirect path	Effect value	BootLLCL	BootULCI
PSNSU→Rumination→SWL	- .12	- .17	- .07
PSNSU→PA→SWL	- .29	- .38	- .21
PSNSU→Rumination→PA→SWL	- .04	- .07	- .01

Table6: Bootstrap 95% confidence interval for Indirect Pathways of Rumination and Negative Affect.

Indirect path	Effect value	BootLLCI	BootULCI
PSNSU→ Rumination→ SWL	- .04	- .10	.02
PSNSU→NA→SWL	- .29	- .41	- .19
PSNSU→ Rumination →NA →SWL	- .11	- .16	- .07

The authors assumed that PSNU would have an impact on satisfaction with life through a chain-mediated pathway of rumination and positive/negative affect. Rumination and positive/negative affect were employed as mediating variables in a chain mediation model that the authors created using Model 6 in the SPSS macro. The results are presented in Tables 5 and Table 6. PSNU positively predicted rumination, rumination negatively predicted positive affect, and positive affect positively predicted life satisfaction, but the direct effect of PSNU on life satisfaction was not significant; similarly, PSNU positively predicted rumination, rumination positively predicted negative affect, and negative affect negatively predicted life satisfaction, but the direct effect of PSNU on life satisfaction was not significant. In conclusion, the relationship between the PSNU and life satisfaction was completely mediated by rumination and emotions.
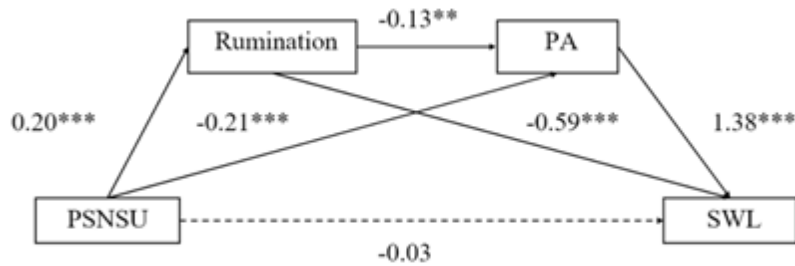
Figure2： Chain mediation of Rumination and Positive Affect.

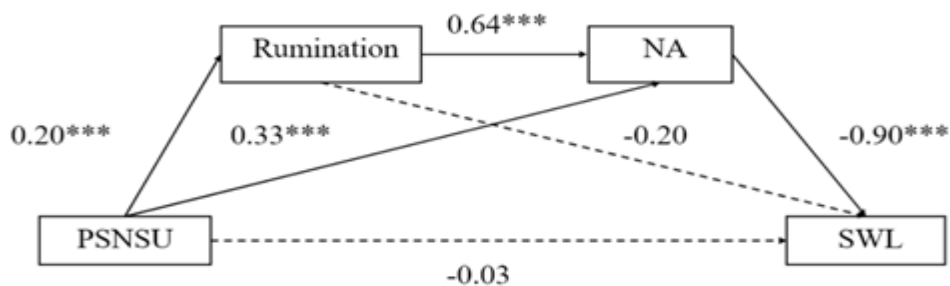Note. *p <0.05, **p <0 .01, ***p < 0.001

Figure3： Chain Mediation of Rumination and Negative Affect.

Note. SWL = Satisfaction with Life. *p < .05. **p < .01. ***p < .001

According to the chain mediation model plots in Figures 2 and 3, PSNU strongly predicted rumination (β = .20, p < .001), whereas rumination significantly predicted negative affect (β = .64, p < 0.001), life satisfaction (β = - .59, p < 0.001), and positive affect (β = - .13, p < 0.001). There was significant positive prediction of positive emotions (β = 1.38, p < 0.001) and significant negative prediction of negative emotions (β = - .90, p < .001) for life satisfaction. PSNSU significantly negatively predicted positive emotions (β = - .21, p < .001) and significantly positively predicted negative emotions (β = .33, p < .001). The direct predictive effect of PSNU on life satisfaction (β = - .03, p > .05) was not significant. However, rumination and positive emotions mediated between PSNU and life satisfaction with a mediating effect value of -0.04, namely, PSNU significantly affected life satisfaction by increasing rumination and decreasing positive emotions among university students; rumination and negative emotions also mediated between PSNU and life satisfaction with a mediating effect value of - .11, namely, PSNU significantly and negatively predicted life satisfaction by increasing and increasing negative emotions in college students.

4. Discussions

The passive using of social websites has a negative predictive effect on SWB. The use of SNU reduces the SWB of individuals, and when individuals only browse others' life status in social networks without directly participating, individuals are prone to jealousy as a result of the upstream comparison, which leads to a decrease in SWB. PSNU can positively predict anxiety levels and depression levels in individuals. Further research found that PSNU decreased the level of SWB cognitive-perception dimension of life satisfaction by exacerbating individuals' negative emotional experiences. PSNU

reduced university students' SWB by enhancing individuals' level of ruminative thinking. Consistent with expectations, PSNU positively predicted ruminative thinking. Individuals who used PSNU more frequently also had higher levels of ruminative thinking [15]. Regurgitated thinking is a way of coping when individuals face negative life events by repeatedly thinking about the negative events without actually solving the problem [11]. The stress-response model of ruminative thinking suggests that ruminative thinking is more likely to be activated after experiencing a stressful event [16]. The dynamics presented by individuals in social media will be embellished to a certain extent, thus creating a "positive bias" that magnifies the advantages of others or friends and making individuals tend to compare themselves with others and feel inferior to them, resulting in a lower sense of SWB. Regurgitated thinking negatively predicts college students' SWB, which is consistent with Wang et al.'s findings that regurgitated thinking negatively affects SWB [17]. The present study further explored the mechanisms underlying its effects and found that ruminative thinking reduces life satisfaction by enhancing individuals' negative emotions. Ruminative thinking, which is not problem-solving oriented, but simply a way of coping by repeatedly thinking about the "threat" of negative events, their causes and possible consequences, increases the likelihood that negative life events will induce negative emotions. Ruminative thinking has also been shown to be an important influence on many negative emotions. Ruminative thinking reduces the level of SWB (life satisfaction) in the cognitive dimension of college students by affecting individuals' negative emotions.

The use of passive social networking sites does not directly predict the perceived dimensions of SWB, for example, life satisfaction. However, passive social networking site use can predict life satisfaction in individual college students through two chains of mediated effects of ruminative thinking and positive/negative emotions. This study found that ruminative thinking predicted negative emotions positively and predicted positive emotions and life satisfaction negatively, further confirming the key mediating role of ruminative thinking between passive social network site use and life satisfaction. That is, passive social network site use does not directly affect life satisfaction but has to be mediated through ruminative thinking. Life gratification is the cognitive assessment of a person's life, whereas PSNU behavior is an information browsing behavior that may not affect an individual's specific cognitive evaluation of his or her life if the individual is not induced by the information to develop ruminative thinking. As previous research has found, PSNU is an indirect predictor of life satisfaction through mediators [18].

Ruminative thinking can mediate between PSNU and life satisfaction not only alone, but also together with positive and negative emotions. The interlocking mediating role of ruminative thinking and emotions is consistent with both the study of ruminative thinking and emotions and the study of emotions and life satisfaction [19, 20]. It also combines these two studies and draws connections between them and PSNU behaviors so as to provide a thorough explanation of how PSNU affects life satisfaction through ruminative thinking and to further clarify the underlying mechanisms by which PSNU affects life satisfaction.

This study focuses on how passive social network site use affects university student groups' SWB in both cognitive and emotional dimension, and its mechanisms of action. It contributes to a deeper understanding of the mechanisms that negatively affect PSNU on the emotional and cognitive levels of college students and provides targeted recommendations for future intervention counseling efforts. It is worth noting that changing the way individuals react to and perceive negative emotions is an effective way to reduce individual rumination. The combination of inhibition control training and positive emotion training can effectively improve college students' cognitive emotion regulation and help promote their psychological well-being. Therefore, in order to address the negative outcomes of passive social networking site use among university students, it is important to focus on training their emotional cognition and regulation skills during the education process in order to prevent and mitigate this problematic behavior.

Through a series of data processing and analysis and expansion of the direction of previous studies, this study gives three conclusions.

(1) PSNU plays a significant negative on SWB, which is the same as research hypothesis 1.
(2) PSNU negatively affects university students' SWB by increasing individuals' ruminative thinking. Research hypothesis 2 holds.

(3) PSNU also predicted life satisfaction through two chains of mediation between ruminative thinking and emotions: through the chain of mediation between ruminative thinking and positive emotions; and through the chain of mediation between ruminative thinking and negative emotions. Research hypothesis 3 holds.

5.   Conclusion

This study can provide useful insights for colleges to maintain and enhance their SWB in the era of rapid Internet development. PSNU can induce regurgitated thinking, which may affect the emotional experience and life satisfaction. Therefore, individuals can consciously control their PSNU behavior by not frequently browsing friends' updates and passively receiving "positive images" presented by others on social media. Regurgitated thinking is an important predictor of PSNU for emotional and life satisfaction. Ruminative thinking is an important mediator of passive social networking site use in predicting mood and life satisfaction. This suggests to educators that reducing individual college students' ruminative thinking may help reduce individuals' negative emotional experiences and positively increase individual college students' life satisfaction. Mental health counseling for college students should encourage them to take direct action to solve problems and reduce their negative emotions, rather than passively and repeatedly thinking over the causes, symptoms and negative emotions that lead to results.

The variable "upward social comparison," which has been demonstrated in prior studies to be a significant mediating variable in the relationship between the two, is frequently closely related to research on the SWB of PSNU. Possibly in the future, researchers will continue to investigate how upward social comparison and ruminative cognition act as mediating elements between SWB and PSNU. This will make it easier for us to completely comprehend the complex mechanisms underlying how PSNU impacts SWB.

However, there are many areas for improvement in this study. Firstly, self-reporting of the scale was used to gather the study's data by university students, and although no serious common method bias in the data, it may have some influence on the results, and multiple reports should be used for data collection in the future. Second, this study uses a cross-sectional questionnaire and does not incorporate other types of research, which does not strictly prove causality. A follow-up study could adopt an experimental design with relatively strict control conditions or introduce actual Internet use situations into the experimental design in combination with the questionnaire; alternatively, a long-term study might be carried out to delve deeper into the connection between Internet use for passive purposes and SWB, a longitudinal study could be carried out.

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